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## Title

8. Real Evidence, Other Nontestimonial Evidence, and Demonstrative Aids  
Chapter

21. Real Evidence, Other Nontestimonial Evidence, and Demonstrative Aids

**§ 214. Demonstrative aids***Supplements to Notes in Main Volume*

It is today increasingly common to encounter the use of demonstrative aids throughout a trial. These aids are offered to illustrate or explain the testimony of witnesses,[1] including experts, and to present complex or voluminous documents[2]; and counsel also rely on such aids during opening and closing statements. Demonstrative aids take many forms; the types discussed in this section are duplicates, models, maps, sketches and diagrams,[3] and computer-generated pedagogic aids.[4] Unlike real evidence, the availability of which will frequently depend upon circumstances beyond counsel's control, opportunities for the use of the types of demonstrative evidence here considered are limited only by counsel's ability to generate them. The potential of these aids for giving clarity and adding interest to spoken statements has brought about their widespread use, which will undoubtedly continue in the future.[5]

*Relevant for "Illustrative" Use Only.* Demonstrative aids are defined here by the purpose for which they are offered at trial: to illustrate other admitted evidence and thus to render it more comprehensible to the trier of fact.[6] They have been called "derivative" evidence because, in theory at least, demonstrative aids do not have *independent* probative value for determining the substantive issues in the case.[7] They are relevant, again in theory, only because of the assistance they give to the trier in understanding other real, testimonial and documentary evidence.[8]

As discussed in § 212 supra, demonstrative aids are defined ...

*Authentication as "Fair and Accurate" Representation of Other Evidence.* When a demonstrative aid is presented, its foundation differs considerably from the requirements for authenticating real evidence. It is not an object that itself was specifically connected to the parties or played a part in the events underlying the litigation. Its source and how it was created may be of no significance whatever.[9] Instead, the theory justifying its admission is that the item is a fair and accurate representation of relevant testimony or documentary evidence otherwise admitted in the case. Typically an aid will be identified by a witness, during the witness's testimony, as a substantially correct representation of something the witness once perceived and is now describing. This satisfies the sufficiency standard of Rule 901(b)(1), as discussed in § 212 supra. Whether the admission of a particular demonstrative aid will in fact be helpful, or will instead tend to confuse or mislead the trier, is a matter within the sound discretion of the trial court, in most jurisdictions decided pursuant to Rule 403. [10]

and Federal Rule of Evidence 611(a).

*Status as Exhibit.* While all jurisdictions allow the use of demonstrative aids throughout trial, there is some diversity of judicial opinion concerning their precise evidentiary status. Many jurisdictions treat such items as admissible exhibits which may be reviewed on appeal<sup>[11]</sup> and sometimes viewed by the jury during deliberations. Other courts treat them differently, either admitting them for “demonstrative purposes” only or refusing to admit them at all as exhibits.<sup>[12]</sup> These courts then differ on whether to allow them into the jury room during deliberations,<sup>[13]</sup> the major concern being the persuasive power of such demonstrative aids and the risk of unfair presentation.<sup>[14]</sup> Even if they are not so allowed, there appears to be no reason to deny admission and status as an exhibit to such items.

However, even when they could be admitted, it is not uncommon for demonstrative aids to be displayed and referred to without ever being formally offered or admitted into evidence.<sup>[15]</sup> Numerous appellate courts have commented upon the difficulties created on appeal when crucial testimony has been given in the form of indecipherable references to an object not available to the reviewing court.<sup>[16]</sup> The clearly preferable practice is for the proponent to offer a demonstrative aid into evidence as an exhibit, to authenticate it by the testimony of a witness, and formally to introduce it as part of the witness's testimony, in which it will be incorporated by reference.<sup>[17]</sup> When the record is not so perfected many courts have presumed that the illustrative items and testimony referring to them support the verdict, making it in the interest of both parties to clarify the record.<sup>[18]</sup>

As stated above, it has also become customary for counsel to make use of demonstrative aids during opening statements and closing arguments.<sup>[19]</sup> The status of these aids is unclear, whether created by the attorney's use of chalkboards and large pads of paper or as power point slide shows. It has been suggested that if these aids either will be, or have been, admitted as exhibits for use during trial, their status is unchanged by counsel's usage; but if their use is only to dramatize counsel's own words or to suggest counsel's inferences about the substantive evidence, then they should be viewed as part of the counsel's statement or argument and should not be available to the jury during its deliberations.<sup>[20]</sup>

