



third edition

voice & vision

a creative approach to narrative filmmaking



Mick Hurbis-Cherrier

A Focal Press Book

ROUTLEDGE



Voice & Vision

Develop your creative voice while acquiring the practical skills and confidence to use it with this new and fully updated edition of Mick Hurbis-Cherrier's filmmaking bible, *Voice & Vision*. Written for independent filmmakers and film students who want a solid grounding in the tools, techniques, and processes of narrative film, this comprehensive manual covers all of the essentials while keeping artistic vision front and center. Hurbis-Cherrier walks the reader through every step of the process—from the transformation of an idea into a cinematic story, to the intricacies of promotion and distribution—and every detail in between.

Features of this book include:

- Comprehensive technical information on video production and postproduction tools, allowing filmmakers to express themselves with any camera, in any format, and on any budget
- An emphasis on the collaborative filmmaking process, including the responsibilities and creative contributions of every principal member of the crew and cast
- A focus on learning to work successfully with available resources (time, equipment, budget, personnel, etc.) in order to turn limitations into opportunities
- Updated digital filmmaking workflow breakdowns for Rec. 709 HD, Log Format, and D-Cinema productions
- Substantial coverage of the sound tools and techniques used in film production and the creative impact of postproduction sound design
- An extensive discussion of digital cinematography fundamentals, including essential lighting and exposure control tools, common gamma profiles, the use of LUTs, and the role of color grading
- Abundant examples referencing contemporary and classic films from around the world
- Indispensable information on production safety, team etiquette, and set procedures.

This third edition also features a robust companion website that includes eight award-winning example short films; interactive and high-resolution figures; downloadable raw footage; production forms and logs for preproduction, production, and postproduction; video examples that illustrate key concepts found within the book, and more.

Whether you are using it in the classroom or are looking for a comprehensive reference to learn everything you need to know about the filmmaking process, *Voice & Vision* delivers all of the details in an accessible and reader-friendly format.

Mick Hurbis-Cherrier has been teaching all levels of film production at Hunter College in New York City for well over a decade. He works professionally in both film and video and has performed a wide range of duties, including producing, writing, directing, cinematography, and editing. His films have been shown around the country and have garnered prizes at a number of festivals. He is also the co-author of *Directing: Film Techniques and Aesthetics* (2013), now in its fifth edition.



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Voice & Vision

A Creative Approach to

Narrative Filmmaking

Third Edition

MICK HURBIS-CHERRIER

Illustrated by Gustavo Mercado

Third edition published 2018
by Routledge
711 Third Avenue, New York, NY 10017

and by Routledge
2 Park Square, Milton Park, Abingdon, Oxon OX14 4RN

Routledge is an imprint of the Taylor & Francis Group, an informa business

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First edition published by Focal Press 2012
Second edition published by Focal Press 2013

Library of Congress Cataloging in Publication Data

Names: Hurbis-Cherrier, Mick, author.

Title: Voice & vision: a creative approach to narrative filmmaking / Mick Hurbis-Cherrier; illustrated by Gustavo Mercado.

Description: 3rd edition. | New York: Routledge, 2018. | Includes bibliographical references and index.

Identifiers: LCCN 2017057452 | ISBN 9781138480445 (hardback) | ISBN 9780415739986 (pbk.) | ISBN 9781315815893 (e-book)

Subjects: LCSH: Motion pictures--Production and direction.

Classification: LCC PN1995.9.P7 H79 2018 | DDC 791.4302/32--dc23LC record available at <https://lccn.loc.gov/2017057452>

ISBN: 978-1-138-48044-5 (hbk)
ISBN: 978-0-415-73998-6 (pbk)
ISBN: 978-1-315-81589-3 (ebk)

Typeset in Helvetica Neue and Kunstler 480 by
Servis Filmsetting Ltd, Stockport, Cheshire

Visit the companion website: www.routledge.com/cw/hurbis-cherrier

This book is dedicated to Frank Beaver, Michelle Citron, and Dana Hodgdon—exceptional professors, mentors, and friends whose teachings have remained with me and whose voices echo throughout the pages of this book.



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Companion Website Contents

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When you see this hand pointer icon in the pages of this book, it indicates that material related to that section is available online at www.routledge.com/cw/hurbis-cherrier

■ THE COMPANION WEBSITE TABS

All By Chapters

This section contains all of the supplementary web materials in the book, listed by chapter and in the order they occur in each chapter. This includes:

- Short film examples
- High-resolution and color figures
- Video figures
- Interactive figures
- Forms, logs, and tables for preproduction, production, and postproduction.

Short Films

This section contains links to stream the example short films discussed in the book. The films are:

- *The Black Hole*. Directed by The Diamond Dogs Phil & Olly (3 min.)
- *Plastic Bag*. Directed by Ramin Bahrani (18 min.)
- *Waking Dreams*. Directed by John Daschbach (24 min.)
- *When I Was Young*. Directed by Huixia Lu (15 min.)
- *Vive le 14 Juillet*. Directed by Didier Rouget (4 min.)
- *Winner Take Steve*. Directed by Jared Hess (2 min.)
- *This is It*. Directed by Alexander Engel (3 min.)
- *The Wake*. Directed by Gemma Lee (7 min.)
- *Before the Making of Sleep Dealer*. Directed by Alex Rivera (12 min.)
- *Kiarra's Escape* (scene excerpt) (2 min.)
- *You Got It* (multiple scene excerpts).

Video and Interactive Figures

This section contains all of the figures and examples which are noted in the book as videos or interactive flash figures.

Forms, Logs, Tables

This section contains downloadable forms, logs, and tables for preproduction, production, and postproduction. These forms include:

- Storyboard forms
- Location scouting report
- Budget forms
- Production call sheet
- Script breakdown sheet
- Camera and sound reports
- Depth of field tables for the 16mm format
- Film can labels for exposed film
- Sound cue spotting sheet.

The Celluloid System

This section contains all of the chapters and sections dealing with the celluloid filmmaking process from the second edition of this book (i.e., film cameras, film stocks, film-to-tape transfers, and film workflow in general). You may download all celluloid film related chapters as .pdfs if you wish.

Web Resources Links

This section contains links to useful websites related to various aspects of filmmaking.

Raw Footage Downloads

This section includes download links for raw video footage to be used for editing exercises.

Misc. and New

This section includes miscellaneous materials from throughout the book and new material added to the website after publication. This includes:

- Sample location contract and talent release
- The CSATF and Ontario production safety guideline publications
- Screenplay formatting specifications
- Instructions for calibrating monitors to color bars
- New materials added to the website after publication date.

Acknowledgments

The third edition of this book represents a veritable overhaul and could not have been accomplished without the kind help, contributions, and counsel of many reviewers, assistants, consultants, students, and colleagues—friends one and all.

Naturally, warmest thanks go to the team at Focal Press (Taylor & Francis): Sheni Kruger, John Makowski, Abigail Stanley, Jonathan Merrett, Emily Boyd, Simon Jacobs, Dennis McGonagle, Emily McCloskey, Peter Linsley, and of course, the former acquisitions editor Elinor Actipis, who initiated this entire project.

I am deeply grateful to the filmmakers who generously provided their excellent short films for analysis and streaming on the book's companion website: John Daschbach, Huixia Lu, the Diamond Dogs Phil & Olly, Ramin Bahrani, Didier Rouget, Alexander Engel, Gemma Lee, Alex Rivera, Jared Hess, and the Wexley School for Girls.

I would also like to thank my colleagues at Hunter College of the City University of New York for their support, advice, and encouragement, primarily President Jennifer Raab, Jay Roman, Joel Zuker, Andrew Lund, Ivone Margulies, Joe McElhaney, Shanti Thakur, Michael Gitlin, Sameh Zoabi, Renato Tonelli, David Pavlosky, Carol Adams, and Peter A. Jackson. Special acknowledgment goes to my colleagues Kelly Anderson and Martin Lucas, with whom I worked on the documentary version of this book (*Documentary Voice & Vision*, Focal Press, 2016), a process that informed this edition; and Ricardo Miranda who created the interactive figures for the companion website.

During the writing of this book I have been deeply touched by the way Hunter College film students eagerly rallied to my aid. To all of those who gave so willingly of their energy, enthusiasm, and talent, I am grateful: Alana Kakoyianis, George Racz, Emily DiPaola, Myles Glynn, Ivana Rai evi , Emilio Castro, Dennis Ragone, Nicole Pommerehncke, Ruomi Lee Hampel, Rommel Genciana, Maya Sheppard, Elvis Maynard, Melissa Hill, Matt Post, Nikki Hracs, Richard Unapanta, Tristan Allman, Eric Smith, Donna Chin, and Brian Kolb.

