2006

Evidence History, the New Trace Evidence, and Rumblings in the Future of Proof

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Publication: *Ohio State Journal of Criminal Law*

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I. INTRODUCTION

This paper is in two parts. The first part is about developments in the rules of evidence and particularly about developments in the Federal Rules of Evidence, which have had a major impact on evidence rules in many states. This part turns out to be largely about the past because my sense is that the impact of changes in the formal rules of evidence, which were substantial, are largely historic. In one area, however, significant future changes in the formal rules seem possible: those that may be made as a result of the Supreme Court's decision in *Crawford v. Washington*,[1] which dramatically changed confrontation and may unleash hearsay reformulation.

The second part deals with my sense that technological and scientific advances may have a dramatic impact in altering the way cases, particularly criminal cases, are proved and evaluated in the future. For example, the development and proliferation of a new type of "trace evidence"—electronic "trace evidence"—is providing dispositive proof in a larger and larger group of cases. As jurors come to understand such dispositive proof exists in many cases, they may come to expect it in all, potentially changing how proof in criminal cases is evaluated. Of course, these possibilities—these rumblings in the future of proof—are speculative. However, there are reasons at least to suspect that, as a result of the accumulation of events brought on by scientific and technological developments, important changes both in the type of evidence offered and the way it is evaluated are beginning to occur that differ in kind from the past.

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[1] 541 U.S. 36 (2004).

II. THE FEDERAL RULES OF EVIDENCE—PRIMARILY AN EXAMINATION OF THE PAST

A. *The Major Event of Developing a National Model for Evidence Rules*

Prior to the Federal Rules of Evidence, which were enacted in 1975, efforts at evidence rulemaking had been largely unsuccessful.[2] The first major effort was by the Commonwealth Fund, whose report was published in 1927.[3] It was reformist, claimed to be empirically based, and was designed to enhance the control of trial judges and curtail the power of lawyers in what it described as a scientific search for the truth. The report had little effect, except that it influenced the development of the modern business records exception to the hearsay rule.

In 1939, the American Law Institute began its project to create a Model Code of Evidence. Professor Edmund Morgan was its Reporter. This proposal, which was published in 1942,[4] went nowhere, much like the Commonwealth Fund Report before it. One explanation was that it put too much discretion in the hands of trial judges, but overall the explanation for its lack of impact was the poor salesmanship of Professor Morgan. He tended to challenge and frighten the bar and bench, presenting the evidence proposal as just a part of a larger reform effort.[5] Professor Eileen Scallen suggests that Morgan failed to understand the relatively conservative nature of lawyers when it comes to trial procedures.[6]

The Model Code did become the basis of the effort by the Commissioners of National Conference on Uniform State Laws to draft Uniform State Laws on Evidence. Significantly, however, the Commissioners redirected the goal toward "acceptability and uniformity," rather than reform.[7] The first set of Uniform Evidence Rules was issued in 1953 with modest effect, being adopted only in Kansas, New Jersey, and Utah.[8]

There seemed to be a catch-22 to efforts to create and enact new evidence rules. If they made no real changes, the reaction was: Why adopt them? On the other hand, if they changed the law, some group of lawyers who had an interest harmed by the proposal rose up in opposition. Uniformity of rules of evidence

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[2] *See generally* 21 CHARLES ALAN WRIGHT & KENNETH W. GRAHAM, FEDERAL PRACTICE AND PROCEDURE: EVIDENCE §§ 5005–5006 (1977) (detailing evidentiary rules developments in the twentieth century and through the drafting of the federal rules); Eileen A. Scallen, *Analyzing "The Politics of [Evidence] Rulemaking,"* 53 HASTINGS L.J. 843, 847–56 (2002) (sketching the history of evidence reform efforts).

[3] EDMUND M. MORGAN ET AL., THE LAW OF EVIDENCE: SOME PROPOSALS FOR ITS REFORM (1927).

[4] 21 WRIGHT & GRAHAM, *supra* note 2, § 5005, at 84–86.

[5] Scallen, *supra* note 2, at 849.

[6] *Id*. at 851.

[7] 21 WRIGHT & GRAHAM, *supra* note 2, § 5005, at 90.

[8] Scallen, *supra* note 2, at 851.

across the states was not highly valued by most lawyers. Perhaps professors at national law schools and large law firms with multi-state practices cared, but most lawyers did not. So the call to national uniformity by itself had little appeal.

The motivating force to enact rules of evidence would in the end come from the federal courts. In 1963, the Judicial Conference of the federal courts recommended the creation of Federal Rules of Evidence. Several years later, Chief Justice Earl Warren appointed the Advisory Committee, with Professor Edward Cleary as its Reporter. The Advisory Committee was carefully balanced with representatives from a large number of different types of practices; it had special emphasis on trial lawyers and judges; and it was a generally conservative group.

The preliminary draft was created over the course of the next four years with the bulk of the work performed by Professor Edward Cleary. It was made public in 1969. When the Supreme Court received the revised rules from the Judicial Conference a year later, rather than sending them directly to Congress under the Rules Enabling Act, it sent them back to the Judicial Conference to be published for comment. This move drew the attention of Congress, produced objections from a group of Senators, and brought about the incorporation of a number of changes proposed by the Justice Department. The proposed rules were finally transmitted to Congress in 1972.

The proposed rules on privilege drew a particularly negative reaction from Congress. With the Watergate scandal unfolding, these rules expanded governmental privileges, which understandably was not popular at the time. Additional issues were also raised, such as what appeared to be excessive influence by a Justice Department hierarchy that was viewed with suspicion. The upshot was that in 1973, Congress passed a law that the rules of evidence could not take effect until expressly approved by Congress.[9]

In this process, the proposed privilege rules were dropped in favor of Rule 501, which left the rules of privilege to legislation or common law development. Basically, the judgment of the supporters of the rules was that either there could be rules of evidence that did not contain privilege rules, or no rules at all. Some of the concern was that the federal rules had the substantive effect of altering state privilege law in diversity cases. Rule 501 also accommodated that concern by deferring generally to state privileges in such cases.

In January 1975, Congress enacted the Federal Rules of Evidence.[10] To date, forty-two states have adopted rules of evidence based generally on the federal rules and the Uniform Rules,[11] which have largely tracked the then-existing federal model since the initial federal draft in 1969.[12]

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[9] Act of Mar. 30, 1973, Pub. L. No. 93–12, 87 Stat. 9 (1973).

