

THE NEW COURTROOM: THE INTERSECTION OF EVIDENCE AND TECHNOLOGY: SOME THOUGHTS ON THE EVIDENTIARY ASPECTS OF TECHNOLOGICALLY PRESENTED OR PRODUCED EVIDENCE

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SUMMARY:

... Commentators have observed that if Thomas Jefferson or Patrick Henry were to be magically transported to the modern era neither would have difficulty practicing in a contemporary courtroom. ... Best illustrated by the internationally known Courtroom 21 Project at William & Mary Law School, the number of high technology courtrooms grows continually in both the state and federal courts. ... If the actual photograph is tendered to the fact finder, the electronic image can be treated as the equivalent of a photocopy, used solely for convenience. ... In courtroom evidentiary presentation, however, it is only the electronic images that are presented in evidence. ... In the courtroom, the animation can be generated on-site by a computer or, as has been more customary in the past, displayed by pre-recorded videotape. ... Accordingly, even if an animation is allegedly used only to illustrate testimony, a significant hearsay problem could exist if the displayed details are not yet in evidence or offered subject to later connection. ... A Rule 403 determination should take into account the manner of evidentiary display, as well as the content, if we are truly to control unfair prejudice. ... When remote testimony is taken, the participants in the courtroom see the life-size image of the remote witness. ... Victoria, Australia, for example, has addressed the entire issue of remote testimony by comprehensive statute to include technology requirements. ...

TEXT:
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I. Introduction

Commentators have observed that if Thomas Jefferson or Patrick Henry were to be magically transported to the modern era neither would have difficulty practicing in a contemporary courtroom. This astute, often critical, and

yet somewhat reassuring observation is becoming less true as modern technology permeates pretrial and trial practice. An ever increasing number of cases are dependent upon scanned documents and court-presented electronic visual images. Lawyers who increasingly have dragged technology into the court room on an ad hoc basis will soon find themselves practicing in integrated high technology facilities. n1 Best illustrated by the internationally known Courtroom 21 Project at William & Mary Law School, n2 the number of high technology courtrooms grows continually [*390] in both the state and federal courts. Faced with document cameras, computer-produced animations, witness-annotated electronic documents and illustrations, and remote live witnesses, all displayed on televisions and/or computer monitors, even Jefferson or Henry would have to defer a court appearance.

Our new technology-dependent trials necessarily raise a number of evidentiary questions. Perhaps chief among them are issues of best evidence, authentication, hearsay, and unfair prejudice. Counsel who seek to question a witness concerning a monitor image of a previously scanned or imaged document, for example, can expect multiple objections. How then should such objections be resolved? Are the current evidentiary rules and practices sufficient to deal with technology-augmented trials? The answers to these questions may depend in large part upon one's approach to the law of evidence.

At its heart, American evidentiary law is rule oriented. Whether common law or promulgated rule, our evidentiary law prizes certainty and stability. Although everyone recognizes the often extraordinary degree of discretion vested in trial judges to decide concrete evidentiary issues, practitioners demand that evidentiary law and practice be based upon a substantial core of clear cut rules. n3 Any review of the evidentiary implications of technology-augmented litigation can address compliance with currently existing rules, or it can also probe into the usually unstated or assumed human and policy assumptions behind those rules. Sharply different results may flow from the approach chosen. Although the practitioner may well seek solely to rely on the black letter rules of the jurisdiction, arguing that it is for the legislature or other rule makers to be concerned with deeper matters of policy, sufficient flexibility and

discretion exist in the trial judge to permit, if not require, the judge to reach such questions. What follows is a brief, admittedly incomplete, pondering of some of these matters, primarily using the Federal Rules of Evidence for purposes of discussion.

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II. In General: The Best Evidence Question

A. Electronically Presented Evidence

Initially, it is useful to distinguish between evidence that is only presented or shown electronically and evidence that is itself electronic in nature or that has been converted into electronic format. Likely the simplest example of electronically presented evidence is a photograph that is displayed at trial via a document camera. The document camera is a simple, vertically mounted television camera that captures the image of anything placed below it and displays the image on an attached television set or computer monitor. n4

Having laid whatever foundation may be necessary to establish logical relevance, counsel would place the photograph on the horizontal stand of the document camera. The image would then be available to judge, witness, and opposing counsel. n5 Counsel would then ask the witness to identify the photograph. Authentication would proceed and, assuming compliance with other applicable rules, the photograph would be offered and admitted. In this example, the underlying evidence is non-electronic in nature. If the actual photograph is tendered to the fact finder, the electronic image can be treated as the equivalent of a photocopy, used solely for convenience. This presents no evidentiary issues if the underlying admissibility of the photograph has already been established. But if the image is used to establish admissibility, what is actually being offered is not the original photograph but the electronic duplicate image in which case the witness, counsel, judge, and in a jury trial, the jury, may never see the original photograph. Instead, all will view and act upon an electronic image. Is a best evidence challenge available? In these circumstances, the image functions as electronically produced evidence.

