LAW AND THE EXPERT WITNESS- THE ADMISSIBILITY OF RECORDED EVIDENCE

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Abstract

Audio tapes, Video Tapes, Voice Identification, Enhancement and Authenticity Issues related to the admissibility of recorded media must pass certain legal criteria before it can be presented as evidence in a court of law. The dictionary meaning of the word "forensic" is any material that is to be presented to a court of law, such as forensic audio, forensic video, forensic voice identification. This paper will address the issues and procedures involved in the introduction of scientific evidence into a court of law. The recorded evidence issues covered herein will provide the audio expert with the basics of what to expect and how to prepare for a courtroom presentation of audio evidence.

Key Words:
Frye v. United States,
Daubert v. Merrell Dow,
Federal Rules of Evidence, rule 702,
Federal Rules of Civil Procedure, rule26,
general acceptance,
gatekeeper,
evidentiary reliability

"It will happen like this"

There is a great scene from the movie "Three Days of the Condor" in which Max VonSydow describes to Robert Redford exactly how the C.I.A. plans to kill Redford for knowing too much about one of their operations. He tells him "It will happen like this". Your initial introduction to the legal process of admissibility could possibly "happen like this".

Usually a prosecutor or a defense lawyer will contact an expert and ask for assistance in determining whether an audio or video recording has been edited, whether the voice on the tape is that of his/her client, or whether it is possible to tell if that is really the defense attorney's client in the video robbing the 7-11 store. He or she will send a tape that has been provided by the government, or by the opposing attorney or agency. The attorney will expect the expert to conduct an examination and present conclusions and opinions. It is up to the expert as to how to conduct the examinations but the report must be in a format acceptable to the court. The steps one takes in conducting the analysis can be found in the appendix. It is the legal processes, rules and regulations we will deal with in this paper.

When did it all start?

Frye v. United States.
Scientific evidence admissibility started with the holding in the case of *Frye v. United States* December 8, 1923 (*Frye v. United States*, 54 App. D.C. 46, 293F.1013, DC Ct App 1923) wherein the Court held, quoting from the brief filed by the defendant;

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

The Court in the *Frye* case went on to state that "numerous cases are cited in support of this rule. Just

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

This opinion initiated the "general acceptance" rule for the admissibility of scientific evidence in the Federal Court system. Many State Court systems also adopted the *Frye* standard. With time, the *Frye* standard began to evolve and change. Today, the *Frye* test for admissibility of scientific evidence has for most Courts been replaced by other standards based on new case law or the adaptation of Federal and State rules of evidence. The two most widely used measures for the admission of scientific evidence are the *Daubert* standard and the Federal Rules of Evidence.

What is *Daubert*?

Daubert v. Merrell Dow Pharmaceuticals, Inc., 509 U.S. 579 (1993)
Argued March 30, 1993 – Decided June 28, 1993

The United Supreme Court, in considering the issues raised in the *Daubert* case, held that the Federal Rules of Evidence, not *Frye*, provide the standard for admitting expert scientific testimony in a federal trial.

The Court held that the adoption of the Federal Rules of Evidence superseded the *Frye* "general acceptance" standard, for admitting expert scientific testimony in a federal trial. The Court found that nothing in the Federal Rules of Evidence gives any indication that "general acceptance" is a necessary precondition to admissibility of scientific evidence.

The Supreme Court held that the Federal Rules of Evidence, especially 702, place appropriate limits on the admissibility of purportedly scientific evidence by assigning to the trial judge the task of ensuring that an expert's testimony both rests on a reliable foundation and is relevant to the task at hand. The reliability standard is established by Rule 702 which requires expert testimony pertain to "scientific knowledge," where the adjective "scientific" implies a grounding in scientific methods and procedures, and the word "knowledge" connotes a body of known facts or of ideas inferred from such facts or accepted as true on good grounds. The Rule's requirement that the testimony "assist the trier of fact to understand the evidence or to determine a fact in issue" goes primarily to relevance by demanding a valid scientific connection to the pertinent inquiry as a precondition to admissibility.