And, of course, I must acknowledge the many friends whose tangible and inspirational support is woven throughout the pages of this text, especially Abbas Kiarostami, Seifollah Samadian, Raymond Cauchetier, Rachel Morrison, Thelma Schoonmaker, Ellen Kuras, John Inwood, Bill Collage, Pam Katz, Paul Cronin, Timothy Corrigan, Mike Figgis, Shirin Neshat, Antoin Cox, Christine Vachon, Kim Fuller, Courtney Hunt, Don Harwood, Heather Rae, Cory McAbee, Becky Glupczynski, Rain Li, Walter Partos, Zachary Sluser, Michel Khleifi, Dag Bennstrom, Matt Anderson, Clarence Courtney, Claire Luke, Henny Garfunkel, and Charles Merzbacher, Catherine Riggs-Bergesen, Laurent Tirard, Wes Simpkins, Pete Abel at Abel CineTech, Jan Crittenden at Panasonic, and Joe Hannigan at Weston Sound.

Deserving of extra gratitude are cinematographers Ben Silberfarb and Michael Carmine for their generous assistance with the exposure chapters; Ken Dancyger, for prompting me to write a book in the first place; and Michael Rabiger who has become a remarkably perspicacious mentor ever since my collaboration with him on *Directing: Film Techniques and Aesthetics* (Focal Press, 2013).

Also, a huge thanks to all of the people who created the online example film excerpts: (*You Got It*) Marta Gac, Liz Dorovitsine, Namakula Mu, Don Puglisi, Tom Ashton, Edel Garstad,

George Mantzoutsos, Joanne Marino, Sydney Amanuel, Marion Kennelly, and Mihir Chitale; and (*Kiarra's Escape*) Miles Adgate, Jordan Cooke, Nick Vega, Sharine Mohamed, Robert Youngren, Jessica Krueger, Victor Varela, and Rick Varela.

And most profoundly, I am eternally grateful and indebted to Katherine Hurbis-Cherrier and my brother Gustavo Mercado, who were in the trenches with me each and every day of the writing and research. This book would not have been possible without them.

Introduction: Third Edition, 2018

As I was preparing the third edition of *Voice & Vision*, I carefully read over my two previous introductions. The first edition intro, written in 2007, essentially asserts that filmmaking is more than just having a good story—it argues that one must gain a degree of familiarity, if not mastery, over the tools and technology of the medium in order to become truly expressive and fluent. Too many times beginners launch into a film project without really understanding how a lens, or light, or an edit, or a sound effect can contribute to telling a compelling story on the screen.

The introduction to the second edition, however, seemed a reversal of this concern. Only a few years after publishing the first edition, digital technologies exploded and became more powerful and available, and I noticed a trend with emerging filmmakers; they were becoming so enamored with the technology that the lion's share of their attention went into securing 4K cameras, strategizing workflows, and designing cool green screen CGI effects, while far too little attention was being paid to the foundational storytelling aspects like writing a solid script, rehearsing actors, or creating expressive lighting and compositions. I had seen more than a few novice filmmakers hire a cinematographer for no other reason than they happened to have an Arri Alexa camera.

Are these two exhortations incompatible? Are they contradictory? Not at all, and this represents the steep learning curve for all new filmmakers; you've got to do it all. You have to know your technology and tools, *and* you must maintain your focus on creative storytelling, expressive image making, and convincing performance.

So how does a beginner absorb all of this—and fast? Practice, lots and lots of practice. It's a good thing that exceptional filmmaking tools are neither expensive nor difficult to acquire, and this makes extensive practice doable. If you are just starting out in your career as a filmmaker, don't get bogged down in complex technologies and expensive workflows. Stay lean. Work simply. Produce much. You can make fantastic films with little more than a good camera, an off the shelf editing system, and a small cast and crew of eager creative people—and of course a great script. Producing multiple short films, quickly, will teach you more about the real world of filmmaking than a film production class, or online forums, or YouTube tutorials, or even a book on filmmaking . . . oh, wait! Of course, if you have all four resources working in coordination, then every short film you make as a beginner will represent a veritable crash course.

So, don't immediately jump into features or 30-minute films. These can take a very long time to simply get off the ground. You should be producing, producing, producing. Some of your movies will be good, others may be not so good—doesn't matter. Making multiple short films with a simple workflow will allow you to develop your core storytelling techniques like writing a solid screenplay, visual storytelling, working with actors, controlling rhythm and tone, and harnessing the storytelling power of editing and sound design. And while none of these things requires a big budget, complex workflows, grip trucks, or a 4K DCP, you will nonetheless be gaining a degree of mastery over the tools of cinematic storytelling. Making many short films quickly will also give you familiarity and confidence with the filmmaking stages, set-protocol and most importantly, working collaboratively. Then, as you begin to add more advanced technologies and workflows, and larger crews and budgets, you'll still remain in control of the filmmaking process, rather than having the process control you. You will be able to tell the difference between a cinematographer who thinks creatively about image making from one who has a lot of awesome gear, but no eye

for image making or story sensitivity (and there are a lot of those). You'll gain a clear-eyed perspective for the relative value between a well written screenplay and a fine actor versus the latest 8K camera and a D-Cinema workflow. In other words, you will discover who you are as a filmmaker and you will be equipped to do good work over the long haul, in whatever production situation you find yourself in, no matter how technologies and workflows change in the future.

This little pep talk does not simply apply to directors; it goes for anyone seeking to work in one of the creative filmmaking roles. A budding cinematographer is better off making five short films in one year with a DSLR and a basic lighting package, rather than spending that year hunting down an Arri Amira, attending training workshops to learn how to use it, researching a technical workflow that includes transcoding proxies and 3D LUTs for it, finding a reliable DIT, and shooting only one project. Shooting many projects will help you understand how to become an expressive shooter with any camera, rather than being just a gearhead, and you will learn about collaboration and how to recognize good directing and good screenwriting. The same goes for editors, and art directors, and sound designers, and special effects designers, and so on. So get out there and make films, lots of them, take risks, experiment, try different approaches—find your voice.

I have included trimmed down versions of the previous introductions here in the third edition because while the technology of filmmaking may have changed dramatically since 2007 (!), the basic principles behind learning and practicing the craft have not. These introductions are still relevant and instructive, and will give you a good sense for the philosophical and pedagogical underpinnings of this book. Please do give them a read.

■ INTRODUCTION: SECOND EDITION, 2012

Early in the process of writing the second edition, I happened to run into a former student who was preparing to go into production on his first feature film. When he elaborated on the project, the very first thing he told me, quite excitedly, was that he was shooting on a RED ONE camera at 24p and 4K resolution and that the latest version of Final Cut Pro supported the REDCODE RAW codec without transcoding, and so on and so on. It took some time for the conversation to get around to the actual story and ideas in the film.

This is not an unusual conversation these days. I have seen countless students labor so mightily over the mysteries of production formats, transcoding, compression ratios, workflows, container formats, and codecs, that the creative dimension (the hard work of crafting a compelling story with convincing characters and expressive images) often takes a backseat. But they're not entirely to blame for this tendency. The technology of filmmaking and film distribution has accelerated rapidly, oftentimes outpacing the end user's ability to fully absorb the new paradigms. American video standards are now completely digital and analog NTSC is a quaint antique. High Definition video has come down in price and saturated all market levels to the point where HD formats are the new standard. Anything resembling tape stock, whether in sound recording or video recording, is totally archaic; sound and picture production is file based and solid state. Elite film camera manufacturers like Aaton, Arriflex, and Panavision have fully entered the digital cinema arena and left celluloid behind. Additionally, the web, which has become an essential tool for promotion, fund raising, and distribution, requires yet another set of technical skills to successfully harness. And if the past five years has shown us anything, it's that we can expect the same rate of technological transformation in the *next* five years—perhaps even greater. So it's understandable why a young filmmaker would reel off the technical dimensions of his project before the story; getting a handle on all of it does constitute an accomplishment of sorts. But this is exactly why we must be extra vigilant not to let the tail wag the dog. Filmmakers must dig deep into the core of their creativity to find their true artistic voices, even while they are digging deep into product spec sheets, user forums, and software manuals. And this is very possible.

I believe that this avalanche of technology is actually having an impact in two ways. Some things are getting trickier, while other things are getting easier. Yes, the constant changes to workflows, shooting formats, frame rates, scanning options, sensor types, and codecs can be a veritable technological tar pit. At the same time, however, gorgeous, high-resolution images of broadcast or theatrical quality, which allow for precise creative control over lighting and exposures, are now within easy reach for even a novice with very little money. In the past, it was rare for a student to shoot a 35mm film, even a short one; now I have many advanced students shooting on the same camera rigs used by commercial directors like Soderbergh or Fincher, and many more recent graduates are able to embark on feature films knowing that even midlevel camcorders and off-the-shelf editing software will yield professional results. Perhaps all this easy and relatively inexpensive access to very high production values, along with this state of constant technological flux, might just make the technology *less* precious and encourage filmmakers to place their best energies into what will truly distinguish them as visual storytellers—the script, the acting, the images, and the ideas behind all of it.

