

**INSTRUCTORS: JORDAN GRUBER
TITO POZA**

I. Fundamentals of Tape Authentication

II. What can an expert do to help you?

A. The first thing an expert can do is to broadly describe the options open to the attorney and the consequences of each option, generally (in terms of time, money and probable outcome.)

B. The simplest of these options is appropriate when taped evidence submitted by the inquiring attorney has been challenged by the other side. In that case, the advice should be to do nothing until the challenge is backed by specific scientific findings.

III. Under what circumstances should one seek an expert?

A. When the other side is going to contest audio tape evidence you want to present.

B. When taped evidence introduced by the other side either: sounds anomalous or its provenance is suspicious, e.g. the recordings are on standard audio cassettes, but there is reason to believe that the originals were made on microcassettes.

C. When your client insists that the recordings do not reflect the conversations as he remembers them. Unfortunately, clients often have very selective memories in these matters.

IV. Can an altered recording always be detected?

No, due to the availability of relatively sophisticated editing facilities to amateurs, the likelihood that an expert could be fooled is substantial. Furthermore, even recordings with alterations that might be detected by experts could be sufficiently unnoticeable to the layman as to never be submitted to an expert for analysis.

V. What tools does the expert use, and why?**A. Critical listening.**

Always the first and often the most crucial analysis technique because it serves to target anomalous sections of recordings for later analysis. The ear and brain bring processing powers of amazing sophistication to the task of audio tape analysis.

B. Waveform analysis.

Waveform analysis involves comparisons, using both subjective and objective criteria, to determine the cause and/or origin of anomalous acoustic events that occur in questioned recordings.

C. Spectral Analysis.

Spectral analysis is less commonly used than other techniques to determine whether anomalous acoustic events are the result of some sort of tampering, but under certain circumstances it can reveal effects that could only be explained by the presence of falsification.

D. Magnetic Development.

Magnetic development can sometimes provide physical evidence that proves a recording was made using a particular tape recorder. Under certain conditions it can also reveal a recording to be a copy.

VI. Fundamentals of Voice Identification

VII. What can an expert do to help you?

The first thing an expert can do is to broadly describe the options open to the attorney and the consequences of each option, generally (in terms of time, money and probable outcome.)

VIII. What are the most likely scenarios and what issues should be addressed?

A. The client is accused and voice evidence is being used against him.

1. Ear witness

When the evidence consists of "ear witness" testimony, the following three issues are of primary concern.

- a. The circumstances of the "hearing," e.g., how long ago, how clearly, degree of attention.
- b. The relationship to the accused, e.g., intimate, friendly, casual.
- c. The details of the identification procedure, e.g., bias factors, lineup.

2. Recording

When the evidence consists of a recording, the following issues are of primary concern.

- a. Whether the admissibility of expert voice identification can be contested.
- b. The duration and quality of the recorded message.
- c. If an exemplar has not been submitted, the mechanics of exemplar production.

d. The details of the identification procedure.

B. The client is accused and he wants to use voice evidence to exonerate himself.

1. Ear Witness

This is an unlikely scenario but the relevant issues would be the same as for A-1.

2. Recording

This situation lends itself to an "elimination" variant of voicegram identification, but the issues described in A-2 also apply here. In some instances opposing counsel can come to an agreement to accept the results of such an identification.

C. The client has an unknown voice and wants to know if it can be matched to some known voice.

1. Ear Witness

The issues described in A-1 are also relevant here. In particular, the need for a proper lineup is paramount.

2. Recording

The issues described in A-2 are also relevant here. In particular, the need for a proper lineup is paramount.

Fundamentals of Tape Authentication

What can an expert do to help you?

Under what circumstances should one seek an expert?

Other side challenges your evidence

Damaging evidence exhibits anomalies

Client insists

Can an altered recording always be detected?