The Court will screen the expert testimony using a three prong test laid out in Rule 702 –

> (1) the testimony is based upon sufficient facts or data,
> (2) the testimony is the product of reliable principles and methods, and
> (3) the witness has applied the principles and methods reliably to the facts of the case.

Faced with a proffer of expert scientific testimony under Rule 702, the trial judge, pursuant to Rule 104(a), must make a preliminary assessment of whether the testimony's underlying reasoning or methodology is scientifically valid and properly can be applied to the facts at issue. Many considerations will bear on the inquiry, including whether the theory or technique in question can be(and has been) tested, whether it has been subjected to peer review and publication, it's known or potential error rate and the existence and maintenance of standards controlling its operation, and whether it has attracted widespread acceptance within a relevant scientific community. The inquiry is a flexible one, and its focus must solely be on principles and methodology, not on the conclusions they generate. The judges will also take into consideration other applicable rules, local rules of the court as well as case precedence.

The Court held that cross-examination, presentation of contrary evidence and careful instruction on the burden of proof, rather than exclusion based on the "general acceptance" standard, is the proper method of challenging valid evidence.While the Federal Court system uses a single standard for admitting scientific evidence, the various States have adopted different standards. Some States have adopted the *Daubert* standard, some continue to use the *Frye* standard while others have developed their own unique standards for the admissibility determinations. Below is a current chart from *Megalinks in Criminal Justice* which contains a summary of what standards are used where:

States using *Daubert:*	States using *Frye:*	States with their own tests, or typically a *Frye-plus* test:
Connecticut **Indiana** **Kentucky** **Louisiana** **Massachusetts** **Missouri** **New Mexico** **Oklahoma** **South Dakota** **Texas** **West Virginia**	**Alaska** **Arizona** **California** **Colorado** **Florida** **Illinois** **Kansas** **Maryland** **Michigan** **Nebraska** **New York** **New Jersey** **Pennsylvania** **Washington**	**Arkansas** **Delaware** **Georgia** **Iowa** **Military** **Minnesota** **Montana** **North Carolina** **Oregon** **Utah** **Vermont** **Wyoming**

Let's look at some common statements of *FRYE* and *DAUBERT*:

Interpretation of *Frye*:	Interpretation of *Daubert*:
Where novel scientific evidence is at issue, the Frye inquiry allows the judiciary to defer to scientific expertise precisely as to whether or not it has gained "general acceptance" in the relevant field. The trial court's gatekeeper role in this respect is conservative, thus helping to keep "pseudoscience" out of the courtroom.	**General acceptance is an austere standard absent from and incompatible with the Rules of Evidence. "Scientific knowledge" must be derived from the scientific method supported by "good grounds" in validating the expert's testimony, establishing a standard of "evidentiary reliability."**

Before the expert witness will face the evidentiary and admissibility standards, whether *Frye* or *Daubert,* the expert will have to prepare a report on their findings. The Federal Rules of Civil Procedure, Rule 26, dictate the process and the order when presenting your findings in a federal court proceeding.

The statue **(**Rule 26**)** is lengthy. Below is an outline of the necessary points that should be included in a Rule 26-style report:

1. a written, signed report with a complete statement of all opinions to be expressed,
2. the basis and reasons of all opinions,
3. the data or other information considered by the witness in forming the opinions,
4. any exhibits to be used as a summary of or support for the opinions,
5. qualifications of the witness (a CV is acceptable),
6. a list of all publications authored by the witness within the preceding ten years,
7. the compensation to be paid for the study and testimony,
8. listing of any other cases in which the witness has testified as an expert at trial or by deposition within the preceding four years.

Voir Dire and cross examination in pre-trial hearings

The different parties in litigation of a recorded evidence issue will usually submit expert reports and those experts should expect to be called upon to defend their findings. During the pre-trial admissibility hearing each attorney will have an opportunity to do a direct examination of their own expert and a cross examination of the opposing expert. The direct is called Voir Dire. Voir Dire comes from the French for "to speak the truth" and is the preliminary questioning of witnesses to determine their competence to testify.