So, yes, the technical information in this book *is* important—these are our tools, this is how we express ourselves in this technological medium after all—and it is my sincerest desire that this book give you the fundamental technical information you need to work successfully as a filmmaker. I hope that the technical discussion in these pages empowers you to make films, to make them look the way you want them to look, and to avoid costly technical detours and errors. But I also hope that this book inspires you artistically and encourages you to never lose sight of the fact that filmmaking is a creative endeavor. We tell stories to move people, to make them cry, laugh, shriek, sit on the edge of their seat, hold their lover a little harder, think about their actions, understand other people better, feel warmth, joy, fear, or outrage. We do not tell stories to prove to the world that we know how to use a RED camera shooting 24p at 4K resolution.

The point is that it really doesn't matter what the equipment is. It really matters who the artist is, and what their attitude is.

Mike Figgis (From *Digital Filmmaking*, 2007)

■ INTRODUCTION: FIRST EDITION, 2007

Where does one begin a journey into the world of filmmaking? Film is creative and it is technical. It's a form of personal expression and a universal language. It requires careful logistical planning and inspired spontaneity. It is the product of a single vision and collaborative energy. Film is also the quintessential hybrid art form, finding its expressive power through the unique amalgam of writing, performance, design, photography, music, and editing. And all of it matters. Every choice you make, from the largest creative decisions to the smallest practical solutions, has a profound impact on what appears on the screen and how it moves an audience emotionally.

The central principle behind *Voice & Vision* is the notion that all of the conceptual, technical, and logistical activity on a film project should serve the filmmaker's creative vision. Making a film begins with someone wanting to tell a story, wanting to bring an idea to the screen for the world to see. The next step then involves gathering together the people, equipment, and resources to produce the movie. However, it's quite common these days to hear people who don't want to bother themselves with the technical or conceptual fundamentals of filmmaking say that "it's not about tech, it's not about rules, it's all about the story." That's a little too facile. The fact is, it's not enough to just have a story, no matter how good it is; you have to be able to tell that story well. It's not simply "all about story," it's all about storytelling, and in this medium storytelling involves actors, a camera, lights, sound, and editing. To develop your ability to tell a story on film necessarily means understanding the basic visual vocabulary of cinema, the process of production, as well as the function and expressive potential of the tools; like a camera, a light meter, and editing software. In a recent filmmaker's master class, the great director Abbas Kiarostami stressed

the point that a mediocre idea brilliantly told is preferable to a brilliant idea poorly told. Film is a complex art form, and in order to make the right decisions and express oneself successfully you must be clear about what your ideas are and what you want to say; and you must gain control of the film language, tools, and production process in order to say just that. As James Broughton, one of cinema's great poets, once wrote:

Every film is a voyage into the unknown. . . . It is unwise to embark on the high seas without knowing a few of the laws of navigation. To have a shipwreck before you have cleared the port is both messy and embarrassing.

(From *Making Light of It*, 1992)

Voice & Vision elaborates on all of the essential information and skills necessary to ensure that the student filmmaker will acquire the technical, logistical, and conceptual authority needed to “speak in film” with cinematic eloquence and fluency. Think of the book like a map—it may not predict every wondrous sight or challenge you’ll encounter on your voyage, but it’ll get you sailing into open waters.

Obviously, it is not possible for one book on filmmaking to be a completely comprehensive resource on such a vast and evolving subject. In fact, all of the film books on the bookstore shelves put together don’t even manage to say all there is to say—and thank goodness for that. *Voice & Vision* is written for the introductory and intermediate film student or independent filmmaker. It aims to provide a solid foundation in narrative filmmaking, from idea to distribution, including essential technical information on production tools, a thorough overview of the filmmaking process, and, of course, a discussion of the conceptual and aesthetic dimensions of telling a motion picture story.

■ FILM IS A COLLABORATIVE ART FORM

The act of making a film, on any scale, is an endeavor that requires enormous effort, concentration, and a broad range of knowledge. It also requires the execution of several tasks simultaneously. For this reason, narrative filmmaking is always a collaborative art form, requiring the collective energy and expertise of a team. A filmmaking team can be anywhere from two to two dozen (or more), but the basic dynamic is the same—a film becomes better when everyone on the team is allowed to make creative contributions and when everyone takes serious responsibility for their practical and technical duties. You will see these ideas of team creativity and responsibility emphasized throughout *Voice & Vision*. This book is also written with the understanding that not every film student will become, or even wants to become, a director. Knowing that students can follow so many creative and fulfilling paths in film (cinematography, sound design, editing, art direction, etc.), I have provided ample technical information, creative context, and discussions of aesthetics to thoroughly engage those many students who are enthusiastic about areas other than directing. Whether they are writing, directing, shooting, or editing, the ultimate goal of *Voice & Vision* is to guide each student of film to develop their own creative voice while acquiring the practical skills and confidence to use it.

■ TEACHING AND LEARNING FILMMAKING

Film writing and directing cannot be taught, only learned, and each man or woman has to learn it through his or her own system of self-education.

Alexander Mackendrick (From *On Filmmaking*, 2004)

The great film director Alexander Mackendrick (*The Ladykillers*, *Sweet Smell of Success*) raises a pertinent issue when he states in his book, *On Filmmaking*, that you cannot teach film, but you can learn it. The interesting twist, however, is that Mr. Mackendrick was also a legendary film teacher at the California Institute of the Arts for 25 years, so he must have believed that something about film could be taught, or at least conveyed, and that

a teacher plays some role in learning about filmmaking. I believe that you can, in fact, teach a great deal about filmmaking. One can teach the essentials of technique, cinematic language, the technology, and the expressive capabilities of the instruments of the art form. One can teach an understanding of how the production process itself supports the creation of a movie. One can teach a student a method for recognizing and appreciating exceptional examples of filmmaking from the history of movies. All of this can bring the serious student right to the threshold. The rest of what is necessary, albeit the core of being an artist in any medium, must be learned through example and experience, and here a teacher, and a book, can serve as a guide. This core consists of imagination, visual intuition, initiative, an aesthetic sense, and personal style. These qualities can't be taught, but they can certainly be nurtured and developed.

So where do we go to learn those things that cannot be taught? The first thing an aspiring filmmaker must do is watch films, especially the films of the masters, old and new. Writers read great writers, painters look at paintings and, in fact, often copy the works of masters when developing their craft. It is imperative that young filmmakers look carefully at films for what they express and how the filmmaker actually achieves that particular mood or emotion, or that specific narrative point, or how they develop a theme, or move you to laugh, or cry, or vote, through images, actions, and sound. Movies themselves are our most useful textbooks. Think about it: not one cinematic storytelling technique in the history of film has become extinct. Every filmmaking technique that has been developed remains part of the lexicon of the art form and it's all there for you to learn from, rework, customize, and apply to your own story. Knowing this, I have included throughout the text numerous illustrations from movies. The "In Practice" feature provides brief analyses of scenes or techniques from films that illustrate how a specific technology, process, or technique is used to support a conceptual, narrative, or aesthetic impulse—in essence, the creative application of a principle or a technology. This encourages the student to look at films analytically and to use the wealth of material available for rent as a research tool. You will notice that I reference films from all eras and from all over the world and at all budget levels. This book celebrates the vast diversity of voices, approaches, perspectives, and innovations in cinema throughout its history. A smart film student will understand that great movies and creative innovations are as likely to come from Taiwan, Denmark, Brazil, and Iran as Los Angeles. Film is truly a global art form, and every continent continues to make vital contributions.

The second way we can learn about filmmaking is to listen to the tales from the trenches of production. Everyone has on-set experience stories: challenges that they faced, puzzles that they solved, issues with which they struggled, ideas that they held on to and those that they had to let go, accounts of their crafty accomplishments, shrewd fixes, and innovative workarounds. It's important to listen to these stories. We learn from the experiences, ideas, ingenuity, solutions, knowledge, advice, strategies, difficulties, disappointments, and successes of other filmmakers, from students struggling with their very first film to seasoned pros struggling with their 30th movie—there are lessons in all of it. Pick up any trade magazine, like *American Cinematographer*, or go to a website like www.filmsound.org, or pick up a book like Laurent Tirard's *Moviemakers' Master Class* or Walter Murch's *In the Blink of an Eye*, and what you'll find are people with experience in cinematography, sound design, directing, editing, or any other creative aspect of filmmaking sharing what they've accomplished and what they've learned along the way. You can tuck all of these illuminating stories, all of this first-hand information, into your tool kit and bring it with you to your next project. Then, after you've spent even one day on a film set, you'll have your own stories to share. It's all about storytelling after all.

