

**SCIENTIFIC EVIDENCE AND  
EXPERT TESTIMONY HANDBOOK**



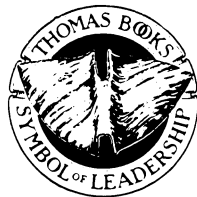
# SCIENTIFIC EVIDENCE AND EXPERT TESTIMONY HANDBOOK

A Guide for Lawyers, Criminal  
Investigators and Forensic Specialists

*By*

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## FOREWORD

Whether you have practiced criminal law for years or are stepping into a courtroom for the first time, the need for scientific evidence and expert witnesses is ever increasing. In the technological future we can only expect that need to increase. Most lawyers are not scientists, nor do they have a scientific background. When confronted with that quandary, many lawyers seek reference materials that will assist in preparation of scientific testimony. Often those materials are written by scientists for scientists, easy for scientists to understand but perhaps elusive for the layman. Ronald Becker's book, *Scientific Evidence and Expert Testimony Handbook*, has something of interest for every trial lawyer, laboratory technician, investigating police officer, and testifying expert. From fingerprint analysis, identification, lifting and comparison to blood spatter patterns and accident reconstruction, the book sets out the significant developments in the field in a way that stands out for its readability, practicality, and applicability. The section on firearms identification is as comprehensive as any but written in a conversational style that lends to understanding and reduces ambiguity and unnecessary jargon. It will not make you a firearms expert, but it should make you comfortable in questioning a firearms expert.

A need for a book like this is obvious: Countless crimes would go undetected, unsolved, or unproven without the benefit of forensic science. But lawyers need more than the evidence itself. They need to understand what story the evidence tells about the crime, the criminal, the crime scene, the investigators and the technicians who handled the evidence. Once the story is told, lawyers need to know how to use the evidence to its best advantage. That advantage can only be had by presenting evidence through the expert witness. Many a case that should have been illustrative was somehow made incomprehensible in translation from legalize to language of the expert. This book demonstrates the use of language to communicate rather than to inadvertently build obstacles to communication and understanding. When the lawyer exam-

ining an expert witness is sure of the technical ground upon which he/she stands, that lawyer, through the expert, will paint a picture that the jury can understand and believe. This book provides the tools to paint a picture in bold, even, and forcible strokes that a jury not only will understand but more importantly will find interesting and to which they will attend. You would be hard pressed to find another volume that more thoroughly explores forensic science in a way that criminal lawyers, prosecutors, police, and experts can digest and use.

THOMAS L. KRAMPITZ  
Executive Director  
Texas District and County Attorneys Association

## PREFACE

Many readers may ask how this book could be written without significant reference to the homicide of Nicole Brown Simpson and Ronald Goldman, the forensic trial of the century. That absence was not accidental. Nothing that contributed to the advancement of forensic science resulted from the trial other than making the public aware of what a forensic scientist is and does. Unfortunately, the battle between defense and prosecution experts convinced the public that forensic science is illusory and that forensic scientists are confused and perhaps dishonest. Little was learned of the day-to-day work of forensic scientists that has advanced the field of criminal investigation and perpetrator identification. Nothing was learned of the vast number of crimes that are cleared because of forensic science and forensic scientists. For a short time in the sun, forensic science received national attention. Hopefully that attention can be refocused on the contribution of forensic science and scientists instead of the media feeding frenzy attempting to “sound bite” their way into living rooms.

The portions of this book dealing with science are largely dependent upon the work of a variety of forensic scientists and the work of Dr. Richard Safferstein specifically. My expertise is that of a trial lawyer and criminal investigator. I am not a scientist and am mathematically challenged. My interest in science and forensic science particularly grew while working as a police investigator. My appreciation for science and scientific expert witnesses grew from the need to retain, examine, and cross-examine expert witnesses in a personal injury trial practice. Cases involving biomechanical engineers, medical examiners, pathologists, petroleum engineers, and various medical specialists taught me that with assistance and study a lawyer could conduct intelligent direct and cross-examinations of highly technical professionals. Applying work and trial experience, I have attempted to understand what forensic scientists do, how they do it, and then explain it in a language that lawyers, jurors, and police investigators can understand.