[10] Act of Jan. 2, 1975, Pub. L. No. 93–595, 88 Stat. 1926 (1975).

[11] 6 WEINSTEIN'S FEDERAL EVIDENCE, TABLE OF STATE AND MILITARY ADAPTATIONS (2d ed. 2005).

[12] Scallen, *supra* note 2, at 851–52 (noting that while initially following the federal model rather closely, the uniform rules have begun to diverge somewhat more in recent years from the

What seems to have been persuasive was that, while most lawyers do not have multi-state practices and so care little about cross-state uniformity, requiring knowledge of two sets of rules within the same state seemed too much. Perhaps more important was that the federal rules successfully codified in a usable form largely familiar doctrines and procedures developed under the common law. The rules seemed helpful and did not prove that threatening or difficult to learn and use. As more states adopted them, they also developed momentum as the largely national standard.

While the federal rules may have been largely a statement of the progressive common law at the time, enacting a set of rules had one significant impact that I see as conservative in nature: with codified rules enacted by the legislature, rather than judge-made rules of common law origin, the concept of "plain meaning" analysis applies. As to an integrated statute, plain meaning analysis tells us that its language is to be followed without examination of legislative history or policy unless the result is absurd or inconsistent with other provisions of the same statute.[13]

Under this analysis, the Supreme Court ruled in *Huddleston v. United States*[14] that "other crimes evidence" under Rule 404(b) need only be proved by sufficient evidence such that the jury could find the fact, not a determination of clear and convincing evidence by the trial judge, which most federal circuits and many states had required prior to the enactment of codified rules.[15] The effect of plain meaning analysis has been to reduce the impact of policy on judicial interpretation of the rules of evidence and to make them somewhat more wooden and fixed in application. I see a clear difference when reading federal privilege cases in the flexibility of application permitted if the apparent operation of the "rule" is inconsistent with the purpose of the privilege. Since there are no codified federal privilege rules and thus plain meaning analysis does not apply, the federal trial and appellate courts are much freer to use policy to correct what they perceive would otherwise be inappropriate outcomes.

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federal rules, such as by the uniform rules omitting Federal Rules 413–415).

[13] *See generally* Edward R. Becker & Aviva Orenstein, *The Federal Rules of Evidence After Sixteen Years—The Effect of "Plain Meaning" Jurisprudence, the Need for an Advisory Committee on the Rules of Evidence, and Suggestions for Selective Revision of the Rules*, 142 F.R.D. 519 (1992); Randolph N. Jonakait, *The Supreme Court, Plain Meaning, and the Changed Rules of Evidence*, 68 TEX. L. REV. 745 (1990).

Others have noted another conservative feature of codification. After codification, the common law rulemaking powers of judges are restricted in a system where the creation of "rules" is principally not the responsibility of judges. *See* Paul R. Rice, *Advisory Committee on the Federal Rules of Evidence: Tending to the Past and Pretending for the Future?*, 53 HASTINGS L.J. 817, 819 (2002) (arguing that this shift has negatively changed the dynamic of how evidentiary rules develop).

[14] 485 U.S. 681 (1988).

[15] *See, e.g.*, United States v. Weber, 818 F.2d 14, 14 (8th Cir. 1987); United States v. Vaccaro, 816 F.2d 443, 452 (9th Cir. 1987). *See generally* United States v. Beechum, 582 F.2d. 898 (5th Cir. 1978) (en banc) (discussing in the majority the different approach taken after passage of Federal Rules of Evidence and in the dissent the prior pattern in other circuits).

Since the federal rules were adopted, the rules have remained relatively stable and further systemic reform has not occurred, although cumulatively there have been a substantial number of amendments over the years. Several rules have been added. In 1978, Congress adopted Rule 412, the rape shield law, which somewhat surprisingly was not part of the original rules but developed in concept in the states. In 1995, over the objection of the Judicial Conference and the Evidence Advisory Committee, Congress also enacted Rules 413–415, which admit the defendant's propensity evidence shown through past criminal sexual acts. Rule 804(b)(6), which admits hearsay evidence through "forfeiture by wrongdoing," was added in 1997.

Changes of note have been made in Rules 701, 702, and 703 (codifying *Daubert*[16] principles and other restrictions on expert testimony); Rule 404 (minor modifications of proof of the character of the accused and victim in criminal cases); Rule 407 (minor modifications of restriction on use of subsequent remedial measures and application to product liability cases); Rule 410 (restricting exclusion of failed criminal plea negotiations to those involving negotiations with government attorneys, etc.);[17] Rule 609 (revising balancing tests for impeachment with criminal convictions);[18] Rule 704 (restricting opinion on ultimate issue going to mental state in criminal cases);[19] Rule 801(d)(2) (modifying proof of vicarious admissions);[20] Rules 803(6), 902(11), 902(12) (admissibility of business records by certification); and Rule 807 (consolidation of the catchall exceptions into one rule and renumbering it).[21]

Although some notable individual additions have been made, the rules in their basic structure and substance are largely unchanged since their enactment. Certainly, there has been nothing that would be termed a systemic revision or substantial law reform in the intervening years.

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[16] Daubert v. Merrell Dow Pharm. Inc., 509 U.S. 579 (1993).

[17] The rule was amended in 1980 to require that covered plea negotiations be held with an attorney for the prosecuting authority, which was intended to rectify an interpretation of the earlier language that arguably excluded interrogations by investigating officers that touched on a potential guilty plea. *See* Fed. R. Evid. 410 advisory committee's note to 1980 amendment.

[18] This change was made by Congress largely to "correct" the result reached by the Supreme Court in *Green v. Bock Laundry Mach. Co.*, 490 U.S. 504 (1989).

[19] This change was enacted by Congress in the aftermath of the unpopular jury decision to find John Hinkley not guilty by reason of insanity for his assassination attempted on President Ronald Reagan. *See* S. REP. NO. 98-225, at 232 (1984), *as repreinted in* 1984 U.S.C.C.A.N. 3182, 3414 (giving legislative history).

[20] These modifications were made to respond to and to codify the rulings of the Supreme Court in *Bourjaily v. United States*, 483 U.S. 171 (1987).