You will find real-world stories sprinkled throughout the book and also in the "In Practice" boxes, which often contain brief anecdotes detailing common and characteristic production challenges from professional film shoots as well as student productions. Many of these on-set stories come directly from the experiences of my students during my 13 [now 24] years of teaching introductory and intermediate production courses. Some of

them come from filmmakers ranging in experience from first-time feature film directors to legendary masters of cinema.

In the end, however, the best way to learn about filmmaking is simply to make films. Here is some advice from someone who's made a few himself:

The advice I would give today to anyone who wants to become a director is quite simple: make a film. In the sixties, it wasn't so easy because there wasn't even super 8. If you wanted to shoot anything, you had to rent a 16-millimeter camera, and often it would be silent. But today, nothing is as easy as buying or borrowing a small video camera. You have a picture, you have sound, and you can screen your film on any TV set. So when an aspiring director comes to me for advice, my answer is always the same: "Take a camera, shoot something, and show it to someone. Anyone."

Jean-Luc Godard (From *Moviemakers' Master Class*, by L. Tirard, 2002)

So there you have it. What are you waiting for? It's time to make movies!

What's New in the Third Edition

■ CELLULOID FILM INFORMATION IS RELOCATED TO THE WEBSITE

The most obvious change from previous editions of *Voice & Vision* is the removal of the chapters and sections dealing with celluloid filmmaking from the text (i.e., film cameras, film stocks, film-to-tape transfers, and film workflow in general). This material, however, is not gone; I have simply relocated it to the *Voice & Vision* companion website under the tab “The Celluloid System.” You may download all celluloid film related chapters from the second edition if you wish.

■ CHANGES IN VOICE & VISION THIRD EDITION

For this new edition, every single chapter has been refreshed and updated to a greater or lesser extent. Clearly, the small changes are far too numerous to list, but some of the chapters dealing with the technical aspects of digital shooting and postproduction have been overhauled, and significant updates have also been made to many of the sections on production procedures. Following is a list of some of the major changes you will find in the third edition of *Voice & Vision*:

- **New Example Films:** I am very excited to include three excellent new short example films: Gemma Lee’s *The Wake*, Alexander Engel’s *This is It*, and Jared Hess’ *Winner Take Steve*. These films are excellent models of tight, effective, and innovative filmmaking on slight budgets. Along with the previous collection of short films, these new shorts are discussed as examples throughout the text and are available on the *Voice & Vision* companion website for streaming.
- **Expanded and Updated Digital Workflow Information:** I have greatly expanded and updated the information on the digital filmmaking workflow. This includes updates on the ever evolving ATSC digital standards, shooting formats, image sensor technology, camera settings and options, and standard record media. I have also augmented the section on the digital video cameras which now lists many more available varieties and their unique features. The new discussion of workflow also takes into greater account the increasing integration of processes that were once thought of as distinctly preproduction, production, or postproduction tasks. Much of the filmmaking process these days happens simultaneously, for example, color grading is no longer strictly a postproduction process, but often “looks” are designed in preproduction, during camera tests.
- **Picture Profiles and Log Format:** Directly related to the digital workflow, I have also included information on working with various picture profiles (gamma settings), including detailed information (across several chapters) on the Log gamma workflow and the use of LUTs in the field and in postproduction.
- **Exposure Control for Video:** Given the ever increasing sensitivity and latitude of modern imaging sensors, I have also greatly expanded the discussion of exposure control for video. Divided between a “basics of exposure” section and later an “advanced exposure control” section, the specific topics include the proper use of in-camera meters, zebras, handheld light meters, external field monitors, and waveform monitors (for both standard Rec. 709 and Log shooting). All in all, lighting and exposure control comprise three full chapters (Chapters 12, 13, and 14) with further discussion of image refinement emerging in the section on color grading as well.
- **New Editing and Color Tools:** In general, the chapters on picture and sound editing and project finishing were updated to reflect the recent developments in the non-linear editing software landscape (i.e., the tremendous expansion of Avid Media Composer and Premiere Pro into the academic market). Along with this platform shift came an

increased sophistication of color tools bundled with software packages which compelled me to also expand the section on color correction and color grading.

- **Data Wrangling, the DIT, and Gear Prep:** Now that this text is given over entirely to the digital workflow, I found it essential that I augment my discussion of data management on the set and include information on the role of the Digital Imaging Technician—a position that has grown in importance so much that the DIT is often considered a D.P.'s principle creative collaborator (along with the 1st A.C.). In addition I have updated the production forms available online, improved my section on the role of the script supervisor, and provided detailed checklists for prepping a digital camera and sound recorder.
- **Independent Film Distribution:** Perhaps one of the most radical transformations to occur since the last edition has been the rapid changes occurring in the world of independent film distribution. At this moment, film distribution is the new “wild west,” a territory that favors the intrepid pioneer, where the rules are being written and broken regularly. Who knows when the dust will settle, or if it will settle. In an attempt to keep up with developments in contemporary film distribution strategies, paths, and opportunities, I have expanded this section and provided many new examples.

Obviously, it's impossible for a published book to remain absolutely current with the technological state of the art for any field of digital production. As before, I've concentrated on the broader concepts and more enduring information concerning what the purpose of a thing is, or how something works, or why we follow a certain procedure, rather than fall down the rabbit hole of trying to catalog every button on every camera and every menu option on every NLE workspace. Not only would this be futile, but that information is readily available in product manuals and online tutorials. I've carefully designed each section involving technology around the fundamental knowledge underpinning the hard specs, and *that* information should prove to be somewhat future proof. Also, consistent with my personal teaching philosophy, I've assiduously maintained my focus on the creative application, aesthetic impact, and expressive possibilities embedded in the digital technologies used in film production—and they are substantial.



PART I DEVELOPING YOUR FILM ON PAPER





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From Idea to Cinematic Story

*Our first job is to look,
Our second job is to think of a film that can be made.*

Abbas Kiarostami

There's no doubt about it. Filmmaking is exciting stuff. Working on a set, surrounded by the energy of a great production crew, collaborating with actors, setting up lights, lining up shots, calling out "Roll camera! Action!" Seeing a film project come to life can be an exhilarating experience. In fact, most aspiring filmmakers simply can't wait to get their hands on a camera and start shooting. Once they get an idea, they're ready to go! But wait. What are you shooting? What is your idea? Are your characters interesting? Does the idea have a shape? Just what do you want to say and how will you say it? What does all this activity on the screen add up to? What about the practical side of making this film? Are the subject and visual approach appropriate for your resources? Can you get it done?

Whether your project is a two-minute chase scene with no dialogue or a complex psychological drama, the first step in any narrative film production is coming up with an idea that is stimulating, engaging, and ripe with visual possibilities. The idea is the DNA of the entire filmmaking process—it informs every word written into the script, every shot you take, and every choice you make along the way. The better your basic idea is, the better your film will be. But an idea is only the first lightning bolt of inspiration. All ideas have to be developed—fashioned into stories that can be told through the medium of film. This means turning an idea into a story that can be captured and conveyed by that camera you're dying to get your hands on.

■ FINDING AN IDEA

At the beginning of any film, there is an idea. It may come at any time, from any source. It may come from watching people in the street or from thinking alone in your office. . . . What you need is to find that original idea, that spark. And once you have that, it's like fishing: you use that idea as bait, and it attracts everything else. But as a director your main priority is to remain faithful to that original idea.

David Lynch (From *Moviemakers' Master Class*, by L. Tirard, 2002)

Where do we find ideas? Where does inspiration come from? As Lynch reminds us, ideas can come to us anywhere and at anytime: an act of kindness we witness on the street, an individual we watch on the bus, a piece of music that moves us, a personal experience or a memory we can't let go, or even an experience a friend relates to us. John Daschbach's *Waking Dreams*, as the title suggests, came from a particularly vivid dream; Gemma Lee's *The Wake* was based on the true story of producer/actor Charlie Clausen's own father's death and the quirky family friend who helped him through the tough period; and the details for Alexander Engel's *This is It* came from his personal experiences with bad roommates.¹ Ramin Bahrani's 2007 feature film *Chop Shop* was inspired by an evocative location that struck him as a perfect setting for a dramatic story (see page 137). I once

¹ All three of these short films are available for viewing on the *Voice & Vision* companion website.