*Duplicates.* A duplicate item may often properly be used in lieu of real evidence. Articles actually involved in a transaction or occurrence may be lost or unavailable, or witnesses may be unable to testify that the article present in court is the identical one they have previously observed. Where only the generic characteristics of the item are significant, no objection would appear to exist to the introduction of a substantially similar duplicate.<sup>[21]</sup> The relevant purpose of such items is to illustrate the characteristics of an object that a witness is testifying was involved in the events at issue. While admissibility is generally viewed as within the discretion of the trial court,<sup>[22]</sup> it has been suggested that it would constitute reversible error to exclude a duplicate testified to be identical to the object involved in the occurrence.<sup>[23]</sup> On the other hand, if there is an absence of testimony that the object to be illustrated ever existed, the introduction of a duplicate may foster a mistaken impression of certainty and thus merit exclusion.<sup>[24]</sup>

*Models, maps, sketches, and diagrams.* These demonstrative aids, as distinguished from duplicates, are by their nature less easily confused with real evidence. They are relevant under the theory that they illustrate and explain live testimony, and they are authenticated simply on the basis of testimony from a witness that they are substantially accurate representations of what that witness is trying to describe.<sup>[25]</sup> Probative dangers may exist because exhibits of this kind can be more misleading than helpful due to inaccuracies, variations of scale, distortion of perspective etc.<sup>[26]</sup> If discretionary control pursuant to Rule 403 is applied, probative value is measured by the degree to which the judge thinks that the item will assist the trier of fact in understanding the witness's testimony. When the trial court has exercised its discretion to admit, it will only rarely be found in error. This is particularly true if the potentially misleading features have been pointed out by witnesses for the proponent, or could have been exposed upon cross-examination.<sup>[27]</sup>

*Computer-Generated Pedagogic Aids.* The use of all types of computer-generated evidence has increased dramatically during recent years, and the trend seems certain to continue as courtrooms become even better equipped to present all forms of computer displays. There are certain types of computer-generated exhibits (CGEs) that fit com-

fortably within the class of demonstrative aids as defined here. Their purpose is to display, and to help the jury understand, evidence that is otherwise admitted. Thus they are also referred to as “pedagogic” aids. The majority position is that such computer-generated aids are not themselves exhibits, and would not be used by the jury during deliberation.[28]

Commonly used types of such aids are now described.

*Static Images.* Static images are non-moving images, or still illustrations, that are created by, or stored in, a computer and are projected at trial onto a large screen or individual monitors by a computer display system.[29] Drawings, objects, scenes or mechanisms can be displayed in this way. When used to illustrate the testimony of a witness, these types of CGEs are treated by courts and commentators no differently from more traditional modes of presentation on chalkboards or easels.[30]

*Enhanced Images.* Enhanced images are presented in static form for the most part, but are subject to computer-driven manipulation to achieve, for example, highlighting, enlargement, split screen presentation and emphasis through the use of zoom, different colors, arrows and the like.[31] Again, while this type of manipulation is more engaging, efficient and perhaps effective than similar techniques created to emphasize points in testimony without a computer, it remains within the category of demonstrative aid so long as it accurately illustrates what a witness has to say.[32] The authenticating testimony from a witness would establish the substantial accuracy of the CGE as reflecting what the witness is trying to describe, and any potential probative dangers in the enhancement would be considered by the trial judge pursuant to Rule 403. [33]

*Animations.* Computer-generated animations present a series of static images which the computer can show in rapid succession. This creates the illusion of motion, like a cartoon. Many simple animations are offered to illustrate the factual testimony of a witness. For example, an animated CGE might portray the simple motion of a person walking; or, the images can move in rotation to show an object from different perspectives; gradual enlargement can show an object or scene from different distances. These simple animations are not used for the purpose of recreating or simulating an event. The authenticating testimony from a witness would establish that the animated CGE is a fair and accurate representation of what the witness is trying to describe, and admission of the animation would be within the discretion of the trial judge pursuant to Rule 403. [34]

