WSSFC Technology Track
Session 9

Using Cutting Edge Technology at Trial: Gadgets, Gizmos and Gimmicks

Kirk Obear
Kirk Obear Attorney at Law, Sheboygan
I. Overview

A. What is the CSI Effect?

The CSI effect is named for CSI: Crime Scene Investigation, a television program which first aired in 2000. In CSI, a fictional team of crime scene investigators solve murders in the Las Vegas metropolitan area. In each episode, the discovery of a dead body leads to a criminal investigation by members of the team, who gather and analyze forensic evidence, question witnesses, and apprehend suspects. The show's popularity led to two spin-offs: CSI: Miami, which debuted in 2002, and CSI: NY, first aired in 2004. The CSI franchise's success resulted in the production of many similar shows; in turn, the "CSI effect" has been associated with other crime shows, including American Justice, Bones, Cold Case, Cold Case Files, Cold Squad, Criminal Minds, Crossing Jordan, Forensic Files, NCIS, Numb3rs, The Secrets of Forensic Science, Silent Witness, Waking the Dead, Wire in the Blood, and Without a Trace. Based on the Nielsen ratings, six of the top ten most popular television shows in the United States in 2005 were crime dramas, and CSI: Crime Scene Investigation reached the number one ranking in November 2007.

Several aspects of popular crime shows have been criticized as being unrealistic. For instance, the show’s characters not only investigate ("process") crime scenes, but they also conduct raids, engage in suspect pursuit and arrest, interrogate suspects, and solve cases, which falls under the responsibility of uniformed officers and detectives, not CSI personnel. Additionally, if CSI’s process a crime scene it is inappropriate for them to also be involved in the examination and testing of any evidence collected from that scene as it would compromise the impartiality of scientific evidence. In real investigations, DNA and fingerprint data is often unobtainable and, when they are available, can take several weeks or months to process, whereas television crime labs usually get results within hours. In the first season of CSI, technicians made a plaster mold of the interior of a wound to determine the type of knife used to make the wound, which is not possible with current technology. Characters on television often use the word "match" to describe a definitive relationship between two pieces of evidence, whereas real forensic technicians tend to use terms that are less definite, which

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1 The description of the CSI Effect is provided courtesy of my favorite legal research tool and early morning coffee companion, Wikipedia.
acknowledges that absolute certainty is often not possible.

Anthony E. Zuiker, creator of the CSI franchise, claimed that "all of the science is accurate" on the shows; researchers, however, have described CSI's portrayal of forensic science as "high-tech magic". Forensic scientist Thomas Mauriello estimated that 40 percent of the scientific techniques depicted on CSI do not exist. In addition to using unrealistic techniques, CSI ignores all elements of uncertainty present in real investigations, and instead portrays experimental results as absolute truth. The notion that these inaccurate portrayals could alter the public perception of forensic evidence was dubbed the "CSI effect", a term which began to appear in mainstream media as early as 2004. By 2009, more than 250 stories about the CSI effect had appeared in newspapers and magazines, including articles in National Geographic, Scientific American, and U.S. News & World Report.

Although the CSI effect is a recent phenomenon, it has long been recognized that media portrayals of the United States legal system are capable of significantly altering public awareness, knowledge, and opinions of it. A 2002 juror survey showed that viewers of the popular court show Judge Judy were greatly misinformed about the purpose of the judge within a courtroom. Earlier programs which may have affected public perception of "the legal or investigative systems" include Perry Mason (1957–66), Quincy, M.E. (1976–83) and the Law & Order franchise (1990–present). News media reports on criminal trials, extensive internet blogging, and the successes of the Innocence Project have also contributed to the increased public awareness of forensic science. Zuiker has stated that "The CSI Effect' is, in my opinion, the most amazing thing that has ever come out of the series."

Nancy Grace’s show on CNN has also contributed to the perception that forensic evidence is exciting, interesting, and expected to exist in nearly all criminal prosecutions. The public has come to anticipate the salacious details of criminal prosecution and has, in a sense, become addicted to a multi-media form of portraying the criminal justice process. Nancy Grace in particular has advanced a form of sensationalism that invents facts that don’t exist and taps into the public’s ever increasing desire to see criminal defendants as depraved individuals.