When the direct examination is completed the opposing attorney will have the opportunity to cross examine the witness. This type of examination can be simple and straightforward or it can be adversarial and personal. The attorney who makes a practice of attacking the witness on a personal level usually does so because he or she knows that their case will be hurt by the admissibility of the evidence examined and will attempt to keep the jury from hearing or seeing the evidence. In some instances an expert will be retained to provide testimony designed to exclude evidence from the jury.

At the end of Voir Dire, the judge will rule as to whether he accepts the expert as an expert in the field. If the expert is accepted, he will then be allowed to testify as to the analysis, findings and opinions concerning the evidence. At the conclusion of the testimony by the expert, the attorneys representing the other parties in the litigation will have the opportunity to cross examine the expert concerning the testimony. At the conclusion of the pre-trial expert testimony, the judge will rule as to the admissibility of the evidence at issue.
Daubert and other standards of admissibility have placed the trial judge in the role of "gatekeeper", deciding what evidence will be admitted in trial. As gatekeeper, the judge is the arbiter of the validity of science. Since judges are not scientific experts anymore than experts are judges, it becomes the job of the expert to make the technology, methodology and conclusions understandable to the court. In the movies the trial judges all seem to understand the intricacies of DNA, Blood Spatter Analysis, audio and video technology, and a host of other sciences. In reality, most judges rely on the expert to provide the information they need to assess the science and technology. The situation is interesting since the judge is tasked with assess the credibility of the expert but must rely on expert testimony to make that assessment.

Subpoenas

While there are many different types of subpoenas, a subpoena can be simple defined as an order of the court commanding a person designated in it to attend court under a penalty for failure to do so.

Usually, the lawyer will not serve his own expert with a subpoena to testify in court. Under certain circumstances, an opposing counsel may be allowed to subpoena a expert retained by another party. The attorney who issued the subpoena must pay your normal expert fees. He can not call the expert as a fact witness and then attempt to elicit an expert opinion as a means of avoiding payment for services. Generally, subpoenas are not enforceable across state lines or from a federal district outside the one in which your case appears. There are exceptions, but circumstances must be extreme.

Admissibility of Audio Evidence

The controlling case for determining audio authenticity is United States v. McKeever, 169 F. Supp. 426 (SDNY 1958). This case provided the foundation for the admissibility audio evidence by listing the parameters necessary for determining the authenticity of recorded audio, which is still followed by Federal and State Courts. The judges formulated a seven pronged standard for determining audio authenticity.

Seven Tenants of Audio Authenticity

1. Recording device was capable
2. Operator was competent to operate the device
3. The recording is authentic and correct
4. Changes, additions or deletions have not been made in the recording
5. The recording has been preserved in a manner shown to the court
6. The speakers are identified
7. The conversation elicited was made voluntarily and in good faith without any kind of inducement

These seven tenants have been used as the Rosetta Stone for audio authenticity since 1958 and while other cases have added enhancements and further explanations, *McKeever* is still the basis of authenticity analysis.

Summary:

This has been a brief overview of but a few of the basic laws and court cases involving the admissibility of recorded evidence as well as scientific evidence in general. The cases in this field are numerous, each with its own subtle differences and as such the expert must work closely with the attorney to find the best method of presenting the expert's analysis, results and conclusions so they are clear to the court. If the Court is going to rely on the testimony of the expert, the expert will have to understand the legal system and know how to navigate

the rules, regulations and case law governing his field of expertise so as to be able to clearly present the evidence.

APPENDIX

The question of Methodology will occur at the admissibility hearing. I am including recently published processes (i.e.) Methodology for Forensic Audio, Video, and Voice Identification.

12 Step Methodology - Audio Authenticity

1. Receive evidence. Mark and photograph evidence including tapes, recorders, envelopes, and containers.

2. Physical inspection. Tape inspection. Record lot numbers, punch tabs, and note condition.

3. Track configuration(mono or stereo) 1 or 2, control track, etc.

4. Azimuth and zenith alignment on lab recorder, and adjust for proper playback speed.

5. Critical listening and note taking.

6. Waveform Analysis. (Spectrum Analysis, including FFT).

7. Magnetic Development.

8. Testing the recorder. All functions must be tested multiple times. Both waveform analysis and magnetic development of the recorder must be included.