More complex “re-creation” animations illustrate the events that form the basis of the parties' dispute. They are offered as illustrative of the expert opinion of a testifying expert witness. Thus, as a demonstrative aid, they could be authenticated by the expert's testimony that the animation fairly and accurately represents that opinion.[34.1] Critics of the use of re-creation animations are concerned that they are not simply illustrative; that they incorporate hearsay from persons who provide information to the animators, the hearsay opinions of the animators themselves,[35] and the technical principles used in the computer software to generate the animation. The re-creation animation may thus serve as a conduit for independent substantive, and potentially inadmissible, evidence. This is a serious objection. If the animation, or any illustrative demonstrative aid, also conveys substantive evidence to the jury beyond the scope of the foundation that it simply “illustrates” a witness's testimony, then this foundation is not adequate. This problem is discussed in depth in § 218 *infra*. [36] See also §§ 215 and 216 *infra*, for related discussion of the mixed illustrative and substantive use of photographs, video and film recordings.

*Summaries and Charts as Pedagogic Aids.* In addition to illustrating the testimony of a witness, CGEs can also be developed to summarize and display evidence (particularly documentary evidence) that has already been admitted at trial.[37] These pedagogic aids are welcomed as effective trial management aids pursuant to Federal Rule of Evidence 611(a), so long as they are limited in scope to summarizing admitted exhibits. Even if Rule 901 does not necessarily apply when the summary or chart will not be an exhibit, a foundation for the accuracy of the summary should be presented by the proponent.[38] The trial court's decision to permit the use of summary charts and witnesses is reviewed for abuse of discretion.[39] Summaries and charts used as pedagogic aids are to be distinguished from summaries admitted under Federal Rule of Evidence 1006, discussed in § 241 *infra*.

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[FN1] Smith v. Ohio Oil Co., 134 N.E.2d 526 (Ill.App.1956) (holding skeleton properly admitted to illustrate medical testimony and distinguishing between “real” and “demonstrative” evidence); United States v. Buck, 324 F.3d 786 (5th Cir. 2003) (use of a diagram summarizing testimony and other evidence permitted as a demonstrative or pedagogical aid).

[FN2] United States v. Bray, 139 F.3d 1104 (6th Cir. 1998) (discussing several categories of demonstrative aids).

[FN3] Brain & Broderick, The Derivative Relevance of Demonstrative Evidence: Charting Its Proper Evidentiary Status, 25 U.C. Davis L.Rev 957, 960 (1992): “Cases referring to the use of models, charts, and diagrams to clarify or highlight other evidence ... are legion.”

[FN4] Verizon Directories Corp. v. Yellow Book USA, Inc., 331 F.Supp.2d 136 (E.D.N.Y. 2004).

[FN5] See authorities cited in § 212 note 2 supra, including Mnookin, The Image of Truth: Photographic Evidence and the Power of Analogy, 10 Yale J. L. & Human. 1, 65 (1998) (describing the emergence of the “culture of construction” within the courtroom, in which “[e]vidence was now something not only to be found, but to be made”). See also Baer and Riley, Technology in the Courtroom: Computerized Exhibits and How to Present Them, 66 Def. Couns.J. 176 (1999) (computerized display systems “provide a means of storing, organizing and clearly presenting large quantities of information in a relatively inexpensive and easy-to-use format”); Kissane-Gaisford, The Case for Disc-Based Litigation: Technology and the Cyber Courtroom, 8 Harv.J.L. & Tech. 471, 472 (1995) (“the normative goal of juror participation can be furthered with the use of high-technology presentation devices”). Sherwin, Feigenson, and Spiesel, Law in the Digital Age: How Visual Communication Technologies are Transforming the Practice, Theory, and Teaching of Law, 12 B.U. J. Sci. & Tech. L. 227 (2006).

[FN6] See, e.g., Slow Development Co. v. Coulter, 353 P.2d 890 (Ariz.1960) (charts, etc., admissible to illustrate anything witness allowed to describe); McKee v. Chase, 253 P.2d 787 (Idaho 1953) (excellent statement of theory of admission); People v. Chatman, 430 N.E.2d 257 (Ill.App.1981) (citing treatise). O'Brien v. Ed Donnelly Enters., 75 Fed.R.Evid.Serv. (Callaghan) 378 (S.D. Ohio 2007) (exclusion of exhibits as pedagogical devices upheld because not based on evidence that had been admitted into evidence).