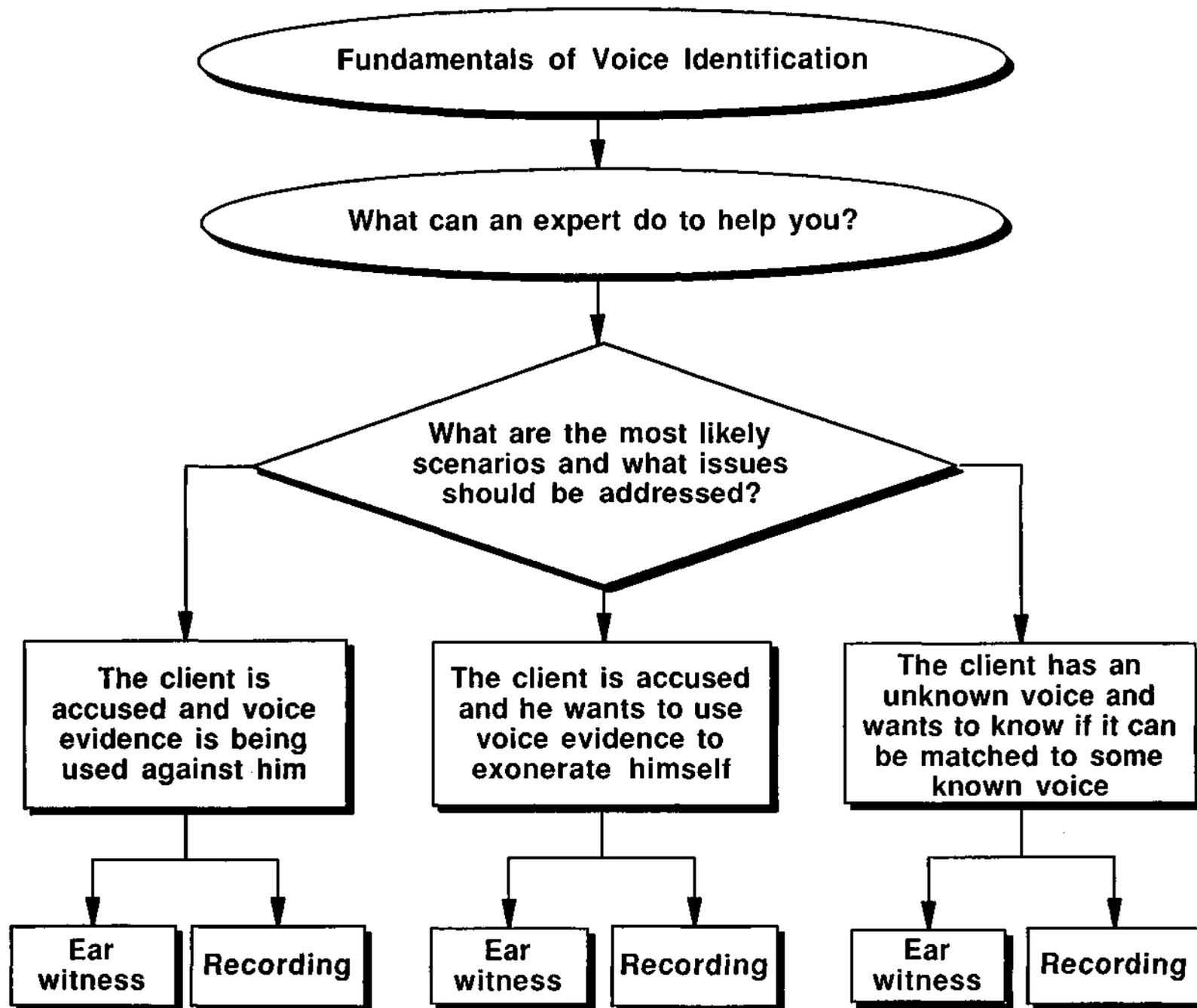
What tools does the expert use, and why?

Critical listening

Waveform analysis

Spectral Analysis

Magnetic Development



ELECTRONIC AUDIO-VISUAL EVIDENCE

Note that all quotes in this handout, unless otherwise specified, are from Gruber's *Electronic Evidence* (1995).

Major Themes

I. Growth, Persuasiveness, and Significance of Audio-Visual Recordings

II. Foundation Standards Have Actually Weakened Over Last Forty Years

III. Previous Editing & Falsification Ability Skyrockets Due To Digital Technology

IV. Forensic Experts Are Routinely Unaware Of, Or Unwilling To Acknowledge, Their Limitations

V. Keeping Track Of The *Real* Problem, And Why There Is No Easy Solution For It

STRUCTURAL CLASSIFICATION TIME VS. CONTROL

↓ Decreasing Control

→ Advancing Time

	Contempor- -aneous Recording	Immediately Subsequent Recording	Retrospec- -tive Recording
Staged	e.g., will (as to capacity)	e.g., informal statements	e.g., recon- -struction
Antici- -pated	e.g., stakeout	e.g., confession after arrest	e.g., depo- -sition
Sponta- -neous	e.g., Rodney King	e.g., scene view	e.g., disability refutation by passerby

ELECTRONIC AUDIO-VISUAL EVIDENCE

Why is Video Evidence So Persuasive To Factfinder?