The popularity of forensic crime television shows supposedly gives rise to many misconceptions about the nature of forensic science and investigation procedures among jury members. The CSI effect is hypothesized to affect verdicts in two main ways: first, that jurors expect more forensic evidence than is available or necessary, resulting in a higher rate of acquittal when such evidence is absent; and second, that jurors have greater confidence in forensic and particularly DNA evidence than is warranted, resulting in a higher rate of conviction when such evidence is present. In particular, prosecutors have reported feeling pressured to provide DNA evidence even when eyewitness testimony is available. In one highly publicized incident, Los Angeles District Attorney Steve Cooley blamed actor Robert Blake’s acquittal on murder charges on the CSI effect. Cooley noted that the not guilty verdict came despite two
By 2005, some prosecutors had begun altering their trial preparations and procedures in an attempt to counter the CSI effect. Some ask questions about forensic television viewership during voir dire to target biased jurors; others use opening statements and closing arguments to minimize the possible impact of the CSI effect, and instruct jurors to adhere to the court's standards of evidence rather than those seen on television. Prosecutors have even hired expert witnesses to explain why particular forms of physical evidence are not relevant to their cases. In one Australian murder case, the defense counsel requested a judge-only trial to avoid having DNA evidence misinterpreted by a jury. By 2006, the CSI effect had become widely accepted as reality among legal professionals, despite little empirical evidence to validate or disprove it. A 2008 survey by researcher Monica Robbers showed that roughly 80 percent of all American legal professionals believed they had had decisions affected by forensic television programs.

New York University professor Tom R. Tyler argued that, from a psychological standpoint, crime shows are more likely to increase the rate of convictions than acquittals, as the shows promote a sense of justice and closure which is not attained when a jury acquits a defendant. The perceived rise in the rate of acquittals may be related to sympathy for the defendant or declining confidence in legal authorities. A 2006 survey of U.S. university students reached a similar conclusion: the influence of CSI is unlikely to burden prosecutors, and may actually help them.

One of the largest empirical studies of the CSI effect was undertaken in 2006 by Washtenaw County Circuit Court Judge Donald Shelton and two researchers from Eastern Michigan University. They surveyed more than 1,000 jurors, and found that while juror expectations for forensic evidence had increased, there was no correlation between viewership of crime shows and tendency to convict. One alternate explanation for the changing perception of forensic evidence is the so-called "tech effect": as technology improves and becomes more prevalent throughout society, people develop higher expectations for the capabilities of forensic technology. Shelton described one instance in which a jury member complained because the prosecution had not dusted the lawn for fingerprints, a procedure which is impossible and had not been demonstrated on any crime show. A later study by the same authors found that frequent CSI viewers may place a lower value on circumstantial evidence, but their viewership had no influence on their evaluation of eyewitness testimony or their tendency to convict in cases with multiple types of evidence.

Many stories about the CSI effect assume that there has been an increase in acquittal rates, though this is often based entirely on anecdotal evidence. A 2009 study of conviction statistics in eight states found that, contrary to the opinions of criminal prosecutors, the acquittal rate has decreased in the years since the debut of CSI. The outcome of any given trial is much more strongly dependent on the state in which it
took place, rather than whether it occurred before or after the CSI premiere. A 2010 study by the University of Wisconsin–Milwaukee suggests that, while there may be a correlation between crime show viewership and a perceived understanding of DNA evidence, there was no evidence that such viewership affected jury decision making. As of August 2010, no empirical evidence has demonstrated a correlation between CSI viewership and acquittal rates. One researcher suggested that the perception of a CSI effect—and of other courtroom effects, such as Perry Mason syndrome and white coat syndrome—is caused not by the incompetence of jury members, but by a general distrust of the jury system as a whole.