[FN7] Brain and Broderick, supra note 3, at 961. A number of courts, while allowing illustrative exhibits, assert they are not “substantive” evidence. See, e.g., Sykes v. Floyd, 308 S.E.2d 498 (N.C.App.1983) (photos “clearly” not substantive evidence).

[FN8] See § 212 note 5, supra. The breakdown of the distinction between illustrative and substantive evidence when some types of nontestimonial evidence are used at trial—in particular photographs, video and film recordings, and computer-generated exhibits—is discussed in this section and §§ 215, 216 and 218 infra.

[FN9] See, e.g., Cohen v. Kindlon, 366 F.2d 762 (2d Cir.1966) (failure to establish authorship of sketch

used for illustration held “of no consequence”); Intermill v. Heumesser, 391 P.2d 684 (Colo.1964) (admission of comparative X rays of unidentified person testified to be “normal” upheld and “encouraged”). But an occasional trial judge will be found confusing illustrative exhibits with real evidence and rejecting the former. See, e.g., Hernke v. Northern Insurance Co., 122 N.W.2d 395 (Wis.1963).

[FN10] See, e.g., Smith v. Ohio Oil Co., 134 N.E.2d 526 (Ill.App.1956); Brown v. United States, 464 A.2d 120 (D.C.App.1983) (admission of demonstrative evidence primarily matter of discretion). The discretion, however, is not unlimited. See, e.g., Workman v. McIntyre Const. Co., 617 P.2d 1281 (Mont.1980) (abuse of discretion to reject sample traffic sign; demonstrative evidence inadmissible only where irrelevant or prejudicial). United States v. Janati, 374 F.3d 263, 273 (4th Cir.2004) (“displaying such charts is always under the supervision of the district court under Rule 611(a), and in the end they are not admitted as evidence”); United States v. Palazzo, 2008 WL 5381581 at \*3 (E.D.La.2008) (use of pedagogical aids permissible when opponent “has not demonstrated that the charts were misleading or prejudicial, that they did not accurately reflect the documentary evidence”).

[FN11] Verizon Directories Corp v. Yellow Book USA, Inc., supra note 4, at 143 (“There is no reason appellate judges should deny themselves the same learning advantages available to trial judges, juries and the world at large;” also, reviews split in circuits); Joynt v. Barnes, 388 N.E.2d 1298 (Ill.App.Ct.1979).

[FN12] Examples of these variegated positions are to be noted: United States v. Buck, 324 F.3d 786, 791 (5th Cir. 2003) (“It was proper for the diagram to be shown to the jury to assist in its understanding of testimony and documents that had been produced, but the diagram should not have been admitted as an exhibit or taken to the jury room”); Crocker v. Lee, 261 Ala. 439, 74 So.2d 429 (1954) (“The use of a map ... for illustration must be distinguished from its admission in evidence”); State v. Peters, 352 P.2d 329 (Haw.1959) (“irregular” to admit sketch used for illustration); Livermon v. Bridgett, 335 S.E.2d 753 (N.C.App.1985) (no error to exclude maps where offer did not indicate limited illustrative purpose of exhibit); Chambers v. Robert, 160 N.E.2d 357 (Ohio App.1958) (stating illustrative sketch should not be admitted and that opponent is entitled, on demand, to an instruction that item is illustrative). United States ex rel. Poong Lim/Pert v. Dick Pacific/Ghemm, 2006 WL 568321 at \*3 (D.Alaska 2006) (“Whenever pedagogical charts or summaries are used, the court must make clear to the jury that the charts or summaries are not evidence themselves, but are displayed to assist in understanding the evidence.”); Nevers v. Altec Indust. Inc., 2009 WL 910491 (E.D.Mich.2009) (model truck showing alternative design may be used as demonstrative evidence but is not to be admitted as substantive evidence at trial).

[FN13] See United States v. Buck, supra note 12; United States v. Johnson, 2005 U.S. Dist. Lexis 44777 (N.D. Iowa 2005) (discussion of varying position among circuits on the proper use of demonstrative aids); United States v. Salerno, 108 F.3d 730 (7th Cir. 1997) (trial court was even-handed in allowing demonstrative aids from both prosecution and defense into the jury room). United States v. Ollison, 555 F.3d 152, 162 (5th Cir.2009) (pedagogical devices should not go to the jury room absent consent of the parties).