[21] In addition, proposed changes from the Advisory Committee in Rule 408 to prohibit impeachment use and to clarify the rule's application in criminal cases have reached the Supreme Court and in Rule 609 to clarify how courts are to determine when criminal convictions of a witness that may involve deceit are to be so considered, which renders them automatically admissible to impeach. These changes and several other minor changes are likely to become effective in December 2006.

One reason for the absence of truly major changes is that the Supreme Court disbanded the Evidence Advisory Committee after enactment of the rules. Unlike the rules of civil and criminal procedure, where advisory committees have continued in existence throughout the period, the Supreme Court apparently thought writing the rules of evidence had been completed. Even after being reconstituted in 1992, the Evidence Advisory Committee has not been about law reform or an activist agenda. One reason is that then Chief Justice Rehnquist gave directions to the chairs of all the advisory committees that he wanted only revisions necessary to rectify clear problems, not law reform. Committee members and critics of their relative inaction agree they have taken a view that "if it ain't broke don't fix it."[22] Some committee members are also somewhat fearful that if they propose major changes they may provoke Congress to recommend politically inspired alternatives.

At its January 2002 meeting, the program of the Evidence Section of the Association of American Law Schools focused on the politics of evidence rulemaking. The clear message from the program's panel, which included some past and present participants on the Advisory Committee, was that there are no plans to change this general picture of incremental and modest change.

The immediate plans for the Advisory Committee concern issues that are substantial, but they do not envision expansive treatment of those issues. One item is a project to *suggest* possible codification of rules of privilege. Congress was fervently opposed to codification of privilege rules in 1975, and I doubt the picture has changed. In any case, the effort is not seen as groundbreaking, but more on the order of writing into rule form for the federal courts the current common law understanding of the basic privileges and resolving some of the conflicts that have developed in the federal courts' treatment of them.[23] These proposals, if adopted some years from now, should have little effect on the states, which have often established evidentiary privileges rules either as part of their evidence rules or by separate legislation.

A second proposed project is to deal with technological developments in the presentation of evidence. As I will discuss in the second part of this paper, the impact of science and technology on the presentation of evidence is becoming enormous, with the promise of even greater impact in the future. However, the changes envisioned by the Advisory Committee for the formal evidence rules are very modest. The immediate changes will likely only involve modifications of terminology to incorporate the term "electronically stored information" into the rules at appropriate places.

The third type of change, which in a broader form is the subject of my next topic, is to conform the hearsay rules to the new confrontation doctrine once the

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[22] *See* Rice, *supra* note 13, at 820–26 (criticizing what Professor Rice sees as inappropriate inaction rather than modernizing the rules and preparing them for the future).

[23] *See* Kenneth S. Broun, *Giving Codification a Second Chance—Testimonial Privileges and the Federal Rules of Evidence*, 53 HASTINGS L.J. 769 (2002).

full implications of *Crawford v. Washington* are known.[24] As discussed below, *Crawford* may provoke very significant hearsay reformulations, but I doubt they will first occur in the federal courts or the Federal Rules of Evidence.

What are the general prospects for the future impact of changes in the Federal Rules of Evidence? My view is that unlike what happened in 1975, there is little reason to believe that the federal drafters and the federal rules will lead the march in future modifications. This situation could, however, change if Chief Justice were to direct a more activist role for the Advisory Committee.[25] I suspect such a change in direction is unlikely, but not unthinkable with respect to hearsay reformulation.

An additional reason that the federal sector is not likely to be the leader in systemic changes is that Congress has in the past insisted that it be directly involved in major changes in evidence rules rather than leaving them to the Rules Enabling Act procedure. Given the partisan split within Congress, it is unlikely that a majority can be brought together on a broad scale set of changes. Too often, specific rules excite interest groups, but broad scale reform has no fervent political following.[26]

B. *The Present and the Near-Term Future: The Opportunity that* Crawford v. Washington *May Provide for Possible Fundamental Hearsay Rule Reformulation*

I have written extensively about *Crawford v. Washington* previously,[27] and I will not repeat that detail here. My point is that the "old system" of *Ohio v. Roberts*[28] that linked the hearsay rules and the Confrontation Clause very, very

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[24] The three elements of the agenda for the Advisory Committee described above are taken from a conversation with Professor Daniel Capra, Reporter for the Advisory Committee, summarized from public discussions of the Committee.

[25] The confirmation hearings of Justice Roberts provide no basis to conclude he will take a position different from Rehnquist, and if he does deviate, one would not expect a change in course in the early years of his tenure as Chief Justice.

[26] The discussion at the 2002 Evidence Section meeting indicated that changes in specific evidence rules may draw substantial interest because they clearly help or hurt certain parties. On the other side, no politically connected constituency supports disinterested evidence reform. Thus, particular evidence rules may gain majority support and be enacted, but it is unlikely that anything so sweeping as the Federal Rules of Evidence would today command majority support in Congress. *See* Scallen, *supra* note 2, at 864–67 (analyzing the comments of several panel members about the narrow interest of political factions in specific evidence rules that might support self-interested changes, in contrast to little sustained interest in more general and neutral law reform).

[27] *See generally* Robert P. Mosteller, Crawford v. Washington*: Encouraging and Ensuring Confrontation*, 39 U. RICH. L. REV. 511 (2005) [hereinafter Mosteller, *Encouraging and Ensuring Confrontation*]; s*ee also* Robert P. Mosteller, *"Testimonial" and the Formalistic Definition—The Case for an "Accusatorial" Fix*, 20 CRIM. JUST. 14 (Summer 2005); Robert P. Mosteller, Crawford*'s Impact on Hearsay Statements in Domestic Violence and Child Sexual Abuse Cases*, 71 BROOK. L. REV. 411 (2005).

[28] 484 U.S. 56, 66 (1980).

closely may be completely discarded in *Crawford*'s wake, thereby creating enormous potential for hearsay reformulation.

Under the *Roberts* regime, a Confrontation Clause challenge was satisfied if the hearsay fell within a "firmly rooted" exception, such as an excited utterance. An exception was "firmly rooted" if it had been in existence for a lengthy period of time and was widely accepted in American jurisdictions. Thus, if the statement fit within one of these "firmly rooted" exceptions, the constitutional issue was resolved. Moreover, for that firmly rooted exception and many others, the unavailability of the declarant was not required. Meeting the hearsay rule meant the evidence was admissible both as a matter of evidence law and constitutional law.

