

motion picture and video

lighting

for cinematographers,
gaffers
and
lighting technicians

blain brown

third edition

CONTENTS

HISTORY OF LIGHTING.....	13
Controllable Light	15
Early Film Production.....	17
Introduction of Tungsten Lighting.....	19
The Technicolor Era	21
HMI, Xenon, Fluorescent, and LED Sources.....	23
Kino Flo	24
LEDs.....	24
LIGHTING SOURCES.....	25
Types of Lights	26
Fresnels	26
LEDs	27
Efficiency.....	29
LED Panels	29
LED Fresnels	30
Remote Phosphor LEDs	30
Tungsten Fresnels	31
The 10K and 20K/24K.....	31
The 5K.....	32
Juniors.....	32
1K.....	33
650, Betweenie, and InBetweenie	33
Inkie	33
HMI Units	34
12K and 18K	35
6K and 8K.....	36
2.5K and 4K.....	36
Smaller HMIs	36
When an HMI Fails to Fire	37
Care and Feeding of HMIs	38
Xenons.....	38
Open Face Lights.....	40
Skypan	40
2K Open Face	40
1000/600/650 Watt Open Face.....	41
PAR 64	41
PAR Groups	42
Dino, Moleeno, and Wendy.....	43
Maxi-Brute	43
FAYs	44
HMI PARs.....	45
Soft Lights	46
Space Lights	47
Fluorescent Rigs.....	47
Color Correct Fluorescent Units.....	48
Color Correct Bulbs	49
Cycs, Strips, Nooks, and Broads.....	50
Plasma Lights.....	51

Other Types of Sources.....	53
Chinese Lanterns	53
Lekos	53
Crane Mounted Lights	54
Jokers.....	54
Dedolights.....	54
Balloon Lights.....	55
Barger Lights	56
LIGHTING BASICS	57
The Fundamentals of Lighting	58
The [Conceptual] Tools of Lighting.....	58
The Attributes of Light	58
What are the Goals of Good Lighting?	59
Full Range of Tones.....	59
Shape	60
Separation	60
Depth.....	61
Texture	61
Mood and Tone	61
Exposure and Lighting.....	62
Hard vs. Soft.....	62
Color Control and Color Balance	63
Some Lighting Terminology.....	63
Working with Hard Light and Soft Light	65
Hard Light.....	65
Soft Light	67
Direction	70
Avoiding Flat Front Lighting	70
Light from the Upstage Side	70
Backlight and Kicker	71
Intensity.....	71
Adding Texture in Lighting	72
Color	73
Lighting Techniques.....	74
Classical Hard Light	75
Ambient	75
Bringing it Through the Windows.....	75
Motivated Lighting and Practicals.....	75
Motivated Light.....	76
Lighting with Practicals	76
Available.....	78
Basic Principles of Lighting	78
Back Cross Keys	80
Ambient Plus Accents	80
Lighting Through the Windows.....	81
Available Light Windows.....	82
Day Exteriors	85
Open Shade and Garage Door Light.....	85
Sun As Backlight.....	86

Magic Hour	87
CONTROLLING LIGHT	91
Hard Light and Soft Light	92
Fill for Day Exteriors	94
Silks and Diffusion	94
Scrim and Barndoors	95
Flags, Solids, and Nets	97
Chimeras and Snoots	98
Softboxes.....	98
Eggcrates.....	98
The Window Problem.....	99
ND for Windows.....	99
Cookies, Celos, and Gobos	100
Dimmers.....	101
LED Dimmers.....	103
Hand Squeezers	104
SCENE LIGHTING.....	111
Lighting Plans.....	112
General Principles of Scene Lighting.....	113
Let's Look at These One by One	113
Read the Script	113
Confer With the Director	113
Light the Scene, Not the Set	115
Insist on Seeing a Full Rehearsal	115
Insist on Having Lighting Stand-Ins	115
What Are the Opportunities?.....	116
The Set.....	116
The Action.....	116
Script Hints	116
Consider Your Resources	116
Lights.....	116
Power.....	117
The Location	117
The Director's Concerns.....	117
Knights Around A Campfire	121
Lighting a Scene With Practicals	128
Lighting/Grip Order	142
LIGHT AS STORY	143
Storytelling With Light	144
Metaphor	145
Atmosphere	146
The Power of Darkness	147
Establish Character.....	147
COLOR.....	173
Color Terminology	174
Color Temperature: The Balances.....	175
Warm and Cool.....	175
Magenta vs. Green	176

The CIE Diagram.....	178
The Spectral Locus.....	178
The White Point	178
The Line of Purples.....	179
Color Balance with Gels and Filters.....	179
Conversion Gels	180
Light Balancing Gels.....	181
CTO	181
CTB.....	182
Color Correction Gels.....	183
Dealing with Fluorescent Light	183
Correcting Off-Color Lights.....	184
HMI.....	184
Industrial Lamps.....	184
Camera Filtration for Industrial Sources.....	185
Measuring Color.....	185
Color Meters	185
The Vectorscope	189
Calibration Test Charts.....	189
DSC Labs Test Charts.....	189
The One Shot	190
The X-Rite ColorChecker.....	193
Color As a Storytelling Tool	193
EXPOSURE	195
Exposure Theory	196
What Do We Want Exposure to Do for Us?	196
The Bucket	196
Controlling Exposure	197
Change the Bucket	198
The Elements of Exposure	199
Light	199
F/Stops.....	199
The Response Curve.....	200
Underexposure	200
Overexposure.....	200
Correct Exposure	200
Higher Brightness Range in the Scene.....	201
Two Types of Exposure	202
The Bottom Line.....	202
Exposure in Shooting RAW Video.....	203
The Tools of Exposure	204
The Incident Meter.....	204
The Reflectance Meter.....	205
A Different World of Exposure.....	205
Setting Exposure with the Waveform Monitor	206
F/Stops on the Waveform	207
Exposure Indicators in the Camera	207
Zebras	207
Histogram	208