B. Electronically Produced Evidence

Electronically produced evidence can be defined as evidence that originates as digital material or that is, regardless of origin, produced in court solely as digital material. Perhaps the best examples are digital photographs and digital audio and video recordings.

[*392] The Best Evidence Rule ordinarily requires that "to prove the content of a writing, recording, or

photograph, the original ... is required..." n6 Under *Federal Rule of Evidence 1001(4)*, an electronic image of our photograph, for example, would seem to be a duplicate n7 produced in court solely as electronic digital or analog material, n8 and as such, under *Federal Rule of Evidence 1003*, ordinarily "admissible to the same extent as the original"; n9 in some cases the image may even be defined by Rule 1001 as an "original." n10

The definition of "duplicate" must be reconsidered, however, before accepting the admissibility of the image in lieu of the original physical image. Electronic visual images of original non-digital evidence nearly always differ in some particulars from the "hard copy" originals. n11 Current technology is such that even if a totally accurate image of the original is made or captured, the displayed image will differ in color and resolution. Except in the most extraordinary installation, it is almost certain that the same photograph, displayed on two or more video monitors, will have at least subtle color balance, shading, and/or brightness differences, as each monitor reproduces the image slightly differently. Small markings on the original, including physical creasing and the like, may be difficult or impossible to detect in an electronic image. Can the resulting multiple, yet only slightly differing, reproductions be termed "duplicates?" In the widely-reported Unabomber case, for example, the defense moved to prohibit **[*393]** the government's use of electronic document images on the grounds that they were not true duplicates of the original paper documents. n12

Rule 1001(3) and (4) require "accurate" reproduction. n13 Rule 1003(2) permits admission of a "duplicate" unless "it would be unfair to admit the duplicate in lieu of the original." n14 A black letter rule analysis unavoidably yields the conclusion that in one sense the image and the original are not identical. Yet even the quickest examination of the intent of the Federal Rules yields a ruling in support of the images. In the Unabomber prosecution, it is my understanding from speaking with members of the prosecution team that had the case not been resolved by plea, the government would have offered the images solely for the textual content of the defendant's writings. n15 The color and condition of the originals would have been irrelevant. Under these circumstances, the electronic image would have been a true duplicate, just as a black and white photocopy would have been, which is already usually considered a duplicate under Rule 1001(4). n16 Insofar as the reason for which the evidence is offered, the image is an accurate copy of the original. Accordingly, unless the differences in electronic display and reproduction are logically relevant, any differences from the original are of no evidentiary consequence.

C. Scanned Documents

Document-camera presented evidence is customary in at least hundreds of American courtrooms. What is less frequent but of increasing importance, especially in major cases, is scanned or imaged documentary evidence. To scan a document, photograph, or the like, one places the original on or in a scanner. The scanner in effect takes an electronic picture of the original using a process similar to that used for photocopying. The resolution and color validity of the electronic image primarily depend upon the quality of the scanner and the way in which the electronic image is recorded. Scans can be imperfect, primarily for physical reasons such as improper feeding of the original into the scanner.¹⁷

Computer scanning should be distinguished from optical character recognition (OCR). When one OCR's a document, one instructs a computer to use special software to review a scanned document and convert the image of the document into computer-recognizable text for purposes such as computerized searching of the document. Optical character recognition is almost never perfect, and inaccurate word conversions are customary, requiring human proofing if perfect accuracy is required. In courtroom evidentiary presentation, however, it is only the electronic images that are presented in evidence. OCR versions of the documents may be used by counsel to help determine which images to offer, but it is only the images that are offered. Accordingly, offering scanned images preserved on, for example, a CD-ROM disk, is functionally identical with use of the document camera—unless there is reason to suspect an inaccurate copying of the original. The proponent must authenticate the image and qualify it as a duplicate. Whether authentication should mean something more than our traditional methods¹⁸ is another matter.