■ **Figure 1-1** Director Abbas Kiarostami.

attended a reading by the fiction writer Raymond Carver, and someone in the audience asked him if he had any secrets to becoming a writer. He said simply, “You have to be a sponge, you have to constantly absorb the world you live in.” If you keep your eyes and ears open, you will discover that material is all around you. Everyday life provides fertile ground for story ideas, visual ideas, and character ideas. Stay alert and connect to the world around you, then you’ll be able to connect with your audience.

In an interview with Houshang Golmakani (done for the 1996 Locarno International Film Festival), the Iranian filmmaker Abbas Kiarostami (**Figure 1-1**), speaking about inspiration, shared the following thoughts:

Gabriel Garcia Márquez once said, “I don’t choose a subject; it’s the subject that chooses me.” The same goes for me. The subject depends on whatever happens to be keeping me awake at night. . . . I have dozens of stories stored away in my memory. There’s a story happening in front of me every day, but I don’t have the time to make a film out of it. In the course of time, certain stories start taking on importance; one of them will end up becoming the subject of a film.

Precisely what strikes us as a good idea, one that could develop into a great movie, is a highly individualistic thing. In fact, where you get your ideas and what strikes you as a good idea for a movie, is *the* thing that makes your films your films and not someone else’s, which is why it is best that ideas come from your own observations and responses to the world around you. The only way that a movie will contain your individual voice is if your core idea comes from you, from your imagination, interests, and perspective. Only Martin Scorsese can make Scorsese films. You may love them, but to try and duplicate them, because they are successful or because you think Mafia violence is the *ne plus ultra* of drama, is to avoid the most important work a filmmaker can do, and that is to find out what your unique cinematic voice and contribution might be. Finding your own voice is not easy work, but it’s essential, and that process begins with your very first film.

Here is an example from the screenwriter and director Peter Hedges, who is discussing where he got the idea for his 2003 feature film *Pieces of April*:

In the late 1980s . . . I heard about a group of young people who were celebrating their first Thanksgiving in New York City. They went to cook the meal, but the oven didn’t work, so they knocked on doors until they found someone with an oven they could use. I remember thinking that this could be a way to have all sorts of people cross paths who normally wouldn’t.

(From *Pieces of April: The Shooting Script*, by P. Hedges, 2003)

Hedges jotted the idea down, made a few notes, and then forgot about it. This idea is like many lightning bolts of inspiration—it’s interesting and compelling, but not yet fully formed. Hedges would not find the story in the idea until ten years later.

■ FROM AN IDEA TO A STORY

One’s initial idea—that first spark of inspiration—more often than not is vague. Sometimes it’s no more than an observation or a feeling. In the case of Peter Hedges, the idea was a simple situation that was not much more than fertile ground for interesting interactions,

but it wasn't a story yet. The most basic elements of film are images and sound, those things that we can capture with a camera and a microphone. Think about it: when you are in a theater watching a movie, everything you understand about a character, the story, the mood, and the themes of the film, is delivered exclusively through sound and images. We cannot point our camera and microphone at ideas, desires, intentions, or feelings, but we can record characters who react, make decisions, and take action as they struggle and strive to achieve something. It's through their actions that we understand who these characters are, how they are feeling, what they are after, and what it all means. This is the fundamental principle behind **dramatization**, transforming what is vague and internal into a series of viewable and audible behaviors, actions, and events (also see page 36).

in practice

THE VOICE & VISION ONLINE SHORT FILM EXAMPLES

The following section refers extensively to the eight short films streaming on the *Voice & Vision* companion website (Figure 1-2). These films illustrate many of the central storytelling considerations for

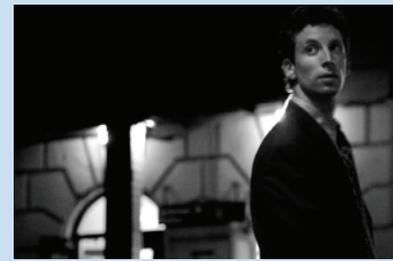
fictional narrative films (especially in relation to the short form). Also, these eight shorts were selected because they represent a broad range of characters, themes, and approaches to cinematic storytelling and technique. Go to the book's companion website to screen these films.



a



b



c



d



e



f



g



h

■ **Figure 1-2** The *Voice & Vision* online short film examples streaming on the companion website (a) *The Black Hole* (Phil and Olly, 2009), (b) *Plastic Bag* (Bahrani, 2009), (c) *Waking Dreams* (Daschbach, 2004), (d) *When I Was Young* (Lu, 2004), (e) *Vive le 14 Juillet* (Rouget, 2004), (f) *Winner Take Steve* (Hess, 2004) (g) *This is It* (Engel, 2013) and (h) *The Wake* (Lee, 2009).

■ NARRATIVE BASICS I: ESSENTIAL STORY ELEMENTS

The next step in the process is to turn your initial inspiration into a dramatic story. In making this transition, it is important to understand the essential characteristics of a dramatic story. Most fictional narrative films have five basic and common elements:

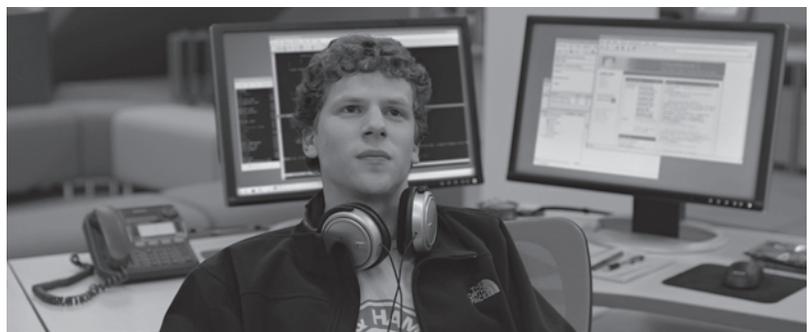
1. A central character
2. A dramatic situation and central question
3. Conflict and stakes
4. Action and development (story dynamism)
5. Resolution and meaning

The Central Character

Drama is based on things that happen to characters, things characters do, and ways characters change. Whatever the story is, it all starts with character. It doesn't matter if your film is about a single business executive (*Waking Dreams*), a recent Chinese immigrant (*When I Was Young*), a sweet, mild mannered guy (*Vive le 14 Juillet*), a bored office clerk (*The Black Hole*), a social misfit (*The Wake*) or even a plain brown plastic bag from the supermarket (*Plastic Bag*); the central character is the primary point of engagement for an audience—the element that encourages narrative involvement. If you really want your film to connect with an audience, you must create a central character who is compelling—a person people want to watch.

One common way to do this is to create a central character a viewer can like or admire, someone who displays very human longings, needs, capabilities, vulnerabilities, and some noble qualities as well, like being fair, courageous, kind, or standing up for what is right; a figure with whom audiences can identify, empathize, or at least sympathize. This is called a **sympathetic character**. The main character in Ramin Bahrani's feature film *Chop Shop*, for example, is Alejandro, a 12-year-old boy, with no parents in sight, who is working hard to build an honest future for himself and his 16-year-old sister (**Figure 1-3 left**). He works adult manual labor jobs, he's resourceful beyond his years, he saves money, and he has noble, selfless goals. We easily like this smart, industrious, street-tough but open-hearted kid. We sympathize when he's not able to completely comprehend the nuances of the very adult situation he is in, and we feel for him when he stumbles. We want him to succeed, so we cheer him on (see page 137). And take a look at Bahrani's short film *Plastic Bag*, which is on the *Voice & Vision* companion website, and see how the first-person voice-over imbues an inanimate object with painfully human traits (loyalty, loneliness, the need for purpose) so much so that we feel immense sympathy for the desperate plight of a piece of trash, a brown plastic bag (read page 10).

However, *the* critical factor in building a main character is audience engagement, not necessarily likability. You can certainly engage an audience with a character who is unkind, unpleasant, mean, despicable, or even repulsive, if that character offers a glimpse at



■ **Figure 1-3** Engaging central characters can be conceived as valiant and likable, like Ale (Alejandro Polanco) in Bahrani's *Chop Shop* (2007, *left*), or unsavory and vindictive like Mark Zuckerberg (Jesse Eisenberg) in Fincher's *The Social Network* (2010, *right*). It's also common to combine noble and ignoble qualities in a single character, as long as they remain compelling figures.

something fascinating, intriguing, and engaging (even if unsavory) to watch. This type of character is sometimes called an **antipathetic** character—but you can just call them unlikable—and boy, oh boy, can they be fun to watch. Mark Zuckerberg from Fincher's *The Social Network* is not likable in any traditional sense (**Figure 1-3 right**). In fact, he's kind of an immature, selfish, arrogant jerk with a superior attitude and a nasty ambition fueled by envy and spite. So why do we want to watch a story about this guy? Well, there is certainly something interesting about getting a behind-the-scenes glimpse at someone's speedy rise from an unpopular tech geek to CEO billionaire, especially if that achievement pushes the borders of ethics, scruples, and friendship. It's also fascinating to see a person with utterly no social skills become rich by creating a social network. Intellectually, Zuckerberg understands the zeroes and ones of a social network, but emotionally he cannot function in a social situation—a delicious central irony. But isn't there also something about this character that, despite his unsavory pettiness, we can understand on a human level? He's brilliant but he's awkward, terribly insecure and yearning to become someone people admire. He just doesn't know how to get there without being duplicitous and stomping on friends. We may not go so far as to feel *sympathy* for America's youngest billionaire, but we can, on some level, connect to him and be engaged in his story. Also, keep in mind that these two character approaches, sympathetic and antipathetic, are only the extreme ends of a sliding scale. Many characters, like most human beings, are created somewhere between these two poles, with a few qualities we can admire and some qualities that are troubling.