Traffic Lights and Goal Posts	209
Goal Posts.....	209
Traffic Lights	209
False Color Exposure Display	210
Red False Colors.....	211
Comparing Red Exposure Modes	211
Arri Alexa False Colors	212
Strategies of Exposure.....	212
Don't Let It Clip, but Avoid the Noise	213
Texture and Detail.....	214
The Dilemma.....	214
Using Light Meters	215
Meter the Key.....	216
Using the Waveform Monitor	216
Placing Middle Gray	217
Start at the Bottom or Start at the Top	218
Expose to the Right.....	218
Zebras.....	219
The Monitor.....	219
Know Thyself and Know Thy Camera	220
ELECTRICITY & DISTRO.....	221
Measurement of Electricity	222
Potential.....	222
Paper Amps	223
Electrical Supply Systems.....	224
Single-phase	224
Three-phase	224
Power Sources	225
Stage Service.....	225
Generators	225
Large Generator Operation.....	227
Guidelines for Running Small Generators	228
Paralleling Small Generators.....	231
Does Paralleling Cause Damage to Generators? ...	231
Tie-ins.....	231
Tie-in Safety.....	232
Determining KVA.....	233
Wall Plugging.....	234
Load Calculations and Paper Amps	236
Ampacity	236
Color Coding	237
The Neutral.....	237
Distribution Equipment.....	237
Tie-in Clamps	237
Busbar Lugs.....	238
Connectors	238
Bull Switches.....	239
Feeder Cable	239
Wire Types	240

Wire Designation Codes.....	241
Distribution Boxes	242
Lunch Boxes, Snake Bites, and Gangboxes	242
Extensions (Stingers).....	243
Zip Extensions	243
Planning a Distribution System	244
Balancing the Load.....	244
Working with DC	246
Calculating Voltage Drop	247
Electrical Safety	248
Wet Work	249
HMI Safety.....	250
Grounding Safety	251
GFCI	252
GRIPPOLOGY	253
Definitions	254
Light Controls.....	255
Reflectors	255
Operating Reflectors	257
Flags and Cutters.....	258
Flag Tricks	259
Nets	261
Net Tricks	261
Cuculoris (Cookies)	262
Grids and Eggcrates	264
Open Frames	264
Diffusers.....	264
Butterflies and Overheads.....	264
Overhead Rules.....	268
Griff.....	269
Holding	269
Grip Heads and C-Stands	269
C-Stand Rules	270
Highboys.....	270
Clamps.....	270
Studded C-Clamps.....	270
C-Clamp Tips.....	271
Bar Clamps	273
Pipe Clamps.....	273
Cardellini and Mafer Clamps	274
Quaker Clamp	274
Wall Plates, Baby Plates, and Pigeons.....	274
2K Receivers and Turtles.....	275
Side Arms and Offset Arms.....	276
Other Grip Gear.....	277
Sandbags	277
Apple boxes.....	277
Wedges.....	277
Candle Sticks	277

Studded Chain Vise Grips.....	278
SET OPERATIONS	279
The DP.....	280
The Team	282
Gaffer.....	282
Assistant Chief Lighting Technician	283
Third Electric and Electricians.....	285
Other Responsibilities	285
The Key Grip	286
Grips.....	288
Other Crews.....	290
Set Operations.....	290
Load-In	290
Staging.....	291
The Generator.....	291
Cabling.....	292
The Process	294
Rough-In	294
Blocking.....	294
Light	295
Rehearsal.....	295
Shooting	296
Procedures	296
Expendables.....	297
TECHNICAL ISSUES	299
Lighting for Greenscreen and Bluescreen.....	300
Greenscreen/Bluescreen Tips	300
Lighting for Process Photography	302
Flicker.....	303
The Power Supply.....	306
Flicker-Free HMIs.....	306
Dimmers.....	307
Dimmer Systems	309
DMX	310
Working with Strobes	311
Strobe Exposure	312
Lighting and Exposure for High-Speed Photography.....	313
Exposure.....	313
Flicker in High-Speed Photography.....	313
Lighting with HMIs and High Speed	315
Tips for Lighting High-Speed with HMIs	316
Exposure for Macrophotography	316
Depth-of-Field in Close-up Work.....	317
Lighting for Extreme Close-up	317
Underwater Filming	319
Effects	319
Rain.....	320
Smoke.....	320
Fire.....	321

TV and Projector Effects.....	321
Day-for-Night.....	322
Moonlight Effect.....	322
Water Effects.....	323
Lightning.....	323
Using the Sun.....	324
APPENDIX.....	325
Typical Lighting Order for a Small Independent Film	326
Equipment Order List for a Large Studio Film.....	327
Order for a 2nd Unit Night Shoot—Big Budget Film.....	329
Light Loss for Common Diffusion Types.....	331
Effect of Diffusion on Color Temp.....	331
Lamps and Sockets.....	332
Lighting Expendables Order Form.....	338
Building Your Own Hand Squeezer.....	345
A Typical 5-Ton Truck Package.....	346
ACKNOWLEDGEMENTS.....	350
INDEX.....	351