III. The Authentication/Digital Alteration Question

Nearly every Courtroom 21 presentation seems to result in at least one question concerning the courtroom validity of digital information, given the ease with which such information can be seamlessly altered. There are methods that can at least diminish the chances of such alteration, but that fail to address the central issue. Suppose a witness is shown a photograph. Traditional authentication requirements will be served when the witness identifies the image as accurate—testimony of a witness with knowledge will suffice.¹⁹ Suppose, however, that the image is a digital one, displayed perhaps by computer from a CD-ROM disk; should the same result apply? To the degree that we consult *Federal Rule of Evidence 901*, or its common law equivalent, the

answer is clearly yes.²⁰ But it has been suggested [*395] that the combination of technology and human perceptual limits could dictate a different result.²¹

The argument goes thusly: when a person looks at an image, the person does not, and perhaps cannot, verify all components of the image. Instead, the person confirms some of the components. That serves to authenticate the entire image, as it is unlikely that part of a photograph could be accurate and part inaccurate, and photographic tampering could be detected. The digital critic then points out that any aspect of the digital image can be altered electronically, potentially without tell-tale signs of alteration. This perspective questions witness authentication of many digital images; although the witness has identified one part of the image as accurate, that tells us nothing about the remainder.

Yet what of a traditional photograph? Are the two image technologies really so very different? Photographs can be altered. Concededly, such alterations may be easier to detect. If the digital critic's assertion that the witness only verifies part of an image is correct, that is a distinction without a meaningful difference as the witness could be fooled by either technology. The critical distinction comes into play only if there is a reason to question the image and refer it for expert analysis, and the expert can detect photographic alterations but not digital ones.

Given the nature of the adversary system, our evidentiary rules actually are rather undemanding. Admissibility rules such as authentication are easily satisfied, leaving it to the parties to deal with evidentiary sufficiency. American courts have dealt with real and alleged forged evidence since the beginning of the nation. In the absence of modern scientific techniques, parchment documents skillfully forged with quill pens presented formidable questions of detection and proof.²² Isn't the current ability to digitally alter or fabricate evidence the same problem - or is it?

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IV. Computer Animations: Hearsay, Scientific Evidence, and Unfair Prejudice

When lawyers and laypeople think of computer-produced evidence, they often think of computer-produced animations. Computer animations are used for a variety of purposes, including basic education of judge or jury, illustration of a testifying expert's testimony, presentation of computer-originated or computer-derived data, and enhancement of opening statements and closing arguments. In the simplest case, an animation is only an electronic illustration, no different than an artist's electronic pen and ink drawing. In the most so

phisticated use, the computer uses programming to process inputted data in order to display a visual result. In the courtroom, the animation can be generated on-site by a computer or, as has been more customary in the past, displayed by pre-recorded videotape.

Ordinarily, the evidentiary issues inherent in any given animation use are simple, as are the answers. n23 An animation used by an expert to visually illustrate the expert's testimony is not "evidence," in the rigorous sense. n24 It is merely "demonstrative evidence," which is itself an inadequately defined, quasi-evidentiary category not customarily dealt with under traditional evidence rules. n25 The published opinions are characterized by inconsistent terminology, making it difficult to determine what the rule is in any given case. n26 Rather than concentrating on the specific purpose for which the animation was to be used, or was used, many judges have sought to classify the animation in more general terms. n27 A "reconstruction" animation, for example, could mean anything, depending upon the author-judge. And given [*397] the difficulty in replicating the conditions surrounding a given incident, the courts have often been hostile to "reconstructions" on at least logical relevance grounds. n28

A. Hearsay

When an image is used as substantive evidence, n29 hearsay considerations can come into play. Unless based upon admitted evidence, an animation that embodies its supporting data and merely displays a result, might be challenged as based upon hearsay. n30 *Federal Rule of Evidence 703*, however, permits experts to rely on information "of a type reasonably relied upon by experts in the particular field in forming opinions or inferences upon the subject" n31 If an expert is involved and an appropriate foundation is laid, Rule 703 is likely to suffice to justify the use of the animation. n32

The greater problem is likely to be the detailed content of the animation. Rule 703 is not generally interpreted as permitting the expert to be a hearsay conduit. n33 The opinion is admissible, the underlying data is not--at least until the opponent opens the door via cross- [*398] examination. n34 An animation often includes, sometimes necessarily, the details of how the proponent maintains that the given event occurred. Those details may well mean the visual presentation of hearsay information to the fact finder. Accordingly, even if an animation is allegedly used only to illustrate testimony, a significant hearsay problem could exist if the displayed details are not yet in evidence or offered subject to later connection.

