Table of Contents

Series Editor's Note **xvii**
Foreword **xix**
MARCUS K. ROGERS
Acknowledgments **xxi**
Introduction **xxiii**
About the Author **xxv**

1 Documentation **1**

Digital Imaging 1
Forensic Digital Imaging 1

2 The Transition from 35-mm Film to Digital Imaging **11**

Introduction 11
4 × 5 Sheet Film Cameras 12
The 120 Roll Film Cameras 13
The 35-mm SLR 13
Other Camera Types 15
  The Snapshot Camera 15
  The Polaroid Camera 16
  The Disposable or Single-Use Camera 17
Film 18
Proper Evidentiary Handling and Storage of Film 19

3 Digital Camera Hardware **21**

The Digital Point-and-Shoot Camera 21
The Digital Camera Body 21
The Menu 21
Image Numbering 21
The Lenses 22
Aperture 26
Focusing the SLR Camera 26
Aperture Preview 26
Shutter 27
Exposure 28
Remote Shutter Release 30
Resolution 31
ASA, DIN, and ISO 32
Hyperfocal Distance 32

4 Digital Imaging **33**

Introduction 33
Money 33
Protection 34
Cases 34
Camera Strap 35
The Ultraviolet Filter 36
The Camera 37
Flash or Strobe 37
Automatic versus Manual 40
Settings 42
Shutter 42
Slave 43
The "Normal" Lens 44
The Telephoto Lens 44
The Wide-Angle Lens 45
The Macro Lens 45
Lighting with the Macro Lens 46
Using the Flash on Your Camera 50
The On-and-Off Switch 50
Turn the Camera Upside Down 50
List Photo Images 52
The 90-Degree Rule 53
Perspective Images 55
The Scale 55
Exculpatory Evidence 58
Extreme Conditions 58
18% Gray Card 60

5 Light **61**

Introduction 61
Ambient Light 61
Color Temperature 62
Color Rendering Index 63
Flash/Strobe 64
Direct Flash 65
Indirect Flash 66
Fill Light 67
Subtractive Light 67
Additive Light 67
Ambient or Available Light 68
Painting with Light 68
Ring Light 70
Diffusing Your On-Camera Flash with Tissue 70
Other Lighting Equipment 70

Snoot 73
Barn Doors 73
Umbrella 74

6 Filters 75

Introduction 75
Polarizing Filter 75
Band-Pass and Band-Block Filters 77
Filter Factors 77
Color-Compensating Filters 77
Kodak Light-Balancing Filters 78
Conversion Filters for Color Films 78
Stacking Filters 78
Neutral-Density Filters 78
Infrared and Ultraviolet Filters 81

7 Macro/Micro Imaging 83

Introduction 83
Photo Image Evidence at 90 Degrees to the Object 83
Bench Imaging 85
Backgrounds 85
Handguns 86
The Scale 88
Studio in a Box 90
The Light Box 92
Rope Caulk 94
Helping Hands 95
The Tripod 96

8 Law 101

The Lay Witness 101
The Professional Witness 101
The Expert Witness 101
The Nature of Law 101
Miranda Warnings 104
Types of Witnesses 105
The Lay Witness 105
The Professional Witness 106
The Expert Witness 107
Qualifying an Expert Witness 114
General 114
Practice 114
Certification 114
Membership in Forensic Organizations 115
Studies and Continuing Education 115

Teaching of Forensic Science 115
Lectures 115
Publications 115
Research 115
Court Experience 115
Reports 115
Changes 116
Daubert 117
Frye 118

9 Enhancement of Images 123

Introduction 123
Scientific Working Group on Imaging Technology 123
History 123
The Mission Statement of SWGIT 123
Admissibility of Digital Images 124
"Doctored" Images 124
Cover Letter, Richard W. Vorder Bruegge, Former SWGIT Chair 125
Photo Image Enhancement Log 128
Photoshop 128
ACDSee Pro 128
Enhancing a Latent Fingerprint 128
Latent Lift 130
Bare Footprint Developed with Ninhydrin 131

10 Footwear and Tire Impressions 137

Introduction 137
Casting 137
Equipment 137
Footwear 138
Tire Impressions 143

11 Digital Panoramic Camera Scanning 147

Scene Scanning 147
The System 147
Photogrammetry 147
The Scene 149
Panorama Imaging: Ultraviolet/Infrared 152
Surveillance 152
Preventive Measures 155

12 Death Investigation 159

Introduction 159
The Coroner or Medical Examiner 159
Official Photos of the Scene 159

The Scene 161
Overall or Establishing Photos 162
Perspective Photos 162
Unexpected Objects and Evidence 163
Types of Images Taken during a Death Investigation 163
Cases 164

13 Morgue Photo Imaging 185

Introduction 185
At the Scene 185
Universal Precautions 185
At the Morgue 187
Sequencing 187
Lighting 191
The Body 191
ID Photo Image 192
Scales 193
Hands 194
Wounds 200
Lividity 206
Scars, Marks, and Tattoos 206
Fingerprints 207
Clothing 211

14 Taphonomic and Entomological Imaging 215

Introduction 215
The Scene 215
The Body 215
Insects 216
Maggot Mass and Maggot Migration 221
Containers 222
Vehicles 226
Water Recovery 227
Bones 228
The Autopsy 228

15 Auto Processing 231

Introduction 231
Exterior 231
Interior 234
Compartments and Hidey-Holes 242
Trunk and Engine 245

16 Fingerprints 249

Latent Prints 249
General Rules 249

	Fingerprints on Glass	250
	Fingerprints on Curved Glass	251
	Feathers	254
	Prints on Pills and Capsules	255
	Prints on Stainless Steel	258
	Prints on Toilet Seats	258
17	**Burglary**	**261**
	Introduction	261
	Exterior	261
	Interior	261
	Alarm	264
	Locks	267
	Items of Interest	
18	**Storage of Digital Media**	**271**
	The Media	271
	Storage	271
19	**Fire and Arson Scene**	**275**
	Introduction	275
	The Scene	275
	Lighting	275
	Flash	277
	Marking Areas	278
	Point of Origin	282
	Artifacts	282
	Crowd	283
	Digital Imaging	285
20	**Sex Offenses**	**287**
	Introduction	287
	Dispatch	287
	The Scene	287
	Victim at the Morgue	288
	Victim at the Hospital	288
	Meeting the Victim	289
	Photo Imaging the Victim	290
	Injuries	290
	Bruising	291
	Clothing	294
	Children	295

21 Trace Evidence and Microscopy 297

Introduction 297
Images through a Microscope 297
Microscope Camera 297
The Nikon Microphot 297
Modification 300

22 Blood 303

Introduction 303
Luminol 306
Blowback: Blood in Gun Barrel 307

23 Ultraviolet and Infrared Imaging 313

Introduction 313
UV Light Sources 313
Body Fluids 314
Insects 315
Tattoos 316
Infrared Light 316
Fuji IS Pro UVIR Camera 317
Filters for Use with the Fuji IS Pro Camera 322
Other Considerations 324

24 Digital Photo Imaging Microscope 325

VHX-1000 and Forensic Inspection 325
Handheld Integration 325
Lenses 326
Multiangle Stand 330
High-Resolution Imaging 330
High Dynamic Range 332
Documentation and Measurement Tools 334
3D Composition and Measurement 336

25 SWGIT 339

Introduction 339
Disclaimer 341

Bibliography 343

Appendix A: Glossary 345

Appendix B: Photo I.D. Card 357

Index 359