

Table of Contents

The Editorsxxvii

Contributorsxxix

Chapter 1: Here We Stand: What a Forensic Scientist Does.....1

Jon J. Nordby

Law and Science

Lawyers and Scientists

Theoretical Natural Sciences and Practical Forensic Sciences

Forensic Experts

An Expert's Role

Scientific Method

SECTION I: Forensic Pathology and Related Specialties

Chapter 2: The Role of the Forensic Pathologist15

Ronald K. Wright

Coroner System

Medical Examiner System

Education and Training of Forensic Pathologists

Training Requirements for a Forensic Pathologist

Duties of a Forensic Pathologist

Autopsy Examination

Obtaining Appropriate Specimens

Photography

Report Preparation

Testimony

Chapter 3: Forensic Nursing.....27

Janet S. Barber Duval, Catherine M. Dougherty, and Mary K. Sullivan

Overview

Evolution of Forensic Nursing

Theoretical Model of Forensic Nursing

What Is and Is Not Forensic Nursing

Career Opportunities

The Clinical Forensic Nurse Specialist

Forensic Case Management

Responsibilities of Hospitals in Evidence Collection and Preservation

Status of Forensic Nurses in the Legal System

Educational Preparation of Forensic Nurses

Educational Models of Forensic Nursing

Continuing Education for Forensic Nursing

Future of Forensic Nursing

Chapter 4: Investigation of Traumatic Deaths.....43

Ronald K. Wright

Cause and Mechanism of Death

Manner of Death

Time of Death
Classification of Traumatic Deaths
Mechanical Trauma
Other Blunt Force Injury
Chemical Trauma
Thermal Trauma
Electrical Trauma
Asphyxias

Chapter 5: Forensic Toxicology61

John Joseph Fenton

Applications of Forensic Toxicology
Testing Process
Drugs of Abuse
Pharmaceutical Materials
Nonmedicinal Agents
Analytical Methods in Forensic Toxicology
Metal Analyses
Interpreting Drug Findings

Chapter 6: Forensic Odontology79

R. Tom Glass

History
Dental Training
Expert Witness Testimony
Body Identification by Dental Means
Forensic Dentistry in Mass Disaster
Bite Mark Analysis
Collection of Bite Mark Evidence
Personal Injury Analysis
Dental Malpractice Analysis

Chapter 7: Forensic Anthropology99

Marcella H. Sorg

Physical Anthropology and Human Variability
Taphonomy
Archaeology
Scene Processing
Examining Remains
Forensic Anthropology Documentation
Expert Witness Testimony

Chapter 8: Forensic Taphonomy119

William D. Haglund

Contributions of Methods and Theory
Taphonomic Factors
Human Remains in Water Environments
Buried Remains
Case Studies
The Future

Chapter 9: Forensic Entomology135

Gail S. Anderson

Importance of Determining Time since Death
History
Training
Determination of Elapsed Time since Death

Determining Whether the Body Has Been Moved
Body Disturbance
Presence and Position of Wounds
Linking Suspect to Scene
Drugs
Human and Animal Neglect or Abuse
Wildlife Crimes
Collection of Entomological Evidence
Challenges to Forensic Entomology
Report Submission
Testifying in Court

SECTION II: Evaluation of the Crime Scene

Chapter 10: Crime Scene Investigation167

Marilyn T. Miller

Defining a Crime Scene
Uses for and Information from Physical Evidence in Criminal Investigations
General Crime Scene Procedures
Scene Management
First Responding Officers
Securing the Crime Scene
Crime Scene Survey
Crime Scene Documentation
Collection and Preservation of Physical Evidence
Crime Scene Reconstruction

Chapter 11: Recognition of Bloodstain Patterns189

Stuart H. James, Paul E. Kish, and T. Paulette Sutton

History of Bloodstain Pattern Interpretation
Properties of Human Blood
Target Surface Considerations
Size, Shape, and Directionality of Bloodstains
Spattered Blood
Other Bloodstain Patterns
Interpretation of Bloodstains on Clothing and Footwear
Documentation of Bloodstain Evidence
The Use of Luminol Photography for Bloodstain Pattern Analysis
Absence of Evidence Is not Evidence of Absence
Report Writing
Training and Education

SECTION III: Forensic Science in the Laboratory

Chapter 12: The Forensic Laboratory219

Linda R. Netzel

Qualifications of a Forensic Examiner
Understanding the Role of the Criminalist
Linking a Crime Scene to a Suspect
Laboratory Sections, Analytical Instruments, and Specialized Equipment