B.

"Scientific Evidence" Concerns

Clearly, the most extreme evidentiary situation is one in which the proponent intentionally, or accidentally, is using computer output itself as substantive scientific evidence. This would implicate *Daubert v. Merrell Dow Pharmaceuticals, Inc.* n35 and all of the usual foundational questions, including the accuracy of the underlying data and the validity of both the scientific concepts inherent in the computer's programming, as well as the accuracy of the implementation of those concepts. n36

C. Unfair Prejudice

Both common law and the Federal Rules of Evidence permit otherwise admissible evidence to be excluded when the evidence gives rise to an unreasonable risk of unfair prejudice. n37 Electronically presented and produced evidence may present such a risk. High production quality animations in particular may convey to some jurors greater probative value than may be justified by the actual content. At the same time, the closer an animation is to reality (i.e., a video taped re-enactment), the higher the risk that the fact finder might subliminally interpret the animation as objective fact. Certainly a judicial instruction might cure any risk in all but the most realistic animations, n38 and this risk would likely be less if a fact finder were faced at trial with conflicting or dueling animations. Ironically, if production [*399] quality raises an unfair prejudice risk, proponents might be better served in some cases by foregoing any efforts at Hollywood glitz.

V. The Display Factor

Electronically presented evidence, which ordinarily includes electronically produced evidence, must be displayed to be perceived. Absent occasional gruesome photographs and the like, the appearance of evidence in traditional cases rarely gives rise to unfair prejudice concerns. This need not be the case when evidence is displayed electronically.

Display methods range from individual computer monitors, n39 to televisions, to very large television/monitors, to front or rear projection systems of eight-foot diagonal size or greater. Large display screens are often favored because a single large screen system can be cheaper than numerous smaller high quality displays. Although we have no data, it seems almost certain that the means of display must factor into at least the unfair prejudice determination. Evidence blown up on a ten-foot diagonal screen may well be perceived as overly persuasive - certainly that is a complaint the Courtroom 21 Project used to receive

when remote witnesses testifying by videoconferencing were displayed on our large screen. At the same time, we have heard lawyers complain that document display on small monitors appeared purged of persuasive ability and psychologically distanced from the viewer. Are these evidentiary concerns? Certainly they are not new concerns; judges have had to deal with them for generations, every time counsel sought to bring in large, sometimes very large photographs, charts, and models. To dismiss these issues as merely a matter of demonstrative evidence seems misplaced, however. A Rule 403 determination should take into account the manner of evidentiary display, as well as the content, if we are truly to control unfair prejudice.

Electronically presented and produced evidence also permits electronically emphasized evidence. Image cutouts, color-highlighting, blow-ups, and the like can all be done electronically, either by prior creation or during trial, using specialized hardware or software. Does the use of a spur-of-the-moment color-highlighted enlargement of a key sentence from a document create a danger of unfair prejudice? Certainly, the evidence itself is not implicated. If there is a problem, it is with the method of presentation, the functional [*400] equivalent of counsel putting up a large board with the sentence cut out. The judge has the power to control the method of presentation, n40 so there can be no doubt about the judge's power to limit or prohibit a method of presentation. The real question is whether there is anything to fear. Effective presentation surely is not the same as unfair prejudice. There is little reason to believe, absent studies yet to be conducted, that this would be improper.

VI. Remote Testimony

In many respects the evidentiary issues raised by technology are best illustrated by the new capability to receive live testimony via videoconferencing. n41 In the Courtroom 21 Project's McGlothlin Courtroom, a forty-inch diagonal SONY(R) television monitor has been installed immediately behind the witness stand. When remote testimony is taken, the participants in the courtroom see the life-size image of the remote witness. n42 The remote witness sees a multi-frame television image of four specific portions of the courtroom, n43 the speaker, and a comprehensive image of the entire courtroom. The witness can effectively see everything. And, of course, there is two-way audio. n44 Direct and cross-examination proceed as customary. Evidence can be displayed electronically via document cameras, computers, or facsimile.

Remote testimony's use is increasingly frequent, and is now expressly authorized in federal civil cases.