During my private practice, I discovered that there were few library resources available to assist in a nontechnical understanding of specific areas of forensic science. Those resources that were available were generally written for forensic scientists or forensic science students by forensic scientists. Few available resources provided the knowledge needed to prepare a forensic scientist to testify or for a lawyer to prepare himself for direct and cross-examination of a forensic scientist. The legal materials that were available to assist a lawyer in fashioning questions necessary to convince the court that a forensic expert was qualified and his testimony necessary had little reference to the scientific aspects of the prospective testimony.

This book will hopefully provide lawyers, criminal investigators, and forensic specialists with a reference book that will advise them of their respective roles and responsibilities when advancing forensic testimony in the context of a criminal trial.

R.F.B.



## ACKNOWLEDGMENTS

Lawyers often are criticized for demonstrating the same traits society has deemed acceptable in itself. Greed, aggression, and intolerance were not invented by lawyers and have become “legal tender” because society finds them useful. In the minds of most, they stand above lawyers and their pursuit of the dollar. People derive tremendous satisfaction degrading a once honorable profession by telling jokes or recounting the most recent sensationalized media report of lawyer misconduct.

This book was motivated by the men and women who have taken on the burden of “court champion.” Who for reasons known only to themselves have forsaken pursuit of significant financial gain and assumed the mantle of representative of the people. Without their inspiration this book could not have been written.

More specifically, the Kendall County, Texas, County Attorney, Pamela McKay, has provided me with insight into the thought processes of a criminal prosecutor. Watching her take a personal interest in the victims of domestic violence and drunk driving gave me some insight into what maintains these dedicated professionals. Pam, as my wife, has provided an up-close and personal portrait of the evolution of a prosecutor. I have had the opportunity to watch her grow from a “baby prosecutor” into a professional who takes pride in her work and the people for whom that work is done. Without her dedication, I would never have recognized that there is a group of unsung heroes out there, and they are called prosecutors.

Writing a book is a time-consuming process. My primary responsibilities as an associate professor are to the Criminal Justice Department at Southwest Texas State University. Our teaching schedule can be adjusted to allow for scholarship activities. To Joy Pollock, our Department Chair, and to Gene Martin, our School Dean, I owe a debt of gratitude for adjusting my schedule to allow me to write this book. Joy Pollock also provided support and direction. Her expertise as author and editor has been invaluable in my evolution as an author.

A hearty thanks to my editor, William Bried, who brought order out of chaos. His patience with someone grammatically challenged was appreciated. I would like to assure him that his job in the future will be easier as a result of his subtle instruction, but I would probably be lying. Once grammatically challenged, always grammatically challenged.

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# Chapter 1

## INTRODUCTION

### The Age of Technology

Science and technology have made life easier and simultaneously more complex. Computers lightened the burden of many in the workplace but concomitantly extracted excruciating pain for many in becoming computer literate. Computers opened technical realms that previously were available only to those seeking specialized knowledge in specialized places. The Internet gives anyone who is computer literate access to technical forums of the most obscure nature through a worldwide repository. Science and technology have expanded at an exponential rate and the computer is the only tool that allows us to keep up.

Police use computers to enhance video images; to establish serial killer data bases; to catalog, compare, and store fingerprints, blood, and DNA samples. Forensic specialists testify about “blood spatter” and “trace evidence.” Criminal justice curriculums are evolving to include courses in forensic anthropology, criminalistics, statistics, research methods, computer science, and forensics.

The criminal trial courtroom has not been immune to the impact of science and technology. Court administrators juggle dockets with computers. Court statistics are often a product of computer networks established for enhanced communication and coordination. Judges are attending continuing judicial education seminars dealing with computers, scientific evidence, and expert testimony. Judges are admitting a greater and more diverse array of experts into their courtrooms than ever before.