The very useful role that these well-established hearsay exceptions had in resolving the constitutional issue under *Roberts* meant that no one was about to recommend radical hearsay rule revision. Radically revised rules would obviously not be considered "firmly rooted." Also, unlike many European countries, we do not have one set of evidence rules for civil cases and another for criminal cases, notwithstanding that some of our rules apply in specific ways to the criminal defendant or in criminal cases. We are committed to one set of rules that generally apply to all litigation, and as a result, even though the Confrontation Clause does not apply in civil cases, hearsay reform was not suggested even there. Thus, the linkage between the rules of evidence and confrontation inhibited major changes in hearsay rules.

Crawford potentially changes that picture and could make fundamental hearsay reform possible. *Crawford* harshly criticized the *Roberts* test that resolved confrontation challenges by measuring the trustworthiness or reliability of the statement in accordance with hearsay theory.[29] *Crawford* said that the purpose of the Confrontation Clause was to prevent inquisitorial procedures and that the way to accomplish that goal is to exclude out-of-court statements that are "testimonial." Satisfying that conception of the Confrontation Clause, by contrast to *Roberts*, has nothing directly to do with the hearsay rules, and is effectively disconnected from hearsay doctrine.

The only uncertainty remaining is whether the Supreme Court in a future decision will completely destroy the "Old System" of *Roberts* or leave it as a backstop.[30] *Crawford* so ridiculed its basic rationale[31] that the Court may have

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[29] *Crawford*, 541 U.S. at 61–68.

[30] *Id*. at 68 (stating that "[w]here nontestimonial hearsay is at issue, it is wholly consistent with the Framers' design to afford the States flexibility in their development of hearsay law—as does *Roberts* and as would an approach that exempted such statements from Confrontation Clause scrutiny altogether").

In the fall of 2005, the Supreme Court granted certiorari in two confrontation cases, *Davis v. Washington*, 126 S. Ct. 547 (2005), and *Hammon v. Indiana*, 126 S. Ct. 552 (2005). While these two cases should give some needed definition to the testimonial concept, neither case appears to present the issue of the future of *Roberts*.

[31] *Crawford*, 541 U.S. at 61–68.

difficulty leaving *Roberts* operative at all. Almost certainly Justice Scalia, who wrote the *Crawford* opinion, would entirely overrule *Roberts*, but other justices may feel differently.

If we assume an evidence world in which *Roberts* has been obliterated and where retaining the traditional (firmly rooted) hearsay exceptions has no advantage in deciding criminal cases,[32] massive reformulation of the hearsay rules would be possible. Interestingly, the initial proposal of the hearsay rules made by the Rules Advisory Committee in 1969 and endorsed by the United States Supreme Court was not the set of specific exceptions we have today, totaling about thirty. Instead, it was a general rule that looked much like the present residual exception that directed the trial court simply to evaluate the trustworthiness and necessity of the statement and to admit or exclude based on that ad hoc determination.[33]

I do not know if that type of rule would be attractive to trial lawyers, who often favor predictability over flexibility. My guess is that it would engender some real opposition by those with vested interests in the current system, particularly defense attorneys, who as a group generally favor rules that restrict the admission of evidence, and especially criminal defense attorneys, who tend to fear the exercise of judicial discretion against unloved criminals. It would bring back the conflicts that were so prominent when the rules were first proposed—whether to give more discretion to trial judges or more power to lawyers and control to legislators, which also pits certainty, predictability, and complexity against flexibility and simplicity.

My suspicion is that despite opposition some state(s) would take the plunge and experiment on a radically simplified hearsay rule with regard to exceptions. It is not a secret that most hearsay is ultimately admitted, and thus there is some merit to the argument that the current complex system of exceptions imposes needless costs. Also some empirical evidence supports the proposition that jurors discount the value of hearsay so that it may not in fact be very much *over*-valued in evidentiary effect.[34]

If my predictions are roughly correct, a decade from now some states will be

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[32] *See* Thomas J. Reed, Crawford v. Washington *and the Irretrievable Breakdown of a Union: Separating the Confrontation Clause from the Hearsay Rule*, 56 S.C. L. REV. 185 (2004) (arguing that *Crawford* has accomplished the separation of a union that Professor Reed argues was fatally flawed from the beginning).

[33] *Preliminary Draft of Proposed Rules of Evidence for the United States District Courts and Magistrates*, 46 F.R.D. 161, 345 & 377 (1969) (using similar elements for two rules, one where unavailability is not required and the other where it is). What constitutes our specific exceptions were listed in the rules, but they were given as examples of the types of statements that would meet their requirements, *id.* at 345–50 & 377–78, not as exceptions. The general structure was thus much like current Rule 901. *See* Mosteller, *Encouraging and Ensuring Confrontation*, *supra* note 27, at 520–21 (discussing possible dramatic impact of *Crawford* on the future of hearsay).

[34] *See* Peter Miene et al., *Juror Decision Making and the Evaluation of Hearsay Evidence*, 76 MINN. L. REV. 683 (1992) (examining empirical evidence that jurors discount the value of hearsay evidence, which the authors argue should make receiving hearsay at least somewhat less problematic).

experimenting with fundamental hearsay rule reformulation. Later, if a consensus seemed to be developing that the experiment had succeeded, the federal rules might adopt such a pattern.

III. THE UNCERTAIN LONGER-TERM FUTURE: THE IMPACT OF TECHNOLOGY AND SCIENCE UPON THE PRESENTATION OF EVIDENCE AND THE PROOF OF CASES

The most far-reaching concern of this essay is also its most uncertain. That is the enormous impact that I believe technology and science will have in various ways on the presentation of evidence in the courtroom, the development of evidence in the outside world, and the appreciation and evaluation of evidence by juries. This discussion is not directed at rules of evidence *per se* and certainly not at the federal rules. It is about evidence broadly conceived and future trends, particularly in criminal cases.

I intend my suggestions to be provocative and thereby to encourage readers to construct their own vision of how the future of proof may be affected by the types of changes that I examine. In the end, I do not reach a clear conclusion about evidence law changes. I suspect that the precise shape of predictions, like most efforts to predict the future and particularly those that are at all ambitious, may be a bit off target. What I mainly seek to accomplish in this part is to bring together some developing trends and suggest a possible view of how in the future they may affect the way cases are proved.