Let's take a look the Sheldon data investigating juror expectations of having scientific evidence in a variety of criminal case contexts:

![Graph showing percentage of jurors who expect scientific evidence from prosecution in various crime contexts](image)
Summary of study findings: Scientific evidence of some kind is expected in every case by 46% of the jurors, in murder cases by 74%, in assault cases by 43%, in rape cases by 73%, in breaking and entering cases by 49%, in theft cases by 38%, and in crimes involving a gun by 55%. Fingerprint evidence is expected in every case by 36% of the jurors, in murder cases by 61%, in assault cases by 35%, in rape cases by 41%, in breaking and entering cases by 71%, in theft cases by 59%, and in crimes involving a gun by 66%. Ballistics evidence is expected in every case by 32% of the jurors, in murder cases by 62%, in assault cases by 23%, in rape cases by 18%, in breaking and entering cases by 17%, in theft cases by 16%, and in crimes involving a gun by 77%. DNA evidence is expected in every case by 22% of the jurors, in murder cases by 46%, in assault cases by 28%, in rape cases by 73%, in breaking and entering cases by 18%, in theft cases by 12%, and in crimes involving a gun by 17%.

The CSI effect has influenced the manner in which forensic scientists are educated and trained. In the past, those who sought to enter the field of forensics typically earned an undergraduate degree in a science, followed by a master's degree. However, the popularity of programs such as CSI has caused an increase in the demand for undergraduate courses and graduate programs in forensic science. In 2004, the forensics programs at Florida International University and the University of California, Davis doubled in size, reportedly as a result of the CSI effect. However, many students enter such programs with unrealistic expectations. Vocational interest in forensic science has proliferated among students in countries besides the United States, including Australia, the United Kingdom, and Germany. The increased popularity of the forensic science program at the University of Lausanne in Switzerland has also been attributed to the CSI effect. Fourth graders are also reported to be asking for microscopes for Christmas with increasing frequency.

Although the increased popularity of forensics programs means there are more applicants for jobs at crime labs, there is some concern that these courses do not adequately prepare students for real forensics work, as graduates often lack a firm grasp of basic scientific principles that would come from a science degree. Many forensics students are presented with streamlined exercises with overly clear answers, which may give them distorted perceptions of the power of forensic science. The Albuquerque Police Department has attempted to improve scientific literacy among future forensic scientists and jurors alike by developing a "Citizen CSI" course which familiarizes local citizens with the "capabilities and limitations of authentic forensic science techniques."

Law enforcement officers often receive inquiries and demands about their investigations that stem from unrealistic portrayals on television. In a 2010 survey of Canadian police officers, some were frustrated by these CSI-affected queries, though most saw them as opportunities to inform the public about real police work. New technologies and the increased public awareness of forensic science have stimulated new interest in solving cold cases and encouraged higher accountability among police investigators. However, the increased demand for forensic evidence can cause an unmanageable workload for forensic laboratories. Some crime labs process several thousand cases every year. Many law enforcement agencies have insufficient storage
space for the increasing amount of physical evidence they collect. In some investigations, DNA evidence is not collected simply because there is not enough space to store it properly.

B. How does the CSI Effect help the Defense?

Now that we understand that the CSI Effect has an effect on juror expectations, even if it does not necessarily translate to a higher acquittal rate, the defense can take advantage of our current cultural response to criminal prosecutions in many ways.

1. Cases where the evidence does not meet juror expectations: Jurors are more inclined to expect some type of evidence that consists of more than just an arresting officers testimony simply because the public is aware of technological capabilities. When the prosecution does not bother to present audio-visual depictions or recordings, there is a question as to why. In those cases where the evidence was either not preserved, or if the officer has deliberately taken action to NOT record some type of interaction, the inference that can be drawn is valuable to the defense. Spoliation instructions and tapping into the public’s expectations that this type of evidence is now commonplace and readily available may create a viable defense issue in even the toughest cases. For example, when the squad video starts after an alleged traffic violation, even though the system utilizes DVR memory to back up 60 seconds prior to the traffic stop. The system is designed to document the officer’s observations, but the officer failed to utilize that capability.