Scientific evidence can come before the jury only from the mouth of an expert witness. Occasionally, controversy surrounds a particular scientific or pseudoscientific practice bringing into question whether such a practice or procedure is in fact scientific. The United States Court of Appeals set forth a rule that has been followed for years, known as the Frye test. The Frye test simply postulated that scientific evidence could not be admitted until it had gained general acceptance in the particular

field to which it belonged (*Frye v. United States*, 293 F. 1013, 1923). It is this test that has been used in determining the scientific validity of hypnosis, polygraphs, battered women's syndrome, DNA printing, and others. Many courts have paid little attention to the Frye standard and employed individual judicial discretion in the determination of what is scientific and what is not. The United States Supreme Court has decided that Federal Rule of Evidence 702 supersedes the Frye test (*Daubert v. Merrell-Dow Pharmaceuticals, Inc.*, 113 S. Ct. 2793, 1993). Rule 702 deals with the admissibility of expert testimony and provides that:

if scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training or education may testify thereto in the form of an opinion or otherwise.

If Frye is no longer the standard, then what standard is to apply? That Frye was replaced by the Federal Rules of Evidence does not imply that there are no restrictions on scientific testimony. Under the rules, the trial judge must ensure that any and all scientific testimony or evidence admitted is not only relevant, but reliable (*Daubert v. Merrell-Dow Pharmaceuticals, Inc.*, 113 S.Ct. 2795, 1993). The trial judge must consider whether (1) the technique employed is replicable, (2) has been subjected to peer review and publication, and (3) to what extent the technique has been accepted by the scientific community.

The standards set forth by McCormick in his article entitled "Scientific Evidence: Defining a New Approach to Admissibility" would provide greater guidance in determining the probative value of proffered scientific evidence. McCormick offers eleven factors to be applied in a probative analysis of the admissibility of scientific evidence:

1. The potential error rate in using the technique;
2. The existence and maintenance of standards governing its use;
3. Presence of safeguards in the characteristics of the technique;
4. Analogy to other scientific techniques whose results are admissible;
5. The extent to which the technique has been accepted by scientists in the field involved;
6. The nature and breadth of the inference adduced;
7. The clarity and simplicity with which the technique can be described and its results explained;
8. The extent to which the basic data are verifiable by the court and jury;



9. The availability of other experts to test and evaluate the technique;
10. The probative significance of the evidence in the circumstances of the case;
11. The care with which the technique was employed in the case (McCormack, 1982).

The simplest test to apply to any suggested scientific procedure is the replicability of the procedure and the opportunity to test the validity of test results. Applying such standards will reduce the arbitrary discretion of trial courts in admitting astrological and junk food influences on defendants.

The United States Supreme Court has opened the floodgates of scientific experts as the result of a recent decision. The rigid standard that has been applied historically to the admissibility of “scientific evidence” has been abandoned. The new standard has been incorporated into the Federal Rules of Evidence embracing virtually any area of expertise that the presiding judge believes may assist in understanding the issues in dispute, from the violence inducing properties of Twinkies and astrological influences. As a result “expert testimony” has become a “growth industry.”

Courts are becoming more reliant on scientific evidence. This reliance appears to be the product of three correlative factors:

1. The ever-increasing dependence of society on technology to provide answers;
2. The original infusion of funds by the federal government into the Law Enforcement Assistance Administration (LEAA) for the upgrade of law enforcement and the development of forensic applications; and
3. The United States Supreme Court, under Chief Justice Earl Warren, restricted the admissibility of evidence under the Fourth, Fifth and Sixth Amendments that had been secured under traditional police methods and admonished that new investigative skills need be developed and applied to criminal investigations (Farley, 1993).

The number of criminal trials relying in whole or part on scientific evidence and expert testimony has increased dramatically. In a 1980 survey of judges and attorneys by the National Center for State Courts, 44 percent of those responding stated that at least 30 percent of the cases in which they were involved required the introduction of scientific

evidence or expert testimony (National Center for State Courts Report, Study to Investigate Use of Scientific Evidence, 1980). The police conduct that the Supreme Court was concerned about in the above mentioned cases has to a large extent been replaced by forensic investigation and evidence.