9. List all signal anomalies. Print waveforms.

10. Compare recorder signatures against the evidence tape signatures. Note differences and similarities. Form an opinion as to whether or not the tested recorder made the evidence tape.

11. Answer the question copy or original? Insertions, deletions, over recordings, omissions, mechanical failures?

12. Analyze results, offer an opinion based on your conclusions. Write report. The report should include all Federal Rule 26Requirements. Send the client all original materials and report in a secure manner.

12 Step Methodology - Video Authenticity

1. Receive evidence. Mark and photograph evidence including tapes, recorder s, envelopes and containers.

2. Physical inspection. Tape inspection. Record lot numbers, punch tabs and note condition.

3. Note playback speed, format,(Time Lapse, SP, SLP,EP DV.etc.)

4. Load video uncompressed into computer and make an analog copy.
   Perform azimuth and zenith correction if necessary.

5. Critical viewing, observing one frame/field at a time. Note scene changes, split fields, motion Blur, and other anomalies.

6. Waveform Analysis- Utilize spectrum analyzer to observe head switching. Check Horizontal and Vertical Blanking Interval. Check Synch, Front Porch, Back Porch, etc.

7. Audio and Time Code Track Analysis. RF envelope analysis,

8. Recorder Test. Check for Dihedral error. Check for Defective Pixel. Also check HBI, VBI, Mistracking, Front Porch and Back Porch.

9. Compare test tape signatures to Original tape signatures.

10. Check evidence tape for discontinuities such as deletions, insertions, over-recordings, stops and starts.

11. Video Hum- A.C. Power

12. Analyze results. Offer an opinion based on your conclusions. Write a report. The report should include all Federal Rule 26 requirements. Send the client all original materials and report in a secure manner.

12 Step Methodology Voice Identification, The Aural Spectrographic Method

1. Receive, mark, and photograph evidence tapes, recorders and containers.
2. Physical inspection, tape inspection, lot number, condition
3. Track configuration Mono or Stereo, 1 or 2, control track etc.
4. Azimuth and Zenith alignment on lab recorder
5. Playback speed analysis and adjustment
6. Load into computer for electronic enhancement
7. Critical listening and notes
8. Create "Unknown" word and phrase list
9. Take verbatim exemplar and create known "best" word list and phrases
10. Create an audio unknown/known short term memory tape for aural comparison.
11. Do the visual comparison of the spectrograms of the unknown/known ST phrases.
12. Analyze the results and form conclusions, offer an opinion, write report. Write to an archive file, make copies and send report to client with original materials (FedEx or Certified Mail). Include all Rule 26 requirements.

Voice Identification Analysis Criteria

Aural Cues

1. Perceived pitch (eg: voice sounds high or low)
2. Quality (eg: street talk vs. educated speech)
3. Rate (how fast or slow a person speaks)
4. Mannerisms (eg: Someone who speaks fast and then slows down at the end of a sentence, "Sopranos" guys who end every sentence with "forget-about-it".)
5. Amplitude (how loud someone speaks)
6. Pathologies (eg: a harelip, a lisp or a stutter)
7. Breath patterns
8. Dialect/accent
9. Syllable coupling (the way we put the words together when we speak)

Visual Cues

1. Bandwidth
2. Mean frequency (vibrations of the vocal chords per second-- average male has a mean frequency 130 cycles per second, average female is 150-160)
3. Trajectory of formants (on a spectrogram the formants are shapes that represent the vocal energy of the words that we're speaking, and our voices)
4. Inter formant information/ intra formant
5. Fricatives ("ch" sounds)
6. Plosives ("p" sounds)
7. Gaps (refers to syllable couplings, how we put words together when we speak)
8. Consonants (have a distinctive look and shape on a spectrogram)
9. Transitions between consonants and vowels
10. Transition between words
11. Rate (average # of words spoken per minute)
12. Pitch
13. Distribution
14. Nasal patterns distribution
15. Evidence of pathology, i.e. nasality, lisp, etc.
16. Relative intensity
17. Other spectral data

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