2. Cases where the defense can use the State’s audio-visual evidence to supplement the theory of the case: Often, there are multiple sources of information that can be accessed either through a discovery demand or through an open records request. Obviously, the squad video is an essential part of the investigation and is a good starting point. However, also consider any video of the intoximeter room, recordings of the radio traffic between dispatch and law enforcement, 911 or citizen calls, and recordings made by other squad cars that may have been on the scene. While its true that sometimes these are videos that we don’t want the jury to see, more often than not they can be used to contrast the testimony of the officer and his / her reliance on their reports with other facts that may contradict the testimony.

3. Cases where the defense can introduce additional evidence, beyond what the State can provide: This is where we have the chance to have the most fun. Think about these possibilities:
   a. Surveillance video from the bar or tavern;
   b. Outdoor surveillance video from local business along the route of travel;
   c. Cell phone location or GPS data from cell phone providers;
   d. Google maps or satellite photos;
   e. Photos of the scene of the arrest, including the condition of the
ground, angles of incline, debris, etc...;
f. Photos of the defendant’s shoes, clothing, or wonky eyes;
g. Photos of the size of the glass that the defendant drank out of (at the bar - just go there and take a picture);
h. Facebook/ twitter / text messages to determine when a person actually left the bar, perhaps in the context of a curve defense.

4. We may also wish to consider the enhancement of videos or other recordings that we may have received from the State in order to help with illustrating a particular point. Examples are the use of captions to assist the jury in what a person is saying; the use of a timer added to the video to show how long the officer is taking to move the stimulus for the HGN test, or zooming in on a particular component of the video to show what the officer is doing wrong when administering a field sobriety test.

5. Let’s also consider the fact that videos or other recordings often include information that we want excluded and must be taken out of the recording (edited). Examples include suppressible statements, administration of a PBT, or discussion of the defendant’s prior record. Use of video editing software, discussed below, can take these portions out of the recording and leave the portion that you wish to use intact.

II. Overview of Demonstrative Evidence

§909.01 General provision. The requirements of authentication or identification as a condition precedent to admissibility are satisfied by evidence sufficient to support a finding that the matter in question is what its proponent claims.

A. It should be relatively easy to establish the foundation for most evidence we seek to introduce, especially when we are proposing to admit demonstrative evidence. “Before a demonstrative videotape may be admitted, there must be a foundation that it is a fair and accurate reproduction of what was seen and that it was produced under conditions reasonably similar to conditions of the actual event. Even with the foundation established, the evidence may be excluded on a finding that its probative value is outweighed by its prejudicial effect.” State v. Peterson, 222 Wis. 2d 449, 588 N.W.2d 84 (Ct. App. 1998). So although there is a threshold requirement that relates to an enhancement of a video or a recording obtained by the defense, it does not need to meet the same rigorous requirements as testimonial or real evidence would. “Authentication does not require proving that the documents are incontrovertibly what they purport to be, but rather authentication requires presenting evidence sufficient to support a finding that the documents are what they purport to be.” Horak v. Building Services Industrial Sales Company, 2012 WI App 54, 329 Wis. 2d 240, 815 N.W.2d 400.

B. On the other hand, there is good case law to prevent the prosecution from utilizing a demonstrative exhibit in lieu of, or to enhance the credibility of actual testimony. A demonstrative exhibit may summarize other testimony that has been
admitted, but it may not become exclusively testimonial. “Computer-generated animation used as a demonstrative exhibit to show the scene and events of an alleged crime is not exempt from longstanding foundation requirements. Demonstrative computer-generated animation should be introduced in conjunction with the witness's testimony it seeks to clarify, as any diagram or photo intended to clarify a lay witness's testimony would be introduced. In this case, the animation was testified to by the animator and not by any witness and was nothing more than bits and pieces from each of the state's witnesses that, when mixed together, effectively represented the animator's own version of what occurred at the time and place in question” State v. Denton, 2009 WI App 78, 319 Wis. 2d 718, 768 N.W.2d 250. Note that this rule is relaxed when a demonstrative exhibit is utilized in closing argument, as long as the demonstrative exhibit fairly summarizes the evidence and does not assume any facts that are not in evidence. Remember that by its very nature, argument includes the process of drawing inferences and logical conclusions from the evidence and the jury is always cautioned that argument is only the opinion of the lawyer.