[FN14] See United States v. Cox, 633 F.2d 871 (9th Cir. 1980); State v. Graham, 371 N.W.2d 204 (Minn. 1985).

[FN15] See, e.g., Maxwell v. State, 370 S.W.2d 113 (Ark.1963); Grantham v. Herod, 320 S.W.2d 536 (Mo.1959); Traders & General Insurance Co. v. Stone, 258 S.W.2d 409 (Tex.Civ.App.1953) (model spine and nerve charts used but not offered; no error). But compare Handford v. Cole, 402 P.2d 209 (Wyo.1965) (error to allow reference to drawings before formally identified and introduced). And see State Farm Fire and Cas. Co. v. Sawyer, 522 So.2d 248 (Ala. 1988) (duplicate stove displayed and referred to became “evidence” without formal admission; no error since appropriate foundation present).

[FN16] See, e.g., Meglemry v. Bruner, 344 S.W.2d 808 (Ky.1961); Murray v. Gervais, 315 A.2d 750 (R.I.1974).

[FN17] See Handford v. Cole, 402 P.2d 209 (Wyo.1965). This is the result advocated by Judge Weinstein in Verizon Directories Corp. v. Yellow Book USA, Inc., supra note 4.

[FN18] For a discerning discussion of the consequences of this rule, see Tuttle v. Miami Dolphins, Ltd., 551 So.2d 477 (Fla.App.1988). See also, Radetsky v. Leonard, 358 P.2d 1014 (Colo.1961) (presumption applied); Friedl v. Benson, 609 P.2d 449 (Wash.App.1980). Compare State ex rel. State Highway Commission v. Hill, 373 S.W.2d 666 (Mo.App.1963) (remanding for new trial where record hopelessly obscure).

[FN19] See Louisiana-Pacific Corp. v. Mims, 453 So.2d 211 (Fla.App.1984) (stating use of charts in argument widely accepted, but holding new trial required where chart sent with jury as court's exhibit); West v. Martin, 713 P.2d 957 (Kan.App.1986) (stating use of demonstrative on opening to be encouraged, but finding no error in trial court's refusal where record unclear as to what would be used). The question is usually held discretionary with the trial court. Bower v. O'Hara, 759 F.2d 1117 (3d Cir.1985) (allowance of use of chart on closing argument held within trial court's discretion, but court cautions that such aids should not be used without prior notice to opposing counsel and opportunity to point out inaccuracies); Ray v. State, 527 So.2d 166 (Ala.Crim.App.1987) (discretionary to prevent counsel from drawing on blackboard during opening); Carson v. State, 751 P.2d 1315 (Wyo.1988). United States v. Waddell, 62 Fed. Appx. 491, 495 (4th Cir.2003) (during argument, a visual aid "should not ordinarily be used without prior notice to opposing counsel, so that any objections can be determined before the visual aid is displayed to the jury").

[FN20] Brain and Broderick, supra note 3, at 983–985.

[FN21] See, e.g., Davis v. Traylor, 530 S.E.2d 385 (S. C. Ct. App. 2000) (rifle admitted by defendant to be similar to that used by him to demonstrate impossibility of concealment; no error); United States v. Weeks, 919 F.2d 248 (5th Cir. 1990) (pistol similar to one used in crime showed by witness but jury instructed it was a model for demonstrative purposes); Dawson v. Mazda Motors of America, Inc., 517 So.2d 283 (La.App.1987) (immaterial difference between duplicate and original does not bar admission of former); State v. Royball, 710 P.2d 168 (Utah 1985) (duplicate admission where real evidence lost or unavailable). Compare Carson v. Polley, 689 F.2d 562 (5th Cir.1982) (error to admit similar knife where jury not clearly informed of illustrative nature of exhibit) with Miskis v. State, 756 S.W.2d 350 (Tex.App.1988) (same; but erroneous admission of ball peen hammer deemed harmless). Similar results have been reached by admitting objects as real evidence on the basis of equivocal "identifications." See, e.g., Crosby v. State, 236 A.2d 33 (Md.App.1967) (unique gun "looking like" that used admitted); Isaacs v. National Bank of Commerce, 313 P.2d 684 (Wash.1957) (hose "believed" to be the hose in question admitted). But compare Alston v. Shiver, 105 So.2d 785 (Fla.1958) (error to admit axe handle 3 feet long to illustrate one 2 feet long).