1. It's The "Real Thing": Detailed & Vivid
2. It Captures Gestures, Expressions, Voice Qualities, Mannerisms, Idiosyncrasies, Personality, & Overall Demeanor
3. We Believe What We See On TV, Often Uncritically
4. It Puts The Same Picture Into Everyone's Mind
5. Studies Show: Increased Attention and Retention
6. If Picture = 1,000 Words, Then How Many Words Are Moving Pictures With Sound Worth?

"... A video recording is an abstracted representation of reality at a very high order, in extreme and focused detail, but not reality itself. As such, a video recording "cleanses" the recorded event of all the subtle tonal and environmental characteristics that were present when the event occurred. By its very nature, then, a video recording recreates, or represents, what has been recorded in an out of context manner. ... Given the extremely detailed and vivid nature of that representation, a video recording, especially a motion video recording, has an inherent credibility which gives it extraordinary persuasive force, and the American system of jurisprudence affords no opportunity to test the perceptions of the trier of fact, nor does admissibility hinge on the "powers of discernment" of the trier of fact.

In years past the written word, especially if found in a newspaper of record such as The New York Times, was taken as "truth." Subsequently, television news became the transmitter, if not the arbiter, of what was acknowledged as "true." Legal video recordings, because they are a variant of television, and because they are such a detailed representation of reality on such a high order, are inherently accepted as a form of the "truth" regardless of the intentions or agendas of those who made the recordings. In short, video recordings, especially motion video recordings and integrated video presentations, constitute the most powerful and persuasive technology ever used in courts of law, and it becomes crucial for practitioners to master the technology."

ELECTRONIC AUDIO-VISUAL EVIDENCE

FOUNDATION STANDARDS GROW WEAKER OVER TIME

7-Pronged Predicate (McKeever 169 FSupp 426 (1958)):

"A review of the authorities leads to the conclusion that, before a sound recording is admitted into evidence, a foundation must be established by showing the following facts:

- (1) That the recording device was capable of taking the conversation now offered in evidence.
- (2) That the operator of the device was competent to operate the device.
- (3) That the recording is authentic and correct.
- (4) That changes, additions or deletions have not been made in the recording.
- (5) That the recording has been preserved in a manner that is shown to the court.
- (6) That the speakers are identified.
- (7) That the conversation elicited was made voluntarily and in good faith, without any kind of inducement."

4-Pronged Biggins Test (Biggins 551 F2d 64 (1977)):

"... requires the prosecution to go forward with respect to the competency of the operator, the fidelity of the recording equipment, the absence of material deletions, additions, or alterations in the relevant portions of the recording, and the identification of the relevant speakers."

Modern, Flexible, Minimal Standards (from Ely 503 NE2d 88 (1986)):

"The necessary foundation may be provided in a number of different ways. Testimony of a participant in the conversation that it is a complete and accurate reproduction of the conversation and has not been altered [Citing cases.] or of a witness to the conversation or to its recording, such as the machine operator, to the same effect [Citing cases.] are two well-recognized ways. Testimony of a participant in the conversation together with proof by an expert witness that after analysis of the tapes for splices or alterations there was, in his or her opinion, no indication of either [Citing cases] is a third available method. A fourth, chain of custody, though not a requirement as to tape recordings [Citing cases.] is also an available method. [Citing cases]."

ELECTRONIC AUDIO-VISUAL EVIDENCE

Silent Witness Theory: A video (or presumably audio) recording can serve as independent, substantive evidence even with no percipient witness to testify that it is a true, fair, and accurate recording: the recording "speaks for itself" as long as some other way of authenticating it, e.g., chain of custody, is present.

"Under the 'silent witness' theory, which originally applied to the admissibility of X-rays (which capture a state of affairs not directly observable by a witness) and films taken by surveillance cameras with no one present, the photographic evidence is said to 'speak for itself': 'Given an adequate foundation assuring the accuracy of the process producing it, the photograph [or video recording] should then be received as a so-called silent witness or as a witness which 'speaks for itself.'" [See Molina 533 So2d 701, 710 citing 3 Wigmore, Evidence § 790 (Chadbourn rev. 1970).] Courts have been reluctant 'to establish specific foundational requirements for the admissibility of photographic evidence under the 'silent witness' theory, since the context in which the photographic evidence was obtained and its intended use at trial will be different in virtually every case.'"

Burdens of Proof

1. Proponent's initial burden of production is to make a clear and convincing showing that the recording is true, accurate and authentic. [See Faurote 749 F2d 40 (1984).]
2. Trial judge has wide discretion in evaluating initial burden; will only be overturned if there was not a "reasonable probability" that proponent met initial burden. [See Albert 595 F2d 283 (1979).]
3. Opponent can't show just that recording may or might have been falsified; must show it was actually falsified. [De La Fuente 548 F2d 528 (1977).]
4. If opponent makes this showing, proponent must address questioned elements and show, "as a matter of reasonable probability," that no falsification occurred. [Haldeman 559 F2d 31 (1976).]
5. Proponents generally supported by presumption of "official regularity." [Cortelleso 663 F2d 361 (1981).]