A. *Technological Impact on the Presentation of Evidence in the Courtroom*

With increasing force, computers, digital evidence, and computer-generated exhibits are making their way into the courtroom. Either through court-provided technology or using that of the parties, various new methods of displaying data electronically to juries and judges are becoming available. In addition, technology provides opportunities for video conferencing and for presenting witnesses from off-site locations or for holding hearings with some of the parties at different locations.

All of these changes present evidentiary issues and costs and benefits. Authentication, best evidence, and hearsay issues regarding such evidence are certainly real, but they do not seem to have caused great difficulty or to have been treated by the courts as qualitatively different than with more traditional forms of evidence. Indeed, since much evidence that ultimately is presented on paper existed at some time as computer-stored data, there is often a commonality of issues between "traditional" and digital evidence.

I do not mean to say that this is not an interesting or a complicated set of issues or that it does not call for legal changes. For example, in 1998, Maryland added a provision to its Rules of Civil Procedure[35] that drew attention for

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[35] MD. R.P. 2-504.3.

beginning to define and deal with computer-generated evidence.[36] It requires notice of intent to introduce such evidence and establishes a procedure for litigating admissibility. The rule represents a helpful step in managing admissibility decisions.[37]

Those of us who began our careers decades ago when this type of technology was unknown or in its infancy, face challenges in being open to such new methods of presenting evidence. However, an expanding set of materials has grown up to help lawyers utilize this technology and to a lesser degree assist judges in ruling on admissibility.[38] Even without special aids, my instinct is that judges can rule on these matters effectively through the exercise of basic principles.

Often, the most important issue for judges is how to let the parties prove their cases effectively using new technology without distorting the cases or unfairly favoring one side. Resolving these challenges are matters of judgment and sensitive application for Rule 403.[39] Other important questions concern whether the evidence in an electronic medium is introduced into evidence or is simply used as a method of displaying the underlying traditional evidence to the jury. This distinction regarding formal admission is important to whether the evidence can be

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[36] *See* Fred Galves, *Where the Not-So-Wild Things Are: Computers in the Courtroom, the Federal Rules of Evidence, and the Need for Institutional Reform and More Judicial Acceptance*, 13 HARV. J.L. & TECH. 161, 261–63 (2000).

[37] Presently pending before the Committee on Practices and Procedures ("Standing Committee") of the Federal Judicial Conference are amendments to the Federal Rules of Civil Procedure that deal with electronically stored information. The amendments affect Civil Rules 11, 26, 33, 34, 37 and 45.

[38] *See, e.g.*, EOGHAN CASEY, DIGITAL EVIDENCE AND COMPUTER CRIME: FORENSIC SCIENCE, COMPUTERS, AND THE INTERNET (2d ed. 2004); PIKE & FISHER, INC., DIGITAL DISCOVERY & E-EVIDENCE: BEST PRACTICES AND EVOLVING LAW (2005); MICHELE C.S. LANGE & KRISTIN M. NIMSGER, ELECTRONIC EVIDENCE AND DISCOVERY: WHAT EVERY LAWYER SHOULD KNOW (ABA 2004); THE NATIONAL CENTER FOR FORENSIC SCIENCE, DIGITAL EVIDENCE IN THE COURTROOM: A GUIDE FOR PREPARING DIGITAL EVIDENCE FOR COURTROOM PRESENTATION (2003); PAUL R. RICE, ELECTRONIC EVIDENCE: LAW AND PRACTICE (ABA 2005); Galves, *supra* note 36; Fredric L. Lederer, *Trial Advocacy: The Road to the Virtual Courtroom? A Consideration of Today's—and Tomorrow's—High-Technology Courtrooms*, 50 S.C. L. REV. 799 (1999); Mark D. Robins, *Evidence at the Electronic Frontier: Introducing E-Mail at Trial in Commercial Litigation*, 29 RUTGERS COMPUTER & TECH. L.J. 219 (2003); *Criminal Justice Magazine*, Volume 19 (Spring 2004) (devoting entire issue to new technology evidence); *Symposium: International Conference on the Legal and Policy Implications of Courtroom Technology*, 12 WM. & MARY BILL RTS. J. 637–938 (2004).

[39] I am implicitly taking the position here that the use of technology to enhance the presentation of evidence is not inherently different in terms of potential prejudice than other types of evidence. In general, that seems a sound assessment.

Another type of concern is whether the increased use of sophisticated technology will exacerbate the gap between adversaries with unequal resources. *See* Galves, *supra* note 36, at 290–91. Rarely is this a matter that should affect admissibility, but it is a concern for the justice system. However, if courts provide the technology and thus provide access for parties with limited resources, that gap may be reduced somewhat or even eliminated. *See* Michael E. Heintz, Note, *The Digital Divide and Courtroom Technology: Can David Keep Up with Goliath?*, 54 FED. COMM. L.J. 567, 586–88 (2002).

used easily during closing argument and whether it goes to the jury during its deliberations.[40]

B. *Effect of Technology on the Proof of Disputed Fact*

The available evidence tends to determine how disputed facts are proved in the courtroom. In many ways, such proof has remained relatively unchanged for several hundred years. However, there is some suggestion that through accretion of scientific and technological advances proof of contested facts, particularly in criminal cases, and courts' and jurors' appreciation of such evidence may be changing in a fundamental way. The items that I will note may be disjunctive, but I believe they have some common threads that are having a major cumulative impact.

My insights are both practically and theoretically driven. Before becoming an academic, I had substantial experience in trial work. I spent seven years as a public defender at the Washington, D.C. Public Defender Service where I tried criminal cases, including a number of homicides, and ultimately as Chief of the Trial Division, consulted throughout the office on a broad range of my colleagues' cases. The cases I saw were part of the gritty world of ordinary criminal litigation. Most of the evidence consisted of the perceptions and memories of ordinary citizens, buttressed from time to time by basic forensic evidence, such as fingerprints, serology, autopsies, and ballistics. This was not the super high-tech world that intrudes into cases with greater frequency today. Certainly, many criminal cases will continue, like the ones I saw up close, to be based largely on such ordinary evidence.