[FN22] See, e.g., State v. McClain, 404 S.W.2d 186 (Mo.1966). An even more permissive view is suggested by Finch v. W.R. Roach Co., 295 N.W. 324 (Mich.1940) (duplicate admissible if proponent introduces testimony from which similarity might be found).

[FN23] Sherman v. City of Springfield, 222 N.E.2d 62 (Ill.App.1966) (error to exclude accurate duplicate where original unobtainable); Cincinnati, New Orleans & Texas Pacific Railway Co. v. Duvall, 92 S.W.2d 363 (Ky.1936) (error to exclude model of car step proved to be exact duplicate); Rich v. Cooper, 380 P.2d 613 (Or.1963) (error to exclude exact duplicates; dictum). But see Carson v. Polley, 689 F.2d 562 (5th Cir. 1982) (error to admit a knife "similar" to the knife allegedly seized from defendant where testimony created great ambiguity as to whether knife was real or illustrative evidence).

[FN24] See Young v. Price, 442 P.2d 67 (Haw.1968) (comprehensive discussion of problem). But see also, Davis v. Lane, 814 F.2d 397 (7th Cir.1987) (no error to admit demonstrative “shank” where evidence in conflict as to possession of shank by inmate).

[FN25] See, e.g., Preston ex rel. Preston v. Simmons, 747 N.E.2d 1059 (Ill.App.Ct.2001) (satisfactory foundation for model requires testimony as to substantial accuracy); State v. Johnson, 730 So.2d 1035 (La.Ct.App. 1999) (diagrams of jail and cell from which defendant escaped admissible); United States v. D'Antonio, 324 F.2d 667 (3d Cir.1963) (blackboard sketch not to scale admissible); Hoffman v. Niagra Mach. & Tool Works Co., 683 F.Supp. 489 (E.D.Pa.1988) (no error in admission of mechanical model not shown to be identical to original); Martinez v. W.R. Grace Co., 782 P.2d 827 (Colo.App.1989) (scale model properly admitted despite conflicting testimony as to fairness and accuracy). But see Gallick v. Novotney, 464 N.E.2d 846 (Ill.App.1984) (model properly excluded where no testimony offered supporting model's accuracy with respect to critical fact shown).

[FN26] San Mateo County v. Christen, 71 P.2d 88 (Cal.App.1937) (engineer's model excluded; “while models may frequently be of great assistance ... even when constructed to scale they may frequently, because of the great disparity in size ... also be very misleading, and trial courts must be allowed wide discretion ... ”); Haggerty v. Foster, 838 So.2d 948 (Miss. 2002) (refusal to permit use of spine model during reading of doctor's deposition not abuse of discretion where not essential to jury's understanding of the evidence and model had not been disclosed during discovery).

[FN27] See, e.g., Wilson v. State, 569 S.E.2d 640 (Ga.Ct.App. 2002) (not abuse of discretion to admit drawings of area around defendant's house that were not made to scale; lack of scale admitted by police officers, and defense cross-examined officers and offered photographs of areas indicated on drawings).

[FN28] The split in circuit court opinion is described in Verizon Directories Corp. v. Yellow Book USA, Inc., supra note 4; United States v. Johnson, 362 F.Supp.2d 1043 (N.D.Iowa 2005); and 6 Weinstein's Federal Evidence, § 1006.04[2] (McLaughlin ed., 2d ed. 2005). The court in Verizon Directories evaluated the probative value of such aids and held that all should be admitted as evidence, noting that “[m]odern juries ... have notebooks containing key evidence ... In the near future they may have notebook computers.” Verizon Directories Corp. v. Yellow Book USA, Inc., supra note 4, at 143 (Weinstein, J.).

[FN29] Verizon Directories Corp. v. Yellow Book USA, Inc., supra note 4, at 137 (quoting from 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.Law & Tech. 161, 177 (2000). Presentation software programs allow attorneys to scan documents, photos, or videotapes into the computer program. “Using a slide application, images are created and edited. Attorneys navigate ... from one screen image to another or highlight pertinent portions of the document.” Cooper, Practitioner's Guide: The Use of Demonstrative Exhibits at Trial, 34 Tulsa L.J. 567, 577 (1999).