§909.015 General provision; illustrations. By way of illustration only, and not by way of limitation, the following are examples of authentication or identification conforming with the requirements of s. 909.01:

(1) Testimony of witness with knowledge. Testimony of a witness with knowledge that a matter is what it is claimed to be.

(2) Nonexpert opinion on handwriting. Nonexpert opinion as to the genuineness of handwriting, based upon familiarity not acquired for purposes of the litigation.

(3) Comparison by trier of fact or expert witness. Comparison by the trier of fact or by expert witnesses with specimens which have been authenticated.

(4) Distinctive characteristics and the like. Appearance, contents, substance, internal patterns, or other distinctive characteristics, taken in conjunction with circumstances.

(5) Voice identification. Identification of a voice, whether heard firsthand or through mechanical or electronic transmission or recording, by opinion based upon hearing the voice at any time under circumstances connecting it with the alleged speaker.

(6) Telephone conversations. Telephone conversations, by evidence that a call was made to the number assigned at the time by the telecommunications company to a particular person or business, if:

(a) In the case of a person, circumstances, including
self-identification, show the person answering to be the one called; or

(b) In the case of a business, the call was made to a place of business and the conversation related to business reasonably transacted over the telephone.

(7) Public records or reports. Evidence that a writing authorized by law to be recorded or filed and in fact recorded or filed in a public office, or a purported public record, report, statement, or data compilation, in any form, is from the public office where items of this nature are kept.

(8) Ancient documents or data compilations. Evidence that a document or data compilation, in any form:

(a) Is in a condition that creates no suspicion concerning its authenticity;

(b) Was in a place where it, if authentic, would likely be; and

(c) Has been in existence 20 years or more at the time it is offered.

(9) Process or system. Evidence describing a process or system used to produce a result and showing that the process or system produces an accurate result.

(10) Methods provided by statute or rule. Any method of authentication or identification provided by statute or by other rules adopted by the supreme court.

For more background on the legislative intent behind §909.01 and its Federal Counterpart Rule 901, see the Federal Advisory Committee Note which follows this outline, also found at 59 Wis.2d R18-R19.

III. Procedure

A. Motions in Limine. Especially in the context of a video that you have edited, it is a good idea to file a motion in limine to permit the defense to utilize the edited version of the video with an explanation of why the different portions were taken out. Our office does this when there is a dispute about what should be left in or what should be taken out. A copy of the proposed edited recording should be provided to the court and opposing counsel well in advance of the final pretrial date.
B. Rule 901 (§909.01) Evidentiary Hearing. Best utilized for situations where you have obtained evidence on your own and you want to have the court determine if the evidence will be admitted under the standards outlined in Rule 901. This may or may not require a foundation witness, depending on the nature of the evidence. Two Step Process: (1) Court determines if there has been a prima facie authentication or identification; (2) Once a prima facie showing is made, the thing or statement is admitted, unless barred by some other evidentiary principle. Admission does not, however, require the fact finder to accept the evidence as genuine or the assertion as true.

C. Disclosure of Demonstrative Aids for Closing Argument. This should be done if you have a demonstrative exhibit that either summarizes the law (such as the burden of proof), or if there is any risk that the State will object to how you have presented audio / video / photographs, especially if edited. Our office will sometimes provide a copy of the closing argument slide show if there is anything that may be objected to. More often than not, however, you will end up assembling or editing the powerpoint presentation on the fly during breaks in the trial. I usually have a basic structure already assembled and then I add or take out items based on how the evidence came in. (There is always that “gem” that the cop gives you that you hadn’t counted on.)

D. Stipulation and Order. If both sides agree on what should be removed from a recording, it is best to submit a stipulation and order regarding how the original video was modified, along with a copy of the recording so that the record will be complete.