ELECTRONIC AUDIO-VISUAL EVIDENCE

Types of Editing and Falsification

1. Initial Selection of Material
2. In-Camera Editing
3. Rearrangement or Deletion of Sequences
4. Conventional (Analog) Editing Techniques
5. Digital Editing Techniques: (Allows Far Greater Precision, Multiple Attempts, Coverups of Falsification; see below)
6. Outright Fabrication of Novel Utterances of Speech (Some Day Soon?)
7. Outright Fabrication of Video Recordings (Maybe Some Day)

Power of Digital Editing

- Random Access
- No Generational Degradation; Easy to Keep On Trying Until You Get It "Just Right"
- Much Smoother Transitions
- Much Greater Precision
- Can Change Pitch and Speed of Speech, and Pixels in Video
- Can Be Used To Go Back and Remove, or "Cover Up," Signs of Editing
- Some Ordinary Computer Users Can Now Competently Falsify Recordings
- May Be Used to Fool Experts

ELECTRONIC AUDIO-VISUAL EVIDENCE

Don't Cry Digital Wolf: Even With Digital Editing Technology, It's Not So Easy To Falsify Evidence

- It's important not to get too enamored of digital editing technology
- It's still generally quite difficult to produce competent falsifications. Human speech, for example, is incredibly complex, and the human ear may be the best mechanism for detecting attempted falsifications.
- Without a great deal of knowledge of what forensic experts look at, it is easy to make mistakes that they will find.
- As a general rule of thumb, the more complex the attempted falsification, the harder it will be to pull off.
- Moreover, digital "encryption" schemes may come along to ensure that a recording originally made in digital form remains completely unaltered from the time it is made. It is doubtful, though, whether such schemes would be used with every digital recording that is made.
- Point: The vast majority of audio and video recordings that you ever come across are likely, in fact, to be unaltered, that is, not overtly falsified. It is important to remember, though, that the very act of making a recording, and any editing that is done at all, can have a tremendous impact on the perceived meaning and value of the recording.

ELECTRONIC AUDIO-VISUAL EVIDENCE

Forensic Expert's Proper Role

Improper Role: Deciding Whether A Recording Is Authenticated; Only Judge Can Decide This, As Part Of Foundation Process.

Proper Role: Determining Consistency of Recording With Purported Protocol: "Technical Authentication"

Watch For: Expert's Tendency to Exaggerate Their Role Here, and Turn "Technical Authentication" Into "Legal Authentication"

"In contradistinction to legal authentication, technical 'authentication' ... refers to the process of a forensic audio expert examining an audio recording with scientific tools and procedures to determine whether, *in the expert's opinion*, the recording is authentic or has been falsified in some way. More precisely, the expert should only state whether the results of his or her analysis show consistency or inconsistency with the recording protocol by which a questioned recording was purportedly made. Any direct statement as to the expert's opinion on the legal issues of authenticity or falsification should probably be avoided, since such statements usually amount to legal conclusions which are beyond the scope of the expert's competence. Thus, the forensic audio expert often plays a critical role in the legal authentication process precisely because the expert is able to offer scientific or technical evidence which bears on the authenticity or genuineness of the audio recording in question.

"Unfortunately, the failure to distinguish between legal authentication and technical 'authentication' tends to make it seem as though forensic audio experts are entitled to properly execute the function of deciding and pronouncing on whether an item of audio evidence has been sufficiently legally authenticated. 'Authentication' seemingly becomes a process that is 'done' to a questioned audio recording by a forensic audio expert, and based on the opinion, reputation, and scientific evidence offered by the expert, the question of authenticity, and therefore admissibility, is presumably settled."