In every trial, the testimony of witnesses shall be taken in open court, unless a federal law, these rules, the Federal Rules of Evidence, or other rules adopted by the Supreme Court provide otherwise. The court may, for good cause shown in compelling circumstances and upon appropriate safeguards, permit presentation of testimony in open court by contemporaneous transmission from a different location. n45

Although the question of where the oath can be effectively given is a significant one, as is the related question of where, if at all, perjury can [*401] be prosecuted, n46 technical rule-type evidentiary issues are not significantly presented. Yet the whole concept of remote testimony unavoidably raises fundamental evidentiary issues.

Remote testimony forces us, for example, to examine our assumptions about the utility and desirability of in-court direct and cross-examination. What does "confrontation" mean, in both the legal n47 and practical sense? Remote testimony raises the question of what we truly mean by demeanor evidence and the degree to which our fact finders should rely on it. After all, absent new high-definition television, the courtroom image may not contain as much visual information as in-court testimony - although a large screen display might make the witness even more visible than when physically present. Numerous judges and lawyers visiting the Courtroom 21 Project have been troubled by remote testimony, complaining that their self-proclaimed ability to tell truth from falsity depends upon the witness's actual presence in the courtroom. Yet remote testimony easily permits the live question-and-answer process of examination usually thought of as direct and cross-examination.

Assuming modern high quality technology, live two-way testimony presents at least these questions:

(1) To what extent do remote witnesses differ from in-court witnesses in truth-telling, and does the location of the remote physical testimony matter?

(2) How, if at all, does demeanor evidence consist of more than hearing and seeing the witness testify?

[*402] (3) To what extent do judges and jurors perceive remote witnesses as testifying truthfully as compared to those giving in-court testimony?

(4) Does remote testimony create a more substantial risk of evidence fabrication or alteration than does in-court testimony; if so, can technology supply sufficient safeguards?

(5) To what extent do even partial "virtual trials" call into question societal acceptance of adjudication as a generally fair and acceptable resolution of disputes?

(6) Is a declarant who is available by videoconferencing "unavailable" within the meaning of the hearsay exceptions that require unavailability? n48

(7) Should video testimony be preferred to hearsay for some of the situations in which hearsay is now acceptable even when declarants are available? n49

Four experiments conducted by or in conjunction with the Court room 21 Project indicate that jurors find remote testimony to be neither better nor worse than in-court testimony. The answers to most of the other questions remain to be determined. Notwithstanding this, as already noted, direct and cross-examination under oath can be accomplished. n50 Yet is this "testimony?" Do we apply the literal text of the evidentiary rules, or should we ponder the larger interests inherent in those rules?

VII. Conclusion

Most technology-related evidentiary questions can be resolved under existing evidentiary rules. Indeed, in most cases the issues they raise are strikingly similar to those produced by low-technology [*403] equivalents. Notwithstanding this, some technology presented or produced evidence raises significant questions of policy, questions that are likely to be addressed on a case-by-case basis as judges ponder the application of traditional rules to new procedures and forms of evidence. Although this traditional method of fleshing out legal questions has merit, it would be more efficient in some areas if critical matters could be resolved early by statute or rule. Victoria, Australia, for example, has addressed the entire issue of remote testimony by comprehensive statute to include technology requirements. n51 Some areas, such as the ability to prosecute a remote extrajurisdiction witness for perjury, may need federal statute or individual state enactments.

Although bar, bench, and legislative representatives ought to be considering these matters, there can be no gainsaying that the pace of change is acute. While the speed of change likely augurs for some form of statutory or rule clarification (if only in the interests of predictability and efficiency), it also suggests caution, lest we act too soon, and before we have sufficient experience. The one requirement most likely to be of immediate use is advance notice by a proponent of the intent to use technology produced or presented evidence. n52 Notice, along with pretrial disclosure (permitting the opposing party to carefully review documents and

other evidence for possible unexpected discrepancies) would go a long way to moot concerns about digital alteration and would permit considered decisions about in-court practices that could otherwise affect admissibility decisions.

Federal Rule of Evidence 102 declares: "These rules shall be construed to secure fairness in administration, elimination of unjustifiable expense and delay, and promotion of growth and development of the law of evidence to the end that the truth may be ascertained and proceedings justly determined." n53 Technologically presented and produced evidence holds great promise for satisfying the commendable purposes announced in Rule 102. Whether that will actually prove to be the case remains to be seen. Whether Jefferson or Henry could practice in the courtrooms of the new century is not really the question. The real question is whether they would be proud of what they, and we, would see in those courtrooms.