E. Motion and Order for Pre-Admission of Self-Authenticating Exhibit under Rule 902 (§909.02). This can be used for evidence that falls within the self-authentication rule (see above). It is a good idea to get the court to sign the order in advance so that you don’t have to take a break during trial and so that you can work it into your powerpoint presentation. For example, telephone recordings as discussed in §909.015.


A. Trial Tool Box

1. **Camtasia**: The gold standard tool for extracting audio and video, recording screen shots, and editing video. Can overdub, zoom in, add captions, splice, and enhance. Also has screenshot capabilities. Cost = $350.00

2. **Adobe Standard**: Includes OCR technology for cutting and pasting
both text and imagery. Can save in a variety of formats. Can cut
and paste between programs. Also, you can use the screen view
mode to eliminate your windows tool bars and borders by using
PrtScr function. Cost = $190.00

3. **Windows Movie Maker**: A less sophisticated, but free version of
Camtasia. Can be used effectively to edit portions of video out.
Cost = Free

4. **Total Recorder**: A “what you hear” recording application that will
capture any sound produced by your computer and save it in any
format you wish. Can be used to capture streaming audio, or for
converting .wav files to .mp3 for easier manipulation. Cost = $40

5. **PowerPoint or Presentations**: Essential for opening, closing
argument, cross of the police officer. Can cut and past audio, video
and .pdf documents directly into the presentation. Cost = (comes
with most office bundled products, either WordPerfect or Microsoft
Office)

6. **Windows Paint**: If you need to resize or reformat a photograph,
paint can convert or change the file size for better use in a
presentation. Cost = Free

7. **Apple TV or Virtual Screen**: No need for a projector if you have a
TV. Wirelessly connects directly and the resolution is much better
than a computer projector. Also, the TV can be placed much closer
to the jurors than a typical projection screen. Cost = $100

8. **VOB to MP4 converter**: Can be used to extract video from a DVD
to MP4 format, which then can be inserted into a powerpoint or
acrobat document. Cost = $40
Federal Rule 901

Notes of Advisory Committee on Rules (1972)

Subdivision (a): Authentication and identification represent a special aspect of relevancy. Michael and Adler, REAL PROOF, 5 Vand.L.Rev. 344, 362 (1952); McCormick §§ 179, 185; MORGAN, BASIC PROBLEMS OF EVIDENCE 378. (1962). Thus a telephone conversation may be irrelevant because on an unrelated topic or because the speaker is not identified. The latter aspect is the one here involved. WIGMORE describes the need for authentication as "an inherent logical necessity." 7 WIGMORE § 2129, p. 564.

This requirement of showing authenticity or identity fails in the category of relevancy dependent upon fulfillment of a condition of fact and is governed by the procedure set forth in Rule 104(b).

The common law approach to authentication of documents has been criticized as an "attitude of agnosticism," MCCORMICK, Cases on Evidence 388, n. 4 (3rd ed. 1956), as one which "departs sharply from men's customs in ordinary affairs," and as presenting only a slight obstacle to the introduction of forgeries in comparison to the time and expense devoted to proving genuine writings which correctly show their origin on their face, MCCORMICK § 185, pp. 395, 396. Today, such available procedures as requests to admit and pretrial conference afford the means of eliminating much of the need for authentication or identification. Also, significant inroads upon the traditional insistence on authentication and identification have been made by accepting as at least prima facie genuine items of the kind treated in Rule 902, infra. However, the need for suitable methods of proof still remains, since criminal cases pose their own obstacles to the use of preliminary procedures, unforeseen contingencies may arise, and cases of genuine controversy will still occur.

Subdivision (b):

The treatment of authentication and identification draws largely upon the experience embodied in the common law and in statutes to furnish illustrative applications of the general principle set forth in subdivision (a). The examples are not intended as an exclusive enumeration of allowable methods but are meant to guide and suggest, leaving room for growth and development in this area of the law.