Chapter 13: Identification and Characterization of Blood and Bloodstains	237
<i>Robert P. Spalding</i>	
<i>Analysis of Blood in Forensic Serology</i>	
<i>Identification of Blood</i>	
<i>Confirmatory Tests for Blood</i>	
<i>Species Origin Determination in Bloodstains</i>	
<i>Genetic Markers in Blood</i>	
Chapter 14: Identification of Biological Fluids and Stains	261
<i>Andrew Greenfield and Monica M. Sloan</i>	
<i>Identification of Semen in the Forensic Laboratory</i>	
<i>Methods for the Identification of Saliva</i>	
<i>Methods for the Identification of Urine</i>	
<i>Methods for the Identification of Feces</i>	
<i>Methods for the Identification of Vomitus</i>	
<i>Methods for the Identification of Vaginal Secretions</i>	
<i>Case Examination Strategy</i>	
Chapter 15: Techniques of DNA Analysis	279
<i>George T. Duncan, Martin L. Tracey, and Eric Stauffer</i>	
<i>Genetics: The Beginnings</i>	
<i>We Inherit DNA Characteristics</i>	
<i>Population Genetics Supports the Use of Statistical Data</i>	
<i>Beginnings of DNA Fingerprinting</i>	
<i>Repetitive Sequences Comprise Large Portion of Human Genome</i>	
<i>Isolation of DNA from Nucleus</i>	
<i>DNA Extraction</i>	
<i>Challenges in Court</i>	
<i>SNP Analysis</i>	
<i>Mitochondrial DNA (mtDNA) Analysis</i>	
<i>The Future</i>	
Chapter 16: Microanalysis and Examination of Trace Evidence	315
<i>Thomas A. Kubic and Nicholas Petraco</i>	
<i>Instruments of Microanalysis and Sample Types</i>	
<i>Other Instrumental Techniques of Value to a Microanalyst</i>	
<i>Microscopic Evidence and Its Analysis</i>	
Chapter 17: Fingerprints	341
<i>Robert E. Gaensslen and Kimberly R. Young</i>	
<i>Fingerprints as Evidence</i>	
<i>Fingerprints as a Means of Identification</i>	
<i>What Fingerprints Are</i>	
<i>Fingerprint Patterns</i>	
<i>History of Fingerprints</i>	
<i>Fingerprint Classification</i>	
<i>Computer-Based Fingerprint Files</i>	
<i>Types of Evidentiary Fingerprints</i>	
<i>Development (Enhancement) of Latent Fingerprints</i>	
<i>Recognition, Collection, and Preservation of Fingerprint Evidence</i>	
<i>Fingerprint Identification: The Heart of the Matter</i>	
<i>The Fingerprint Identification Profession</i>	

Chapter 18: Forensic Footwear Evidence361*William J. Bodziak*

Forms of Footwear Impressions
Information from Footwear Impressions
Location and Recovery of Footwear Impressions
Enhancement Methods
Known Shoes and Preparation of Exemplars
The Examination Process and Conclusions

Chapter 19: Forensic Tire Impression and Tire Track Evidence377*William J. Bodziak*

Original Equipment Tires, Replacement Tires, and Tire Construction
Tread Nomenclature and Sidewall Information
Noise Treatment
Tread Wear Indicators (Wear Bars)
Retread Tires
Tire Reference Material and Databases
Tire Track Evidence
Recovery of Tire Evidence
Known Tires and Tire Exemplars
Tire Impressions, the Examination Process, and Conclusions

Chapter 20: Firearm and Tool Mark Examinations391*Walter F. Rowe*

Types of Modern Firearms
Manufacture of Firearms
Firearm Ammunition
Collection of Firearms-Related Evidence
Laboratory Examinations
Types of Tool Marks
Processing of Tool Marks at Scenes of Crime
Laboratory Examinations of Tool Marks
Tool Marks on Manufactured Items
Striation Matching for Personal Identification

Chapter 21: Questioned Documents.....423*Frank H. Norwitch and Howard Seiden*

Functions of a Forensic Document Examiner
Becoming a Document Examiner
Theory of Handwriting
Collection of Writing Standards
Process of Comparison
Types of Fraudulent Writing
Factors That Can Affect Handwriting
Challenge to the Document Field
Future Trends
Alteration, Obliteration, and Ink Examination
Photocopy and Photocopier Examination
Typewriter and Typewriting Examination
Paper and Watermark Examination

Chapter 22: Analysis of Controlled Substances441*Donnell R. Christian, Jr.*

Standards of Analysis
Botanical Examinations

Chemical Examinations
Instrumental Examinations
Quantitation
Clandestine Drug Laboratories