1. Who "Done It?": The Creation of More "Trace" Evidence and Magnifying Its Impact

Increasingly, we see the use of technological and scientific evidence in a growing range of criminal cases to show who is the perpetrator. Videotapes or pictures of actual events in criminal cases were almost never part of criminal cases two decades ago. They are more and more a part of cases today with the ubiquity of various types of recording systems. Recordings may be made by surveillance cameras in stores, at ATMs, and on street corners, or by pictures made by passersby who more frequently today have video cameras and picture phones as they walk and drive about. Others leave behind evidence trails in e-mails or physical trails of their travels by automobile electronic pass information.[41]

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[40] *See* Brian Carney & Neal Feigenson, *Visual Persuasion in the Michael Skakel Trial: Enhancing Advocacy through Interactive Media Presentations*, 19 CRIM. JUST. 22, 28–29 (Spring 2004) (commenting on the effective use of video during the prosecution's closing argument and debating the issues of how best to allow jurors to view admitted video evidence during deliberations).

[41] I observe that some young people appear almost constantly in communication through cell phones and instant messaging. That gives rise to more admissible hearsay under Rule 803(1), which

In general, new types of "trace" evidence, which is not physical trace evidence like fingerprints or DNA, but recordings of actions and motions, are being created that did not exist at previous times. The chances are growing that crimes committed in public places will have some part of them on film and that versions of events given by suspects and witnesses will have elements that can be corroborated or refuted by electronic trace evidence. Stories should have points of corroboration or contradiction that were not available earlier, and the growth of these unknown and unanticipated sources of evidence makes it somewhat more difficult for false claims to succeed. In a number of recent national crime stories, the original version of events given by either a possibly guilty perpetrator[42] or a bogus victim was rather conclusively refuted.[43]

Also, the growing power of computers, the digitizing of evidence, and the development of sophisticated search technology have allowed for far more effective use of the trace evidence that is discovered. DNA analysis is possible with smaller amounts of material than earlier forms of the technology required. "Cold hits" occur, whereby completely unknown suspects are identified by computer searches that match fingerprint fragments and DNA profiles. These processes were at one time totally impractical because of computing limitations, and one must assume they will become ever more common as technological capacity advances.

A different, but perhaps related, development has been the "innocence movement" that has grown out of the use of DNA evidence principally in death penalty cases but is having some impact in other types of serious criminal cases. This type of "proof of innocence"[44] demonstrated errors in criminal convictions of

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requires contemporaneous communication of observations. I predict that this exception, which has been used relatively little in the past because most ordinary events are not communicated contemporaneously to others, *see* JOHN W. STRONG, MCCORMICK ON EVIDENCE § 271 (5th ed. 1999), will be used more frequently as a larger percentage of ordinary events are routinely narrated as part of an almost continuous series of conversations.

In addition, technologies such as picture phones, rather than relying on human description and memory, not only generate a digital image, but also create a digital record of that observation that is stored in a relatively long-lasting data bank. This type of "observation" can very easily be displayed as powerful recorded evidence of the event.

[42] *See Possible Break in Disappearance of Student in Aruba*, N.Y. TIMES, June 11, 2005, at A10 (reporting that the story of three men suspected of kidnapping Natalee Holloway in Aruba was undercut when security cameras at the hotel where the suspects said they left Ms. Holloway did not show her return).

[43] *See* Lisa Donovan, *Woman Admits to Hoax*, DULUTH NEWS TRIBUNE, Apr. 3, 2004, at 1A (describing unraveling of story by victim of nationally publicized kidnapping hoax, who admitted to staging the event after videotape at store showed her buying a knife, duct tape, rope, and other items allegedly used by perpetrator, and her home computer revealed that shortly before the alleged abduction she had used it to find the location of wooded areas near her residence and to access the five-day weather forecast that covered the period of her alleged kidnapping).

[44] I do not claim that DNA evidence that does not show guilt is the same as proof of innocence. There are reasons why the failure to find the defendant's DNA may not mean that he or she is innocent—for example an unknown person may have left the DNA while the defendant left

the most serious type that cannot be discounted. The reversal in formal assessment of guilt happened because trace evidence that could not be tested at the time the cases were tried was preserved and could be tested by later-developed DNA technology. In many cases, DNA evidence confirmed the fallibility of eyewitness identification evidence, which was always theoretically suspect. However, DNA showed with scientific certainty that such identifications can sometimes be dead wrong.

The result of these cases has been to encourage calls for higher standards for the proof of guilt. Some proposals include better procedures for conducting the showing of photos for identification procedures in criminal cases;[45] videotaping interrogations of the suspects in serious cases; and imposing certification procedures on forensic labs that analyze trace evidence. This movement dovetails with one of the likely lasting results of *Daubert*—a demand either that scientific and technological claims be shown to be valid or that the evidence be excluded.[46]

I am not sure anything unique is happening here. The burden of proof beyond a reasonable doubt in criminal cases was always designed to make false convictions far more difficult to obtain than false acquittals.[47] What may be developing, however, is a growing skepticism of convictions obtained without corroborating trace evidence.

Finally, there is some anecdotal evidence at least to suggest jurors may be acquiring an unrealistic expectation of the certainty that scientific forensic evidence may provide. I want to use here what I take as mainly a metaphor rather than a causative agent. This is what some call the "*CSI* effect."[48] *CSI*, which stands for *Crime Scene Investigation*, is now an ever-expanding series of very popular television shows that air on CBS in which crimes are solved by use of sophisticated forensic tools.

The message of the series is that dispositive forensic evidence almost always exists to prove the guilt of the true perpetrator and to exculpate the innocent. It is a modern day version of Perry Mason's cross-examination when the guilty party had no alternative but to confess under Perry's examination. In *CSI*, frequently the

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none.

[45] AMERICAN BAR ASSOCIATION, STATEMENT OF BEST PRACTICES FOR PROMOTING THE ACCURACY OF EYEWITNESS IDENTIFICATION PROCEDURES (Aug. 2004), *available at* http://www.abanet.org/leadership/2004/annual/dailyjournal/111c.doc.

[46] *Cf.* Edward K. Cheng & Albert H. Yoon, *Does* Frye *or* Daubert *Matter? A Study of Scientific Admissibility Standards*, 91 VA. L. REV. 471, 503–05 (2005) (arguing that *Daubert* has had an effect not only on states that adopted that standard but on *Frye* states as well in causing judges to be more restrictive in admitting scientific evidence in civil cases).

[47] William Blackstone made the well-known statement, "[I]t is better that ten guilty persons escape, than that one innocent suffer." 4 WILLIAM BLACKSTONE, COMMENTARIES ON THE LAW OF ENGLAND 358.