FOOTNOTES:

n1. Consistent anecdotal evidence reports time savings on the order of one-quarter to one-third in cases tried with comprehensive electronic evidence display. This gives rise to a potential "cost-benefit" savings that impels a shift to technology augmented litigation.

n2. A joint project of William & Mary Law School and the National Center for State Courts, the Courtroom 21 Project, "The Courtroom of the 21st Century Today," includes the McGlothin Courtroom, the world's most technologically advanced trial and appellate court room. See generally Courtroom 21 Project (visited Feb. 14, 1999) <<http://www.courtroom21.net>>. The courtroom is primarily a trial courtroom, but also functions as an appellate courtroom. See Fredric I. Lederer, *Technology Comes to the Courtroom*, and <elip> , 43 *Emory L.J.* 1095, 1098 (1994). Courtroom 21 is used for in-house educational purposes, as a "model of integrated main stream, commercially available technology and as an experimental test-bed for various technologies." Id. It is designed "to provide judges, court administrators, architects, lawyers, court reporters, and others concerned with courtroom activities with a functional model courtroom" within which they can test and devise "technological solutions to their unique needs." Id. This Essay is informed by the experimental work conducted by the Project.

n3. Accordingly, the call by academic commentators for a largely discretionary hearsay rule failed when the Federal Rules of Evidence took final form. Instead, the

well-known structure of the general rule with numerous exceptions was adopted. See *Fed. R. Evid. 801-03*.

n4. Although a number of companies manufacture similar products, this type of device is often referred to as an "ELMO," "DOAR Communicator," or "(Wolfvision) Visualizer," taking the name from three of the best-known companies in the field.

n5. In civil cases it is likely that the evidentiary admissibility would have previously been established via pre-trial order.

n6. *Fed. R. Evid. 1002*.

n7. See *Fed. R. Evid. 1001(4)* (stating that a duplicate is "a counterpart produced by the same impression as the original, or from the same matrix, or by means of photography, including ... mechanical or electronic re-recording, or by chemical reproduction").

n8. Technically speaking, some "electronic" material is analog and not digital in nature. To avoid unnecessary technicality, this Essay ordinarily does not distinguish between analog and digital material.

n9. *Fed. R. Evid. 1003*. The rule provides for the admissibility of duplicates unless "a genuine question is raised as to the authenticity of the original," or "it would be unfair to admit the duplicate in lieu of the original." *Id.*

n10. If the image is produced from data "stored in a computer or similar device, any printout or other output readable by sight, shown to reflect the data accurately, is an original." *Fed. R. Evid. 1001(3)*. In the computer scenario, all data printouts are identical. In the case of the document camera, the process is closer to a photographic enlargement or reproduction and thus more likely a "duplicate."

n11. New forms of digital evidence include the IPIX "photobubble" or immersive reality. The computer displays a 360 degree photograph, which can be rotated about the center point. Assuming the process that produces this impressive image does not create distortions of significance, this type of evidence has no "hard copy" or traditional equivalent.

n12. See *Opposition to Government's Motion to Use Computer Litigation, United States v. Kaczynski, No. CR-S-96-259GEB, 1997 WL 567038, at *2-*3* (E.D. Cal. Sept. 12, 1997). The trial judge denied the motion by order.

n13. *Fed. R. Evid. 1001(3), (4)*.

n14. *Fed. R. Evid. 1003(2)*.

n15. While counsel were still preparing for a contested trial, the author informally and briefly

consulted with the prosecution concerning technology-related evidentiary issues.

n16. See *Fed. R. Evid. 1001(4)*.

n17. We had at least one first hand incident in an experimental Courtroom 21 Laboratory Trial of an image which, for some electronic reason, lacked one internal paragraph. The omission occurred in such a way as to effectively change an autopsy report.

n18. See, e.g., *Fed. R. Evid. 901(b)* (setting forth, by way of illustration, examples of authentication conforming with the Rule's requirements).

n19. See, e.g., *Fed. R. Evid. 901(b)(1)*.

n20. See *supra* notes 4-16 and accompanying text (discussing best evidence issues).

n21. I am indebted to the faculty of the June, 1998, National Advocacy Center Department of Justice's Technology for Investigations and Prosecutions course for this argument.