More professionals are using more of their time to testify in criminal and civil cases. Hourly expert witness fees may exceed \$600.00 per hour. Professional bar journals abound with advertisements for expert trial assistance from medical malpractice cases to criminal drug cases. The classified section of many bar journals, heretofore the purview of those seeking to fill legal positions, is rapidly giving way to “experts” hawking their wares.

In the midsts of a technical revolution in the courtroom, police, investigators, prosecutors, defense lawyers, jurors and judges prepare to do battle by focusing on scientific circumstantial evidence admitted or refuted by “expert witnesses.” For every prosecution or plaintiff’s expert, there will be an equally credentialed opposing expert ready and willing to take exception to the work of prosecution and plaintiff experts. Many advertisements should read “fast gun for hire.” If an expert cannot be found to refute a prosecutor’s scientific evidence, then one will be found who can assist in confabulation, obfuscation, confusion, and delay (justice delayed is sanction delayed, not necessarily justice denied). It is axiomatic in criminal defense trial practice to argue the facts if the case law is against you, argue the law if the facts are against you, and delay and confuse when both the case law and the facts are against you. One of the best sources of confusion in a criminal trial is an expert witness for the defense who can make the easily understood absolutely indecipherable. It is discouraging to discover that other professions and professionals can be held in the same disdain as are many lawyers (money can have that effect).

Too often the name of the expert witness game is “the price is right”; if you have the right price, there is an expert somewhere, someplace willing to provide testimony regardless of how tenuous the defense. Although a “growth industry,” it would be erroneous to presume that any “expert” is capable of giving credible expert testimony. If it was easy anyone could and would do it.

The balance in the system to thwart unqualified, unnecessary, and incompetent experts is cross examination. Although the quality of advocacy varies, there is a maxim that generally holds true: as the stakes

increase, so does the quality of advocacy, especially in those cases where counsel is privately retained. It is a matter of time before a marginal expert witness who continues to professionally testify is pummeled at the hands of a competent cross-examiner. Once humiliated during a vigorous cross examination the “expert” will find an easier way to make a living.

Unfortunately, the language of science and technology can be lost on judges, juries, and lawyers. This book will attempt to simplify the concepts and the methods used to present these concepts.

Many expert witnesses testify as a direct result of working for a state agency. Forensic scientists working in crime laboratories, medical examiners, police evidence technicians, police investigators, and laboratory specialists must testify as an integral part of the services they provide. No additional compensation is provided. Often these men and women will have to do battle with well-paid, hired specialists for the defense. Although sale of this book is unrestricted, it is to these professionals and to prosecutors nationwide that this book is addressed.

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## Table of Cases

- Daubert v Merrell-Dow Pharmaceuticals, Inc.*, 113 S Ct. 2786, 1993.
- Frye v United States*, 293 F. 1013 (D.C. Cir. 1923).

## **Chapter 2**

### **GETTING EXPERT TESTIMONY BEFORE THE COURT**

**I**n most courts, in most states, and in most jurisdictions, lay witnesses and expert witnesses are allowed to testify. Under the Federal Rules of Evidence which most states have adopted, lay testimony generally is restricted to what the witness has seen or may reflect an opinion as to the character for truthfulness and/or violence of the defendant, the victim, or another witness. Most courts will allow lay witnesses to testify as to the nonviolent nature of the victim. It is not to these witnesses that the responsibility of expressing opinions on causation, intent, motive, or other ultimate issues involved in criminal or civil trials falls. Expert witnesses are allowed a latitude unique in the examination of witnesses. However, that latitude must first be shown to be warranted.

#### **The Rules**

Federal Rules 702 through 705 provide the framework within which an expert witness will be allowed to testify. That framework provides that:

1. That the witness has knowledge, skill, or training to form an expert opinion that will assist the trier of fact (judge or jury) to understand evidence or to establish a fact in issue, i.e., was the latent fingerprint lifted at the scene left there by the defendant (Rule 702).
2. An expert's opinion(s) may be based on facts or data compiled or provided by the expert himself (Rule 703).
3. An expert's opinion(s) may be based on information (fact or data) provided to the expert prior to or at the time of the expert's testimony (Rule 703).
4. An expert's opinion must be based on the type of facts or data that expert's ordinarily rely upon (Rule 703).