You may have noticed in these examples that I mention both who the central character is and what happens to them. How an audience feels about a character is integrally linked to that character's dramatic situation and what that character *does*. This is, after all, the way we come to conclusions about anyone we meet in our lives. We know who people are by seeing what they do. So we cannot really talk about character without talking about what the character does.

The Dramatic Situation: Conflict, Action, and the Central Question

A dramatic narrative film involves a **character** in a **dramatic situation** that has a clear effect on the character and provokes **action**. That situation is almost always initiated by the introduction of **conflict** in their lives or the need for the character to accomplish a task or gain something that involves negotiating **obstacles** and **conflict**. What emerges from the chemical reaction between a particular character in a particular dramatic situation is a specific **central dramatic question**. Very often the dramatic question revolves around a **goal** or **objective**: Will he get the girl? Will she get the job? Can she leave home without losing her father's love? Can he follow orders and remain true to his principles? However, especially in short films, a direct goal is not always necessary; we can develop dramatic questions around a mystery like: Why is he behaving so erratically? Why does she have so much power over him? Who is this guy, really? However you frame the dramatic question, it functions as the narrative core of the film and all other characters and events serve to develop that dilemma, mystery, or idea. We will explore in more detail the characteristics of goal-oriented and alternative dramatic questions starting on page 12.

The first step to developing a good dramatic story is to understand that the character's response to the situation of conflict—the *actions* they take, the *decisions* they make, their *behavior*, what they do or fail to do—reveals to the audience who they are and also moves the story forward. This is the engine at the heart of all drama; this is what it means to *dramatize a story*. The ultimate goal of drama is to create a story that essentially tells itself—allowing an audience to understand character, story, and thematic meaning purely by witnessing a character negotiate a situation of conflict. You should not need to concoct convenient devices—like an explanatory voice-over or expository dialogue—to broadcast who your characters are, what's going on inside them, what they're thinking, what's going on, or indeed the final meaning of the film. The audience's understanding comes from what they witness—not what they are told.

 Take a look at the short film *The Black Hole* by Phil and Olly, which you can find streaming on the *Voice & Vision* companion website. Working late one night, a bored office clerk receives a mysterious and magical black hole from the photocopier machine. He does not utter one word in the entire film, yet we always know what he's thinking, from his initial "WTF?" moment when he discovers the magical properties of the black hole, to the rapacious action of crawling into the safe to reach the *very last* stacks of cash. No one has to tell us what's going on because the story unfolds with the clerk's behavior and actions revealing everything the viewer needs to understand (see pages 40–41 for a more detailed look at the expressive use of action in *The Black Hole*).

Story Dynamism: Action, Change, and Development

In addition to actions and decisions revealing character, it's also important to understand that actions can (and should) cause changes to the story situation itself and therefore to the direction the story takes. In other words, by thoughtfully and strategically varying the nature of our main character's choices you can create a dynamic story.

 Here again, *The Black Hole* provides a perfect example. This is a very simple and very short film, but the story never stops evolving and developing fresh territory: (1) A bored office clerk receives a mysterious black hole while doing photocopying chores. (2) He discovers the supernatural "nature" of the mysterious black hole by accidentally dropping his coffee cup through it. (3) Astounded, he tests this nature by pushing his hand through it; he now understands the "capability" of the black hole. (4) Next he decides to test this "capability" for personal gain and he uses it to successfully steal a candy bar. (5) Fully realizing the "power" of the black hole, he's ready to exploit its power and go for the cash—which of course (6) leads to the "power" backfiring on him and his ultimate downfall. Notice how each character decision creates a line of rising actions and elevated stakes. As you can see, in only two minutes this film moves through six (!) escalating dramatic beats.

The dynamism of *change* and *development* over time is essential to keep any story from feeling repetitive, one dimensional, and predictable. Change and development creates story momentum, narrative shape, and allows the story to reveal different facets of your character and even change the character by the end—as happens in *The Black Hole* where the main character's avarice emerges and gets the better of him. Character transformation can occur through a discovery, an accomplishment, an experience, an epiphany, an ordeal—whatever it is, the main character is not quite the same at the end of a film as they were at the beginning, or if the character remains relatively unchanged, then it is the viewer's understanding of that character that is not quite the same.

The Stakes

These concepts, "central dramatic question" and "conflict" sound big, but in the hands of a skilled storyteller, small or subtle conflicts can be just as compelling as large conflicts. Yes, of course, stories that revolve around life-or-death struggles, or James Bond style fate-of-the-world plots, are intensely engrossing, but if you are able to truly convey in specific terms not just the conflict, but the personal importance of the outcome for the central character (i.e. what's at stake), then practically any story can become captivating, even though the situation may be very small in the global scheme of things.

 A perfect example of this is Jared Hess' ultra small-scale *Winner Take Steve* which you can also stream from the *Voice & Vision* companion website. The film is mostly just a foot race between two high school frosh named Steve: Steve Caulkin and Steve Dingle. But we're clear what the stakes are—what this race means to those boys—the winner gets to be called "Steve" while the loser will be referred to by his last name (probably for his entire time in high school). Granted, this isn't a life-or-death situation BUT who would want to be called "Dingle" for four years of high school? So, while the situation is comparatively small, the personal stakes are huge! And we know it. And those boys run that race as if their lives depend on it!

What this tells us is that it's not the magnitude or gravitas of the conflict that matters, but *the personal stakes* that are involved for our central character in this particular story. This is why it's important to be clear about what the character stands to lose, or win, or discover; or how the character might be changed.

Resolution and Meaning

In any film, all the narrative activity leads to a conclusion of some sort. This means that the dramatic situation you've established is resolved and the central dramatic question you've posed is answered, even if the viewer understands that life goes on for the character after the movie ends. This resolution can be positive or negative for your central character; you can have ironic endings, Pyrrhic victories, unexpected outcomes, humorous twists, epiphanies, or any sort of conclusion that satisfies the questions you've raised. In Hess' *Winner Take Steve*, the question "Who will win the name Steve?" is answered—Steve wins and poor Dingle loses.

Beyond simply ending your story, however, the nature of your resolution must be carefully considered. Not only do they emerge from and answer back to the dramatic situation, but the way you resolve your movie is a significant part of the ultimate meaning of your movie. To find the most dramatically satisfying and thematically appropriate resolution, you need to ask yourself what the point of all this narrative activity (character/conflict/action) was and what it all adds up to. This ultimate meaning can be as big as a universal theme or as small as a clever ironic point. Is your film an allegory with a broad moral lesson? Is it a mystery with a surprising dramatic twist? Is it a glimpse into a unique person's life that connects a viewer to a new perspective? Is it a comedy that will give viewers a great belly laugh?

In *The Black Hole*, the dramatic question is, "What will the clerk do with this magical ability?" In the end the major dramatic question is answered: he abuses the magical powers and dooms himself—he is defeated by his own greed and avarice. Coming in around two minutes, this film turns out to be a little morality tale. Like nearly every other allegorical story about a person given magical powers (or three wishes), the irony of the conclusion is that he is undone by the very magic that promised to make his life better. Knowing specifically what effect you want to have on an audience and what you want them to be left with will help you organize your material into a dramatically satisfying narrative shape and find the strongest conclusion to your story.