n22. Even in the 20th Century, forgery detection can be difficult. Absent a professionally questioned document examiner, "it is often impossible for a layman ... to detect a well-executed forgery...." Andrea A. Moenssens et al., *Scientific Evidence in Criminal Cases* 412 (1973). "The scientific examination of questioned documents, however, did not develop into a distinct profession until about 1870." *Id.* at 140. Note that "in a leading experiment assessing the accuracy of lay handwriting identification, Professor Inbau found that lay opinions suffer from 'an appalling degree of inaccuracy.' In this study, the highest accuracy attained by a lay witness was 29% and the average was only 11%." 2 Paul C. Giannelli & Edward J. Imwinkelried, *Scientific Evidence* 140-41 (2d ed. 1993) (footnotes omitted) (quoting Fred R. Inbau, *Lay Witness Identification of Handwriting*, 34 *Ill. L. Rev.* 433 (1939)).

n23. As opposed to the always-hard-to-determine question of what constitutes unfair prejudice.

n24. The "evidence" is the testimony of the expert. Counsel proffers the animation simply as a fair and accurate visual illustration of the testimony. See, e.g., *People v. McHugh*, 476 *N.Y.S.2d* 721 (1984). Of course, the animation may have significant persuasive impact, highlighting the difficulty implicit in claiming that the illustration is not "evidence."

n25. "Demonstrative evidence" is not dealt with per se by the Federal Rules of Evidence. Most jurisdictions are primarily concerned with potential unfair prejudice. See, e.g., *Robinson v. Missouri Pac. R.R. Co.*, 16 *F.3d* 1083 (10th Cir. 1994).

n26. The terms "reconstruction," "re-enactment," "simulation," or "visualization" are commonly used. See, e.g., *Hinkle v. City of Clarksburg*, 81 F.3d 416, 425 (4th Cir. 1996); *Robinson*, 16 F.3d at 1089 n.7; *Vornado Air Circulation Sys., Inc. v. Duracraft Corp.*, No. 92-1543-WEB, 1995 WL 794070, at *3 (D. Kan. Nov. 29, 1995).

n27. Hence, admissibility is often related to the terminology chosen. Courts that term animations "reconstructions," for example, are far more likely to hold them to a high standard, thus making them more likely to be inadmissible, than courts that describe them as "illustrations" or "demonstrations." Cf. *Gilbert v. Cosco, Inc.*, 989 F.2d 399, 402 (10th Cir. 1993) ("Experiments which purport to recreate an accident must be conducted under conditions similar to that accident, while experiments that demonstrate general principles used in forming an expert's opinion are not required to adhere strictly to the conditions of the accident.").

n28. See generally *Datshow v. Teledyne Continental Motors Aircraft Prods.*, 826 F. Supp. 677 (W.D.N.Y. 1993). In *Datskow*, the district court judge stated that:

Defendant's major objection to the video is that it was less an illustration of Sommer's testimony than a purported re-creation of the accident, and as such was unduly prejudicial. Defendant made the same argument at trial, and I overruled the objection at that time, stating (outside the presence of the jury) that I would allow the tape to be shown "to help the jury understand the expert's opinion as to what happened and that it's not meant to be a re-creation. It's some visualization to allow the jury to conceptualize and appreciate the expert's opinion as to what happened here."

Id. at 685 (quoting the Record at 724).

n29. There can be a stark variance between an image's intended and actual use. When the details inherent in an animation's depiction go beyond the actual testimony of the expert, the additional details are likely to be perceived by the fact finder as being offered for their substantive content.

n30. See *Fed. R. Evid. 801(c)* (defining hearsay as "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").

n31. *Fed. R. Evid. 703*.

n32. In the alternative, in some cases the proponent might successfully assert, by at least analogy, under Rule 1006, that the animation constitutes a "summary" of its underlying data. See *Fed. R. Evid. 1006* ("contents of

voluminous writings, recordings, or photographs which cannot conveniently be examined in court may be presented in the form of a chart, summary, or calculation"). Given the Rule's express reference to "contents of voluminous writings, recordings, or photographs," it may be too large a stretch to argue that under the Rule, an animation is appropriate as a summary of data. *Id.* Further, data is not susceptible to examination or copying, as Rule 1006 requires, in the same sense as documents. See *id.*

n33. See *Fed. R. Evid. 703* advisory committee's note.