ELECTRONIC AUDIO-VISUAL EVIDENCE

Technical and Scientific Limitations on Experts

- Expert's Admit They Can Fool Other Experts, So . . . Experts Can Themselves Be Fooled.
- Digital Editing Technology Makes It Impossible To Spot Every Falsification. It may have been impossible to spot every falsification before digital technology, but now it is certainly not possible
- Many Of Expert's Common Techniques Can Be By-Passed With Knowledge, Or Are No Longer Relevant With Digital, Non-Tape-Based, Recording Formats. For example, one of the most common techniques used by experts is to look for "original signatures" on a recording to make sure it has not been copied and altered. Every time a machine is stopped, started, paused, or put into record or erase mode, it makes an electronic signature that is said to be unique to that machine. However, it is possible to "add" an apparently original signature to a tape that has been falsified after the fact, and it is impossible to distinguish an apparently original signature and an original signature.
- When Subjective Pattern Matching Is Involved, e.g., Voicegrams ("voiceprints"), It Is Impossible To Know No Mistake Has Been Made. The sciences of signal detection theory and statistical decision theory have unambiguously shown that when a forensic technique relies on subjective pattern matching, as in voicegrams, then there is no way for anyone, including an expert, to be certain that they have not made an error, or to be certain about whether they are in a decision making "zone" in which they might have made an error. Although certainty is not required for admissibility, forensic experts are prone to greatly exaggerate how certain they can be in any given instance.

ELECTRONIC AUDIO-VISUAL EVIDENCE

The Real Problem & Why It's Hard To Fix

Many possible problems include:

- Today, or some day soon, it may be possible to regularly make evidentiary falsifications that are not detectable by even the best forensic experts. In other words, it will in fact become possible for someone to make it seem as though you have said something, or done something, that you haven't said or done.
- Forensic experts, by and large, are far more limited than they let on to.
- We are incapable of judging the impact of audio, and especially video, evidence on the legal profession and judicial system; most lawyers are poorly trained to grapple with the many uses, and implications, of this evidence.

But the big problem, taking into account all of the four major themes delineated earlier, as is follows:

We may soon be faced with a situation in which the routine acceptance of electronic audio-visual evidence leads to the inadvertent acceptance of competently falsified evidence in an unacceptably large number of cases.

Why Is this problem hard to fix?

There is both a good and a bad side to electronic evidence. The bad side is the possibility of intentional alteration and falsification, as well as the tendency to disproportionately influence jurors with audiovisual presentations. The good side is that technology actually brings us closer to dealing with facts, precisely because it gives us the ability to present actual representations of events as well as the ability to visualize and therefore make more commonly available concepts and ideas which would otherwise have to be left solely to the abstraction of language. Technology arises out of a social context and often helps address societal needs: most of the time, electronic evidence does, in fact, bring us closer to the truth.

Our only real tool, besides awareness, is to change foundation standards and burdens of proof. But precisely to the degree that we tighten up standards to keep out falsified or questionable evidence, we will also keep out perfectly good, desirable evidence, the vast majority of which will not be falsified in any way. Simply "trusting the jury" may not be good enough in a context where the evidence is, by its very nature, so extremely persuasive.

ELECTRONIC AUDIO-VISUAL EVIDENCE

Note: Copies of *Electronic Evidence* (1995) can be ordered directly from Lawyers Cooperative Publishing at 1-800-254-5274. This nearly 1,100 page treatise, which provides the most complete and understandable treatment of electronic evidence ever written, and which synthesizes and adds to all of the content covered in the below-referenced articles with new material, sells for \$110. Copies of reprints of the following Am Jur Trials and Am Jur Proof of Facts articles are available directly from Jordan S. Gruber:

- Voicegram Identification Evidence (1995, 259 pages)
- Audiotape Recordings: Evidence, Experts and Technology (1993, 585 pages)
- Foundation For Audio Recordings As Evidence (184 pages, 1993)
- Videotape Evidence (145 pages, 1992)
- Foundation For Contemporaneous Videotape Evidence (88 pages, 1992)

ELECTRONIC AUDIO-VISUAL EVIDENCE

Biography

Jordan S. Gruber is the president of LexTech Consulting of Menlo Park, California, a research and communications firm emphasizing legal, technological, and psychological innovation. Mr. Gruber received a B.A. with honors in philosophy (Phi Beta Kappa), and an M.A. in public policy analysis and administration, from SUNY-Binghamton. His law degree is from the University of Virginia School of Law, where he was Order of the Coif and served as the Virginia Law Review's Research and Projects Editor. Mr. Gruber formerly practiced law with Cooley, Godward, Castro, Huddleson & Tatum in Palo Alto, California, and he is also the former managing editor of Gnosis Magazine, a scholarly journal of religion and psychology. In addition to contributing to Gnosis, Wired, and Green Egg magazines, Mr. Gruber has authored or co-authored several book-length articles on audio and video recordings in the legal encyclopedias Am Jur Trials and Am Jur Proof of Facts. Mr. Gruber's recently published, nearly 1,100 page, treatise, *Electronic Evidence*, constitutes the most complete and understandable treatment of the forensic, technical, and evidentiary aspects of electronic audio-visual evidence ever written.