Story Essentials in Practice



Now that I've laid out the essential elements for fictional narrative films, let's turn our attention to some of the other short films from the *Voice & Vision* companion website and see how these elements of cinematic storytelling play out. These movies were chosen specifically because they represent a variety of approaches, styles, and even running times, yet they all contain, in some form, the five basic narrative elements:

- John Daschbach's short film *Waking Dreams* has a simple premise to express a complex idea. Office executive Mr. Saroyan (*central character*) is all set to go on a scuba diving vacation. But Becky, an eccentric office temp worker whom he doesn't know, tells him she had a dream in which he was attacked by sharks and killed. She's certain that this was a premonition and warns him that he's going to die if he goes in the water (*dramatic situation, conflict*). The *central dramatic question* is, does he or doesn't he believe her? Which, in practical terms also poses the question, will he or won't he go in the water? In order for this premise to work, Daschbach must plant small seeds of plausibility in her clairvoyant prediction, and he does so by conveying that she could not possibly have known he was going on a scuba diving vacation, and by showing her seemingly predict an incoming phone call. Daschbach only needs to establish a tiny bit of probability precisely because the *stakes* here are so high, life and death, so there is no margin for error. Although this film is built around dialogue scenes, dialogue is not used to directly relate the story or internal character struggles, rather, each scene essentially traces the actions taken by Mr. Saroyan—namely the various strategies he employs to uncover the falsity of her prediction (*narrative shape*) (see pages 40–41 for

more detail on the use of dialogue in *Waking Dreams*). In the end, the film's *resolution* answers the central question—yes he went scuba diving and he didn't die. But *Waking Dreams* remains slyly open ended because it intentionally doesn't entirely answer another nagging question, was Becky's premonition accurate? Maybe yes, maybe no. He didn't wear a yellow bathing suit, so maybe she was correct, but he changed his fate. Or maybe the "premonition" was just the invention of a mentally unstable woman. Or maybe her next premonition, "don't take the subway," is a true portent. Without answering this question, our central character and the viewer are left with a larger, lingering existential question about fate, destiny, and free will, which human beings will never adequately answer.

- In Ramin Bahrani's *Plastic Bag* the *central character* is, well, an ordinary plastic grocery bag. But Bahrani has given this particular bag human consciousness and character with which a viewer can empathize. The bag speaks and articulates its desires, fears, and hopes. The bag's *dramatic situation*, which unfolds quickly, is that it is at first put to constructive use by its "maker" and is truly happy. However, once its maker throws the bag away, it no longer has a purpose in life (*conflict*). This *situation* requires *action* because, like humans, the bag wants its life to mean something. Obviously, the *central dramatic question* is, will it find a purpose for its existence? That bag's larger goal is broken down into smaller, very specific goals (e.g., to find its maker, to find community in the vortex, etc.) and these *decisions* and *actions* make up its journey, its search for purpose. The journey provides the narrative shape for the film; like most journeys, it is episodic in nature with each episode posing new conflicts and revelations (*story dynamism*). Along the way, the plastic bag encounters many complications: it gets caught in trees, the winds do not blow, it gets lost, it discovers that there are no people left on earth, not even its maker. Without people, how can it find a purpose? Also, it doesn't really understand the world it explores (*internal conflict*) and this causes confusion. The "humanity" of this plastic bag, however, also means that it is painfully cognizant of its terrible condition of loneliness, purposelessness, and immortality. In the end, after all its peregrinations, it does not find its purpose, and that's the tragedy and the thematic point of the film (*resolution*). A discarded plastic bag, with no purpose, is simply garbage, an unnatural thing floating around the natural world forever and ever. If only it could die. To find the ultimate point of this film we need to consider some of the ideas Bahrani has developed: a journey, looking for one's "maker," searching for meaning in life, immortality; these ideas tap into rich story traditions, and by doing so Bahrani has created an allegorical tale that follows one brown plastic bag but is not just about the plight of that one bag. Rather, it represents the trillions and trillions of plastic bags with no purpose that we've already created and thrown away. By the end of the film we come to feel that the consequence of discovering immortality in the form of plastic has precipitated the destruction of the human race. These are *huge* themes carried in a very small and poetic film.
- Gemma Lee's *The Wake* is a delicate film that straddles comedy and pathos with great dexterity. Rather than being driven by a clearly defined goal or strong objective, *The Wake* is more like a slice of life—the filmmaker enters into the characters' lives at a particularly difficult and revealing moment and once it has unfolded, quickly leaves it behind. Slice-of-life films give us a strong feeling that the stream of these lives flowed before the film began and will continue on after it ends, because the emphasis of the narrative is not on a single compelling task with a decisive resolution or twist—rather these stories revolve around the nuances of characters who are closely observed during a moment of crisis or tension; in this case, a wake. That said, *The Wake* still contains all of the essential dramatic elements that I've discussed so far. Jonathan (*main character*), an endearing misfit, shows up at the wake of his close friend's father. The social expectation at this service is to offer comfort and consolation to those grieving at the death of a loved one; to express sympathy (*the task*). The problem is, Jonathan is not adept at following social conventions. In fact, he readily admits that he's "... just not good at this sort of thing" (*conflict*). So rather than mingle among the somber gathering, he remains on the periphery of the service with another person who is equally detached—the bemused 8-year-old son of the deceased. Occasionally Jonathan

interacts with adults, his friend's mother and sister (whom Jonathan once had a crush on), but each encounter is awkward and he manages to say the wrong thing. However, each encounter also develops Jonathan's genuinely good and sincere nature (*character dynamism*). Jonathan is clearly most comfortable with the boy and bonds with him precisely by doing what comes most naturally, the "wrong thing" for the situation—particularly teaching the boy to make fart noises with his hands (*action*). With this he makes the kid laugh and in his own quirky way, Jonathan alleviates the somberness of the moment for the boy who would otherwise be absorbing this misfortune on his own. The boy races off and shows his family how he can make fart noises with his hands and poor Jonathan is further embarrassed; however, Jonathan reveals to his friend that his father (the deceased) was the one who showed him how to do that when he himself was a little boy and this connection, as goofy as it is, somehow infectiously spreads to the rest of the family and the awkward misfit manages, in his own quirky and utterly authentic way, to comfort the bereaved (*resolution*). The nice little irony of this film is that Jonathan is successful by failing at his implicit task, which was to follow the traditional behavior for a wake.

- Perhaps the subtlest film of the online examples is Huixia Lu's short, *When I Was Young*. The *central character* of this film is Sue, a young Chinese immigrant in Philadelphia. Her task in the film is completely banal, to pick her husband up from work. There are no conflicts or obstacles to this task, so the real story isn't located here. Sue's *dramatic situation* arises when she hears her housemates, another married couple from China, arguing over the husband's inability to score TOEFL grades good enough to get into college. This moment, along with other triggers later on, cause her to remember an American boy she knew in China. The *dramatic tension* in this film centers on the disquiet and disappointment she experiences when she compares the optimism and excitement she felt about America when she was young (delicately represented by the figure of the American boy) and the way her actual life in America has turned out. The *central dramatic question* is understated, but it is there: How will this woman reconcile the dream with the reality? The shape of this film moves back and forth from her optimistic days in China to her dreary current life in America, but nothing in either location is overt or exceptional. The ultimate idea and organizing principle for this film is that it is a small slice of life, an intimate portrait of a person who is disappointed with how things have turned out. The poignancy for this kind of film does not come from grand dramatic gestures; rather, the opportunity for an empathetic and human connection comes from the accumulation of small, sharp, and truthful details—the close and accurate observation of someone who could be our next-door neighbor or any person walking down the street. By close observation I mean carefully chosen, small yet precise details that reveal much: sharing a cheap apartment with another couple in quarters so tight that she can hear their bickering, splitting the phone bill down to the penny, locking the car door, her husband's low-level prep job in a Chinese restaurant, the disrespectful way her husband is treated, the fact that he gives her all his earnings, the American flag hat he wears, and so on. The scenes in China are not explicit expressions of her immigrant dreams; rather they are poetically associative of an emotional state of youthful hopefulness. During this clash of her current life and what she felt as a young woman in China, she decides to do something nice for herself and she buys a single rose (an *action* that is clearly and revealingly a financial splurge). That rose is hers and she makes this clear to the husband who just lost his job. But her next act brings this one small moment in her life to a *resolution* of sorts and satisfies the major dramatic question; she takes her husband's hand sympathetically in her own, meaning she doesn't reconcile her hopes with her reality but accepts the reality and carries on. True to the slice-of-life genre, Lu has just dipped in and out of a brief moment in a longer life of struggle: Sue's life will go on and on after the moment she takes her husband's hand. But the small moment Lu has chosen is so representative and revealing that it stands as a portrait of a woman (*the meaning*).

By now you should be able to see, given the interplay of the essential elements of dramatic narrative, how the engine of cinematic storytelling works: (1) a compelling character

is placed in a situation of conflict that provokes a reaction or action, (2) what the character does (or doesn't do) reveals more about who that character is, *and* (3) results in a new situation requiring new actions (etc.). With the right choices we get to have our cake and eat it too, in that as the story moves forward we both reveal our character and develop complexity or intensity or nuance to the storyline.