The examples relate for the most part to documents, with some attention given to voice communications and computer print-outs. As WIGMORE noted, no special rules have been developed for authenticating chattels. WIGMORE, Code of Evidence § 2086 (3rd ed. 1942).

It should be observed that compliance with requirements of authentication or identification by no means assures admission of an item into evidence, as other bars, hearsay for example, may remain.
Example (1). Example (1) contemplates a broad spectrum ranging from testimony of a witness who was present at the signing of a document to testimony establishing narcotics as taken from an accused and accounting for custody through the period until trial, including laboratory analysis. See California Evidence Code § 1413, eyewitness to signing.

Example (2). Example (2) states conventional doctrine as to lay identification of handwriting, which recognizes that a sufficient familiarity with the handwriting of another person may be acquired by seeing him write, by exchanging correspondence, or by other means, to afford a basis for identifying it on subsequent occasions. MCCORMICK § 189. See also California Evidence Code § 1416. Testimony based upon familiarity acquired for purposes of the litigation is reserved to the expert under the example which follows.

Example (3). The history of common law restrictions upon the technique of proving or disproving the genuineness of a disputed specimen of handwriting through comparison with a genuine specimen, by either the testimony of expert witnesses or direct viewing by the triers themselves, is detailed in 7 WIGMORE §§ 1991-1994. In breaking away, the English Common Law Procedure Act of 1854, 17 and 18 Viet., c. 125, § 27, cautiously allowed expert or trier to use exemplars "proved to the satisfaction of the judge to be genuine" for purposes of comparison. The language found its way into numerous statutes in this country, e.g., California Evidence Code §§ 1417, 1418. While explainable as a measure of prudence in the process of breaking with precedent in the handwriting situation, the reservation to the judge of the question of the genuineness of exemplars and the imposition of an unusually high standard of persuasion are at variance with the general treatment of relevancy which depends upon fulfillment of a condition of fact. Rule 104(b). No similar attitude is found in other comparison situations, e.g., ballistics comparison by jury, as in Evans v. Commonwealth, 230 Ky. 411, 19 S.W.2d 1091 (1929), or by experts, Annot. 26 A.L.R.2d 892, and no reason appears for its continued existence in handwriting cases. Consequently Example (3) sets no higher standard for handwriting specimens and treats all comparison situations alike, to be governed by Rule 104(b). This approach is consistent with 28 U.S.C. § 1731: "The admitted or proved handwriting of any person shall be admissible, for purposes of comparison, to determine genuineness of other handwriting attributed to such person."

Precedent supports the acceptance of visual comparison as sufficiently satisfying preliminary authentication requirements for admission in evidence. Brandon v. Collins, 267 F.2d 731 (2d Cir. 1959); Wausau Sulphate Fibre Co. v. Commissioner of Internal Revenue, 61 F.2d 879 (7th Cir. 1932); Desimone v. United States, 227 F.2d 864 (9th Cir. 1955).

Example (4). The characteristics of the offered item itself, considered in the light of circumstances, afford authentication techniques in great variety. Thus a document or telephone conversation may be shown to have emanated from a particular person
by virtue of its disclosing knowledge of facts known peculiarly to him; Globe Automatic Sprinkler Co. v. Braniff, 89 Okl. 105, 214 P. 127 (1923); California Evidence Code § 1421; similarly, a letter may be authenticated by content and circumstances indicating it was in reply to a duly authenticated one. MCCORMICK § 192; California Evidence Code § 1420. Language patterns may indicate authenticity or its opposite. Magnuson v. State, 187 Wis. 122, 203 N.W. 749 (1925); Arens and Meadow, PSYCHOLINGUISTICS AND THE CONFESSION DILEMMA, 56 Colum.L.Rev. 19 (1956).

Example (5). Since aural voice identification is not a subject of expert testimony, the requisite familiarity may be acquired either before or after the particular speaking which is the subject of the identification, in this respect resembling visual identification of a person rather than identification of handwriting. Cf. Example (2), supra, People v. Nichols, 378 Ill. 487, 38 N.E.2d 766 (1942); McGuire v. State, 200 Md. 601, 92 A.2d 582 (1952); State v. McGee, 336 Mo. 1082, 83 S.W.2d 98 (1935).