SECTION IV: Forensic Engineering

Chapter 23: Structural Failures471

Randall K. Noon

Static Loads
Dynamic Loads
Case Studies

Chapter 24: Basic Fire and Explosion Investigation489

David R. Redsicker

Chemistry and Behavior of Fire or Explosion
Behavior of Fire
Origin and Cause Analysis
Fatal Fire Investigation
Motor Vehicle Fires
Collection of Fire Evidence
Evidence Containers

Chapter 25: Vehicular Accident Reconstruction.....511

Randall K. Noon

Primary Cause of Vehicular Accidents
Analytical Tools Used to Evaluate Accidents
Converting Scene Data into an Event Sequence
Basic Energy Method
Basic Momentum Method
Tips and Solution Strategies

SECTION V: Cybertechnology and Forensic Science

Chapter 26: Use of Computers in Forensic Science535

Zeno Geradts

Forensic Databases
Image Databases
DNA Databases
Paint Databases
Forensic Archiving of X-Ray Spectra
Video Image Processing and Animation Software
Use of Networks in Forensic Science

Chapter 27: Investigation of Computer-Related Crime553

Peter Stephenson

Definitions
Framework for Investigating Computer-Related Crime
Human Aspects of Computer-Related Crime
Analyzing the Remnants of a Computer Security Incident
Determining if an Incident Actually Has Occurred

SECTION VI: Forensic Application of the Social Sciences

Chapter 28: Forensic Psychology573

Louis B. Schlesinger

Psychological Research and Law

Clinical Forensic Psychology

Psychology and Law: An Uneasy Alliance

Forensic Assessment: Distinctions between Clinical and Forensic Approach

Psychological Testing: Traditional and Specialized Forensic Tests

Interviews in Altered States of Consciousness

Complicating Factors in Forensic Assessment: Deception Syndromes

Chapter 29: Forensic Psychiatry593

Robert L. Sadoff

Definition of Forensic Psychiatry

History of Forensic Psychiatry

Scope of Forensic Psychiatry

Assessment of Competency

Training in Forensic Psychiatry

Chapter 30: Serial Offenders: Linking Cases by Modus Operandi and Signature605

Robert D. Keppel

Introduction to Crime Scene Assessment

Historical Perspective

What Is a Killer's Signature?

Signature Versus Modus Operandi

The Shoreline Murders

Chapter 31: Criminal Personality Profiling615

Michael R. Napier and Kenneth P. Baker

History of Profiling and Criminal Investigative Analysis

General Concepts

Results: Type of Analyses

Case Linkages for Serial Offenses

Equivocal Death Analyses

Search Warrant Application

Concepts and Applications in Sexual Assault Investigations

Applications in Homicide Investigations

SECTION VII: Legal and Ethical Issues in Forensic Science

Chapter 32: Countering Chaos: Logic, Ethics, and the Criminal Justice System637

Jon J. Nordby

Law Enforcement and the Law

Attorneys and the Law

Forensic Scientists, Scientific Values, and the Law

Organizational Codes of Scientific Conduct

Scientifically Reliable Methods

Scientific Testimony

Chapter 33: Forensic Evidence	649
<i>Terrence F. Kiely</i>	
<i>Forensic Evidence</i>	
<i>Criminal Law Theory and Evidence</i>	
<i>Classic and Individual Characteristics</i>	
<i>Forensic Evidence and the Crime Scene</i>	
<i>Laboratory Matches and Courtroom Rules of Evidence</i>	
<i>Forensic Science, Forensic Evidence, and Litigation</i>	
<i>Litigation as History</i>	
<i>Forensic Science and Forensic Evidence: Sutherland Case</i>	
<i>People v. Sutherland — Forensic Science and Justice Issues</i>	
Chapter 34: Legal Issues in Forensic DNA	667
<i>Susan Herrero</i>	
<i>Historical Overview</i>	
<i>Admissibility of DNA Evidence</i>	
<i>Forensic DNA Testing Laboratories</i>	
<i>Discovery and Legal Procedures</i>	
<i>Challenges to DNA Evidence</i>	
<i>Convicted Offender Databases</i>	
<i>Protecting the Innocent</i>	
<i>Forensic DNA in Noncriminal Cases</i>	
<i>DNA in the Future</i>	
Appendix A: DNA Advisory Board (DAB)	
Guidelines	683
Appendix B: Biohazard Safety Precautions.....	695
Appendix C: Forensic Websites	701
Appendix D: Trigonometric Tables: Sine and Tangent Functions	707
Appendix E: Metric Measurements and Equivalents.....	709
Glossary	713
<i>(Words highlighted in green in text are terms included in the Glossary)</i>	
Contributor Biographies	737
Index.....	753