[48] *See* Boatswain v. State, No. 408-2004, 2005 WL 1000565 (Del. Apr. 27, 2005) (concluding that the prosecutor's closing argument that, unlike on *CSI*, finding no fingerprints did not mean the defendant was not guilty, improperly diminished the state's burden).

same result occurs after the test comes back and conclusively identifies the perpetrator.

As yet, only the intuition of trial lawyers[49] and judges[50] suggests the impact of this phenomenon on the expectations of jurors. In cases I tried, fingerprints were only rarely found because, at least with the recovery technology of that era, useable fingerprints were often not left on surfaces that could be effectively processed. The growing use of more sophisticated techniques and the over-statement of their effectiveness in shows such as *CSI*, however, may produce a different reaction in jurors today. In my day, jurors seemed quite willing to accept that fingerprints were hard to find. Whether that is the mindset today, I am not so sure. Moreover, as more and more trace evidence is developed and analyzed more effectively, the expectation may grow that such proof must exist if guilt is to be found.[51]

2. With What Intent?: Not Such Clear Progress, but Major Possibilities for the Detection of Lies

The advances in scientific evidence that I have been discussing largely have affected the process of identifying the perpetrator.[52] Fewer developments have enhanced our ability to determine the intent with which action was taken, often the key issue in determining whether a crime occurred (e.g., rape, when sexual intercourse clearly occurred and the parties know each other, or whether a killing was committed in self-defense) or in setting the level of the offense (the grading of homicides between first-degree and second-degree murder and manslaughter). There are, however, indications that new technology may have an enormous impact here as well. New technology promises major advances in lie detection, which with its potential to solve these problems of intent may unsettle much of our current understanding of fact-finding through trials.

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[49] *See* Michael Watkins, Forensics in the Media (2005) (unpublished study, on file with the author) (describing empirical research indicating that lawyers believe *CSI* has altered juror perceptions and describing the resulting changes in lawyer behavior).

[50] When I presented this paper to the Ohio Judicial Conference in September 2005 to several hundred judges the point I made that received the most reaction was the *CSI* effect. The judges reported in comments both at the public session and privately that they frequently see indications of this effect in the questions and comments of jurors and that they and the lawyers trying cases spend time acting upon the perception that the effect on jurors is real and important.

[51] Perhaps we saw something of this phenomenon in the acquittal of Richard Scrushy. *See* Simon Romero & Kyle Whitmire, *Former Chief of HealthSouth Acquitted in $2.7 Billion Fraud*, N.Y. TIMES, June 29, 2005, at A1 (reporting that one juror said, "I wanted more than just hearsay," and another said, "I wanted something in black and white, something like fingerprints"). It is somewhat remarkable that a juror wanted and perhaps expected actual fingerprint evidence in a Sarbanes-Oxley accounting fraud prosecution.

[52] Trace evidence left in e-mails or on computer hard drives can show the intention of their author as well as revealing the perpetrator's identity.

The promising technology that I am focusing on is functional Magnetic Resonance Imaging (fMRI).[53] In addition to MRI technology that is somewhat familiar to many of us, this technology also relies on "blood oxygenation level dependent" (BOLD) contrast, which allows it to detect increases in brain activity. In essence, it allows us to see what parts of the brain are being used in a task by the test subject. The basic theory, which is being developed and validated by a number of researchers,[54] is that different parts of the brain are involved in deception than when a person simply recalls information.[55]

Conceptually, this new technology promises to advance lie detection greatly beyond the effectiveness of today's polygraph. In contrast to functional MRI technology, the polygraph detects the subject's physiological reactions to questioning, registering non-specific changes in arousal, and not the act of deception itself. As a result, some subjects may be able to take countermeasures to suppress the emotional response to lying. Functional MRI in essence observes the mental activity involved in telling a lie.

Although the various uses of functional MRI are not yet clearly established, the technology may permit testing beyond subjects who voluntarily submit to a polygraph and answer a series of test questions. Such testing could allow a determination, by brain activity indicating familiarity, that the subject has guilty knowledge of some object he or she is shown.[56]

I do not know that we will ever achieve a technology that reliably determines deception. Functional MRI may in the end prove no better than earlier lie detection technologies, but it has a potential to move the process of determining deception forward even if it does not itself reach proficiency. What would be the consequences of developing such technology? That is indeed a difficult question.

I suggest no evidentiary and constitutional revolution. Certainly the Fifth Amendment would stand in the way of requiring a criminal suspect to take a lie

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[53] *See generally* Sean Kevin Thompson, Note, *The Legality of the Use of Psychiatric Neuroimaging in Intelligence Interrogation*, 90 CORNELL L. REV. 1601, 1607–08 (2005). *See also* Michael S. Beauchamp, *Functional MRI for Beginners*, 5 NATURE NEUROSCIENCE 397, 397–98 (2002).

[54] *See, e.g.*, Frank Andrew Kozel et al., *A Replication Study of Neural Correlates of Deception*, 118 BEHAVIORAL NEUROSCIENCE 852, 853–54 (2004); F. Andrew Kozel et al., *A Pilot Study of Functional Magnetic Resonance Imaging Brain Correlates of Deception in Healthy Young Men*, 16 J. NEUROPSYCHIATRY CLINICAL NEUROSCIENCE 295, 296 (2004) [hereinafter Kozel et al., *A Pilot Study*]; D.D. Langleben et al., *Brain Activity During Simulated Deception: An Event-Related Functional Magnetic Resonance Study*, 15 NEUROIMAGE 727, 727 (2002); Jennifer Maria Nunez et al., *Intentional False Responding Shares Neural Substrates with Response Conflict and Cognitive Control*, 25 NEUROIMAGE 267, 273–76 (2005); Sean A. Spence et al., *Behavioural and Functional Anatomical Correlates of Deception in Humans*, 12 NEUROREPORT 2849 (2001).

[55] *See* Kozel et al., *A Pilot Study*, *supra* note 54, at 296; Langleben et al., *supra* note 54, at 727; Tatia M.C. Lee et al., *Lie Detection by Functional Magnetic Resonance Imaging*, 15 HUM. BRAIN MAPPING 157, 158 (2002).