[FN30] People v. McHugh, 476 N.Y.S.2d 721, 722 (Sup.Ct.1984) (“whether a diagram is hand drawn or mechanically drawn by means of a computer is of no importance”); Ladeburg v. Ray, 508 N.W.2d 694 (Iowa 1993) (diagrams merely mechanical drawings; expert available for cross examination).

[FN31] Galves, supra note 29, at 177.

[FN32] Even non-computer exhibits may be enhanced in similar ways. Blasdel v. Montana Power Co., 640 P.2d 889 (Mont. 1982) (areas of survey colored to show differing degrees of soil damage, supported by testimony).

[FN33] In the *Verizon* case, *supra* note 4, at 144, Judge Weinstein acknowledged the dangers: “There may be occasions when the ability of the attorney to utilize computer-generated evidence to manipulate the viewer’s subconscious may escape the awareness of the court .... Courts should be aware of the heightened power of audio-visual evidence .... The trial court must exercise appropriate sensitive control over the proceedings, issuing limiting instructions when appropriate ....”

[FN34] *Sommervold v. Grevlos*, 518 N.W.2d 733(S.D.1994) (computer animation must fairly and accurately reflect oral testimony; animation held properly excluded where recreation not shown sufficiently similar to event); *Clark v. Cantrell*, 504 S.E.2d 605 (S. C. Ct. App. 1998) (computer animation properly excluded where inconsistent with testimony to be illustrated; citing treatise).

Objections to the testimony illustrated as opposed to the illustration itself should be directed to the testimony. *See North American Van Lines, Inc. v. Emmons*, 50 S.W.3d 103 (Tex.Ct.App.2001)(objections to graphic illustrating expert testimony waived by failure to object to testimony).

[FN34.1] *Pierce v. State*, 718 So.2d 806, 809–810 (Fla.App.1997) (admissibility of a re-creation animation of a motor vehicle accident based on combination of factors, such as helpfulness to the jury, a qualified expert, the opinion being applied to evidence adduced at trial, balancing of prejudice against probative value, acceptance in the field of expertise, and accuracy in depicting the facts upon which it is based).

[FN35] *Wright & Graham, Federal Practice and Procedure: Evidence § 5174.1, at 174 and n. 17* (Supp. 2005): “Inadmissible hearsay does not become admissible because it comes in the form of pictures or has been run through a computer .... The animators are obviously not experts in the underlying facts ... and would never be allowed to testify to the opinions that they parade before the jury through the computer.”

[FN36] In § 218, re-creation animations are compared to simulations which are based on a computer-generated opinion as to how an event occurred. Simulations are treated as independent substantive evidence, and are subjected to a more rigorous authentication standard, including scrutiny under the rules regarding scientific evidence and hearsay.

[FN37] *United States v. DeBoer*, 966 F.2d 1066, 1069 (6th Cir. 1992); *United States v. Bray*, 139 F.3d 1104 (6th Cir. 1998); *United States v. Buck*, 324 F.3d 786 (5th Cir. 2003).

[FN38] If the summary reflects assumptions or inferences about the evidence, there must be evidentiary support in the record for these assumptions or inferences. *United States v. Hart*, 295 F.3d 451 (5th Cir. 2002) (government witness who prepared an analytic summary could not state her assumption that “all” of defendants’ debts had to be reported in a Farm and Home Plan disclosure form, since no evidence supporting this assumption had been offered at trial and the witness was not an expert). So long as they are accurate, however, such summaries may present only one party’s side of the case. *United States v. Sawyer*, 85 F.3d 713, 739 (1st Cir. 1996) (not error to admit summaries that did not depict full range of defendant’s expenditures; defendant had opportunity on cross-examination to place the summaries within the context of his total financial activity and to explore any misleading impressions that he claims the summaries created; defendant could also offer his own contrary evidence including his own summary); *United States v. Bishop*, 264 F.3d 535 (5th Cir. 2001).

[FN39] *United States v. Ray*, 370 F.3d 1039 (10th Cir. 2004) (noting factors such as length of trial, number of witnesses, number of complex transactions in this particularly complex drug conspiracy case).

MCMK-EVID § 214

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