n34. See *Fed. R. Evid. 705* (permitting an expert to testify "in terms of opinions ... without first testifying to the underlying facts or data The expert may ... be required to disclose the underlying facts or data on cross-examination.").

n35. 509 U.S. 579 (1993).

n36. See *id.* at 592-95; cf. *Frye v. United States*, 293 F. 1013, 1014 (D.C. Cir. 1923) (applicable in non-Daubert states).

n37. See *Fed. R. Evid. 403* ("Although relevant, evidence may be excluded if its probative value is substantially outweighed by the danger of unfair prejudice").

n38. What I sometimes call the "Jurassic Park effect" could come into play. Although one's intellect may recognize what the animation is, even to the degree of marveling at its excellence, that recognition may be unimportant if one's entire psyche is reacting at a more basic level by mentally screaming, "dinosaur, run!"

n39. The judge will usually have a 15- to 21-inch monitor; jurors frequently will have one monitor for every two jurors.

n40. See *Fed. R. Evid. 611(a)* (providing for the mode and order of interrogation and presentation).

n41. As distinguished from recorded videotaped testimony.

n42. This would enable witnesses to testify from anywhere--preferably, in a remote courthouse.

n43. The viewable image contains the bench, the counsel tables, and the witness stand.

n44. The McGlothlin Courtroom even includes, via AT&T LanguageLine(R), the ability to translate testimony into 140 different languages.

n45. *Fed. R. Civ. P. 43(a)*.

n46. Witness testimony requires that a witness first swear or affirm to tell the truth. See, e.g., *Fed. R. Evid.*

603. Modernly, the oath or affirmation is of particular importance because violation permits a perjury prosecution and conviction, yielding some degree of faith in the testimony. See, e.g., *Harrell v. State*, 709 So. 2d 1364, 1368 (Fla. 1998) ("Thus, the Confrontation Clause also ensures ... that the witness will give the testimony under oath, impressing upon the witness the seriousness of the matter and protecting against a lie by the possibility of penalty of perjury."). Thus, a court may condition remote testimony upon a finding that the remote witness, testifying from another state or nation, is potentially subject to a possible perjury prosecution. See *id.* at 1371.

To ensure that the possibility of perjury is not an empty threat for those witnesses [who] testify via satellite from outside the United States, it must be established that there exists an extradition treaty between the witness's country and the United States, and that such a treaty permits extradition for the crime of perjury. In the present case, an extradition treaty does exist between the United States and Argentina.

Id.

n47. See *Maryland v. Craig*, 497 U.S. 836, 852 (1990) (holding that given a case-specific finding of necessity, one-way video testimony by a child victim did not violate the Sixth Amendment); *Harrell v. State*, 709 So. 2d 1364, 1371 (Fla. 1998) (holding that two-way satellite testimony of crime victims in a foreign country did not violate federal or state constitutional requirements); *United States v. Gigante*, 971 F. Supp. 755, 759 (E.D.N.Y. 1997) (authorizing a witness in a RICO case to testify by closed-circuit television).

n48. The new Rule 804(a) defines "unavailability as a witness" for purposes of the relevant hearsay exceptions as situations in which the declarant:

(1) is exempted by ruling of the court on the ground of privilege from testifying concerning the subject matter of the declarant's statement; or

(2) persists in refusing to testify concerning the subject matter of the declarant's statement despite an order of the court to do so; or

(3) testifies to a lack of memory of the subject matter of the declarant's statement; or

(4) is unable to be present or to testify at the hearing because of death or then existing physical or mental illness or infirmity; or

(5) is absent from the hearing and the proponent of a statement has been unable to procure the declarant's attendance (or in the case of a hearsay exception under subdivision (b)(2), (3), or (4), the declarant's attendance or testimony) by process or other reasonable means.

Fed. R. Evid. 804(a)(1)-(5).

n49. If the exceptions under *Federal Rule of Evidence 803*, for example, are based in part on the desire to avoid the expense of bringing witnesses to court, would not cheap, remote testimony both meet that need and enhance the fact-finding process? See *Fed. R. Evid. 102*.

n50. See *supra* note 44 and accompanying text.

n51. See Evidence (Audio Visual and Audio Linking) Act 1997, No. 4 (Austl.).

n52. This is a key part of an amendment to Maryland's civil procedure rules. The new Rule is Md. R. Civ. P. 2-504.3 (1998) (Computer-Generated Evidence and Material).

n53. *Fed. R. Evid. 102*.