[56] *See* Faye Flam, *Your Brain May Soon be Used Against You*, PHILADELPHIA INQUIRER, Oct. 29, 2002, at A1.

detector test or an argument or comment by the prosecutor about the suspect's failure to do so.[57] The Fourth Amendment would likely restrict[58] and Fifth Amendment would likely prevent[59] involuntary uses of functional MRIs to show deception in criminal cases. And while some jurisdictions allow polygraph results to be admitted by the defendant in selected circumstances, that is the minority view.[60] A more effective lie detection technology would have no direct impact on this body of law that generally restricts its admissibility.

I do imagine, however, if there were a truly accurate lie detection technology, over time it would have a substantial impact both on how criminal cases are handled before trial and on how they are tried. Wouldn't innocent defendants submit to lie detectors and prosecutors dismiss cases when the results are favorable to the defendant? Wouldn't the Due Process Clause mandate admissibility for clearly authoritative lie detector results favorable to the defendant?[61] Wouldn't potential jurors learn of this general process and suspect that those not taking advantage of it are guilty? I assume the impact in civil cases would be even greater where juror knowledge of the results or the refusal to undergo the examination would be more direct.

C. *The Impact of Terrorism*

No doubt our effort to prevent and punish terrorism will play a substantial role in technological advances in detecting and solving crime. The bombings in London during the summer of 2005 showed the use of England's system of surveillance cameras, the usefulness of picture phones, and the application of advanced forensic techniques. Presumably, lessons learned regarding what proved helpful in that investigation will be used to develop and deploy technology to meet the continued threat of terrorism.

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[57] The Fifth Amendment would not impose the same restrictions on, for example, informing the jury of a civil litigant's refusal to submit to testing.

[58] *See* Kyllo v. United States, 533 U.S. 27, 40 (2001) (requiring a warrant for use of technology that obtains information about activities inside the home, which should impose a similar requirement on technology that gathers information from inside the mind).

[59] *Cf.* Pennsylvania v. Muniz, 496 U.S. 582, 598–600 (1990) (ruling that interrogation about date of defendant's sixth birthday revealed mental processes covered by the Fifth Amendment).

[60] *See* Paul C. Giannelli, *Polygraph Evidence Post*-Daubert, 49 HASTINGS L.J. 895 (1998) (describing mixed results in the courts on the admissibility of polygraph evidence offered by the defense in criminal cases). In *United States v. Scheffer*, 523 U.S. 303, 317 (1998), the Supreme Court upheld a *per se* rule of exclusion of polygraph evidence even when offered by the defense. However, Justice Kennedy, writing for four justices, stated that in a more compelling case the result might be different. *Id*. at 318. He did not make any direct reference to a far more accurate lie detector technology, but one would imagine that such technology would further support arguments by the defense for a constitutional right to introduce such evidence.

[61] *See* Chambers v. Mississippi, 410 U.S. 284, 302–03 (1973) (requiring admission of exculpatory confession).

Efforts to make our own country safer from terrorist attacks will surely be separated from the efforts to prevent and solve ordinary crime. However, techniques used in the anti-terrorism effort, such as expanded video monitoring of public places and the cumulation and analysis of that data will likely seep into ordinary cases and spawn the development of new identification technologies that over time gain widespread use in ordinary criminal investigations.

D. *The Overall Impact of Technological Change*

How these technological trends will affect evidence rules is unclear to me and my fuzzy crystal ball. My suspicion is that technical rules of admissibility, such as those dealing with authentication, which currently are quite easily met, will remain that way. The impact thus may not be so much on admissibility, but rather on what is in fact offered and what is found to be sufficient.

Of course, I do not mean to suggest that technology will eliminate uncertainty. That will never happen where we are trying to reconstruct the actions and thoughts of human beings. Moreover, crime is often committed in secret. Technology may, however, reduce the number and types of cases where real uncertainty exists, and we may find that more cases are relatively conclusively proved. At the same time, we may observe a greater difficulty in securing convictions in cases that depend on the perceptions and memories of witnesses and lack corroborating "hard evidence."

The effects of technological advances push in two conflicting directions when it comes to findings of guilt or innocence. On the one hand, as more types of powerful evidence become available, many cases will become much stronger, sometimes virtually irrefutable, and will lead to more convictions. These clearly proved cases may reinforce a growing sense in the public to expect and sometimes to require such types of proof, which cannot be met in many other cases where definite scientific proof is absent.

Will the availability of certain proof in clear cases interfere with the necessary task in many more trials for the jurors to evaluate uncertain evidence and to make the best human judgment possible? Will it effectively change what is meant by proof beyond a reasonable doubt? If so, courts may need at least to develop new instructions to set a context for jury determinations in different types of cases.

IV. CONCLUSION

The history of evidence law in the last century was eventful although not filled with dramatic changes, and I predict at least the near-term future will be much the same. After unsuccessful efforts at law reform, the rules as adopted had the more modest goals of uniformity and consolidation of progressive common law trends. Their achievements in modifying the law and practice, although largely technical, were cumulatively quite significant.

The future of changes in evidence law *per se* could be even more modest. One exception may occur in the area of hearsay reformulation. This will be possible if the Supreme Court in a future decision turns the separation between the protections against unreliable or untrustworthy evidence provided by the hearsay rules and that afforded by the Confrontation Clause, which *Crawford* announced, into a total break.[62] I anticipate that *Crawford* will at least encourage more piecemeal hearsay innovation if not a wholesale reformulation.

Proof of facts and their evaluation by juries could be enormously changed by technological advances that are upon us. These changes are most pronounced in the expansion of dispositive trace evidence, particularly pictorial trace evidence. Extremely significant advances may occur in the near future on proof of deception, which could prove even more revolutionary. Together they may change juror expectations about the quality of proof that is available, whether or not accurate in a particular case, and may affect when jurors are willing to convict and condemn.

My suggestions for the shape of the future depends upon my ability to foresee that future, and for most people, including me, such "crystal ball" gazing is highly problematic. Nevertheless, I do sense that changes that are different in kind are beginning to affect proof and evaluation of proof, particularly in criminal cases, as the result of the accumulation of scientific and technological changes. On that general point, although not the specifics, I am reasonably confident. Among our tasks in addition to anticipating the future will be the very real need to respond to those changes as they occur. I believe it will be a very interesting evidence future indeed.

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[62] This total break is marginally more likely in that the justices who cast the two votes taking issue with the new system and supporting continuation of *Roberts*, Chief Justice Rehnquist and Justice O'Connor, are no longer on the Court.