Example (6). The cases are in agreement that a mere assertion of his identity by a person talking on the telephone is not sufficient evidence of the authenticity of the conversation and that additional evidence of his identity is required. The additional evidence need not fall in any set pattern. Thus the content of his statements or the reply technique, under Example (4), supra, or voice identification under Example (5), may furnish the necessary foundation. Outgoing calls made by the witness involve additional factors bearing upon authenticity. The calling of a number assigned by the telephone company reasonably supports the assumption that the listing is correct and that the number is the one reached. If the number is that of a place of business, the mass of authority allows an ensuing conversation if it relates to business reasonably transacted over the telephone, on the theory that the maintenance of the telephone connection is an invitation to do business without further identification. Matton v. Hoover Co., 350 Mo. 506, 166 S.W.2d 557 (1942); City of Pawhuska v. Crutchfield, 147 Okl. 4. 293 P. 1095 (1930); Zurich General Acc. &Liability Ins. Co. v. Baum, 159 Va. 404, 165 S.E. 518 (1932). Otherwise, some additional circumstance of identification of the speaker is required. The authorities divide on the question whether the self-identifying statement of the person answering suffices. Example (6) answers in the affirmative on the assumption that usual conduct respecting telephone calls furnish adequate assurances of regularity, bearing in mind that the entire matter is open to exploration before the trier of fact. In general, see McCormick § 193; 7 Wigmore § 2155: Annot., 71 A.L.R. 5, 105 id. 326.

Example (7). Public records are regularly authenticated by proof of custody, without more. MCCORMICK § 191; 7 Wigmore §§ 2158, 2159. The example extends the principle to include data stored in computers and similar methods, of which increasing use in the public records area may be expected. See California Evidence Code §§ 1532, 1600.

Example (8). The familiar ancient document rule of the common law is extended to include data stored electronically or by other similar means. Since the importance
of appearance diminishes in this situation, the importance of custody or place where found increases correspondingly. This expansion is necessary in view of the widespread use of methods of storing data in forms other than conventional written records.

Any time period selected is bound to be arbitrary. The common law period of 30 years is here reduced to 20 years, with some shift of emphasis from the probable unavailability of witnesses to the unlikeliness of a still viable fraud after the lapse of time. The shorter period is specified in the English Evidence Act of 1938, 1 & 2 Geo. 6, c. 28, and in Oregon R.S. 1963, § 41.360(34). See also the numerous statutes prescribing periods of less than 30 years in the case of recorded documents. 7 Wigmore § 2143.

The application of Example (8) is not subject to any limitation to title documents or to any requirement that possession, in the case of a title document, has been consistent with the document. See McCormick § 190.

Example (9). Example (9) is designed for situations in which the accuracy of a result is dependent upon a process or system which produces it. X-rays afford a familiar instance. Among more recent developments is the computer, as to which see Transport Indemnity Co. v. Seib, 178 Neb. 253, 132 N.W.2d 871 (1965); State v. Veres, 7 Ariz.App. 117, 436 P.2d 629 (1968); Merrick v. United States Rubber Co., 7 Ariz.App. 433, 440 P.2d 314 (1968); Freed, Computer Print-Outs as Evidence, 16 Am.Jur. Proof of Facts 273; Symposium, Law and Computers in the Mid-Sixties, ALI-ABA (1966); 37 Albany L.Rev. 61 (1967). Example (9) does not, of course, foreclose taking judicial notice of the accuracy of the process or system.

Example (10). The example makes clear that methods of authentication provided by Act of Congress and by the Rules of Civil and Criminal Procedure or by Bankruptcy Rules are not intended to be superseded. Illustrative are the provisions for authentication of official records in Civil Procedure Rule 44 and Criminal Procedure Rule 27, for authentication of records of proceedings by court reporters in 28 U.S.C. § 753(b) and Civil Procedure Rule 80(c), and for authentication of depositions in Civil Procedure Rule 30(f).