Making Specific Choices

It is critical that the choices you make when creating a character and the dramatic premise are very specific. Vague situations or amorphous characters will not yield specific actions, a sharp narrative line, or a well-defined conclusion. A woman who is lonely and wants to escape loneliness may be the general subtext of your movie, but in terms of a storyline it is way too vague and open ended. Who is the woman, specifically? Is she a rich dowager in New York City? The wife of a mean farmer in a rural town? A young intellectual who is obsessed with, and lives within, her books? And what does it mean “to escape loneliness”? Specifically, what is her situation and what does she do? Leave her neglectful husband? Convince her gerontologist to start an intimate relationship? Join an exclusive singles club composed of much wealthier members? Convince an estranged son to move back home? Search for her lost dog? Although derived from the same general idea, each one of these specific choices will yield a significantly different story. So when moving from vague inspiration to an images-on-the-screen story, you need to define and develop those specific details that can generate the particular movie you wish to make (see the *Pieces of April* concept, discussed later).

■ NARRATIVE BASICS II: GOAL AND CONFLICT-DRIVEN STORIES

One of the most common methods to develop a compelling dramatic premise is devising a story around a **character** who needs to accomplish something (a **goal** or **task**) who then encounters obstacles (**conflict**) and must struggle against those obstacles to get what they need (**actions**). The American playwright, screenwriter, and director David Mamet (**Figure 1-4**) wrote a description of this common story type in his book *On Directing Film*:

The story is the essential progression of incidents that occurs to our hero in pursuit of his one goal. . . . It consists of the assiduous application of several basic questions: What does the hero want? What hinders him from getting it? What happens if he does not get it?



■ **Figure 1-4** American writer/director David Mamet works extensively in both film and theater.

This sort of story conception readily generates momentum and dramatic material because of the chemistry between a character driven by an identifiable goal and the dynamics of overcoming obstacles through action.

The goal can be obvious (to get the job) or it can be subtle (to understand another person). It can be an extraordinary goal (to save the world) or an ordinary one (to get home). Goals can be professional tasks that must be accomplished (to solve the criminal case) or a personal need (to earn a mentor's respect). In feature films, where you have more time to develop characters, you can incorporate multiple layers to what a character wants or needs in the film. For example, features often include an exterior objective on the plot level of the narrative that ultimately reflects a deeply held interior longing or emotional need (as you will see with *Pieces of April* later).

Once you add some kind of **opposing force** (obstacles) to the progress of the central character, the dramatic question emerges: Will the central character achieve their goal? Will they complete their task? Conflicts that oppose our “hero’s” progress can come from many places. An opposing force can be another character who stands in the way or is struggling for a contradictory goal. This sort of character is called an **antagonist**. More general external forces like government bureaucracy, an inhospitable landscape, a traffic jam, the weather, or a physical injury can also be used as obstacles. And, of course, the opposing force can be even more subtle or complex than this. For example, you could create a situation where your central character is ambivalent or averse to a task they are obliged to accomplish (e.g., to prosecute a close friend who is corrupt). Thus, the conflict is built into the task itself. Or the obstacles can have an internal source, coming from the character; for example, a character might feel fear, insecurity, ambivalence, or lethargy in the face of the task at hand. However, when dealing with obstacles that come from within, a filmmaker needs to figure out ways to externalize the internal so that “feelings” are transformed into actions and decisions that we can put on film.

In David Mamet’s quote he mentions an “essential progression of incidents.” These are the events of the film—the moments, actions, reactions, and interactions, all of which make up the plot. The **plot** is the order of events in your film—the unfolding of the story in scenes and the order of those scenes. When a goal-oriented character encounters an obstacle, something that “hinders him from getting [his goal],” he is compelled to do something in order to find a way over, around, or through that obstacle to get what he wants. The exciting thing about conflict-driven drama is that deciding what characters do and how they do it reveals, in a dramatized way, who each character is. So I would add one more to Mamet’s list of basic questions: *What is the hero willing and able to do to achieve their goal?* Now, if we pose a question like this, then it stands to reason that there are things a character is *not* willing or able to do. Keep in mind that what characters *don’t* do, what they avoid and how they avoid it, can also be revealing of character. As the plot continues, the obstacles and actions usually increase in intensity because each action (or inaction) has *consequences*, and those consequences cause the tension to increase until the protagonist, in one last-ditch effort to get what they want, brings the film to a *resolution*. As I mentioned earlier, the resolution answers the central question: Did the hero get what they wanted after all? Did the hero accomplish what they needed to do? In a happy ending the goal is accomplished, and in a tragic ending the resolution is not what the hero had hoped.

Now, let’s get back to *Pieces of April*. Hedges did not completely discover the full dimensions of the story until the late 1990s, when he was dealing with his own mother’s cancer diagnosis. As he says in his book, “That’s when I realized I had a story to tell.” He also hung onto that initial spark—“this could be a way to have all sorts of people cross paths who normally wouldn’t”—and it emerged as the central theme in the film. Hedges transformed his idea into a cinematic story by turning the “group of people” (too vague) looking for a working oven to cook their Thanksgiving turkey into the specific story of a girl named April, the black sheep of a family (*central character*), who decides to cook an all-out, traditional Thanksgiving dinner for her family in her New York City apartment (*plot level objective*). Cooking is the way this iconoclastic character tries to reconcile with her mother, who is dying from cancer (*internal need and the stakes*), but April’s lovely gesture nearly fails because she has no cooking ability whatsoever (*conflict/obstacle*) and her oven doesn’t work (*conflict/obstacle*). Her dysfunctional family, arriving from out of town, is fully anticipating a disaster (*rising stakes/pressure*). April elicits the aid of her neighbors (*actions*), whom she doesn’t know, to help her pull off the meal. In the end April completes the Thanksgiving dinner, forms a new family of friends, *and* manages to reconnect with her mom before her mom dies (*resolution*) (**Figure 1-5**).

A lot of Pieces of April to me is about the family you’re born into but also the family you find, and it was the family you find that really compelled me to write this particular story.

(From an interview with Mark Pfeiffer, *The Film Journal*, November 2003)



■ **Figure 1-5** In Hedges' *Pieces of April*, free spirit April (Katie Holmes) reconnects with her estranged family by preparing a Thanksgiving meal.

Pieces of April shows that while the terms “hero,” “goal,” “conflict,” and “action” sound hugely dramatic, they actually work for films of any size and any subject. You don’t necessarily need to conceive of a film like *Raiders of the Lost Ark*, in which Indiana Jones (hero!) has to obtain the Arc of the Covenant (goal!!!), before the Nazi Army gets their hand on it (obstacle!!!). If you’re clear about the personal stakes involved, you can use these same dramatic principles on just about any scale project and with any degree of subtlety, such as a young woman who wants to connect with her mother by cooking a Thanksgiving turkey; or two boys who want to win a foot race to claim the name Steve; or even a little boy who wants to get past a big dog to get home (see *Bread and Alley*, discussed later).

■ NARRATIVE BASICS III: OTHER DRAMATIC STORY CONCEPTS

Conflict is immensely useful for a filmmaker because it provides narrative momentum and elicits revealing actions from characters. But does conflict always have to be so overt? Is it always used as a direct obstacle, getting in the way of our character’s goal? Must we always have an expressly stated goal at the center of the story? Not at all.

The goal and conflict approach is a mainstay for the feature-length form because it must maintain dramatic tension and develop characters and storylines over an extended period of time. Naturally, the goal and conflict approach works perfectly well for short films as well, as we can see with *Plastic Bag*, *Winner Take Steve*, and *Waking Dreams* (and *Bread and Alley*, discussed later). But the brevity of a short film makes it an extremely flexible story form, allowing a filmmaker to work with subtler types of conflict, other sources of dramatic tension, and other approaches to a central dramatic question beyond “will the hero achieve a specific goal?” A short film can also give priority to exploring a character over achieving a goal. We already explored two films with non-goal-oriented story approaches in our analysis of Gemma Lee’s *The Wake* and Huixia Lu’s *When I Was Young* on pages 10–11. Let’s look at two others on the *Voice & Vision* companion website.

 Didier Rouget’s film, *Vive le 14 Juillet*, starts out with dramatic tension in the form of an unsupportable situation: a sweet, mild-mannered guy (*central character*) has a wayward girlfriend who is attracted to men in uniform. To make matters worse, he doesn’t seem capable of doing anything about it (*situation*). What sends him into action is when he literally loses his girlfriend during the Bastille Day parade. In order to find her, he commandeers a tank, locates her with high-powered binoculars, and lifts her into his arms with the tank’s canon barrel, all the while revealing the military mojo necessary to truly get his girlfriend back (*resolution*). While there is definitely a dramatic *goal* in this film (find the girlfriend) there are, in fact, no real obstacles getting in his way; nonetheless, something significant is revealed in the end to his girlfriend and the viewer that was there all along—this sweet, mild-mannered guy can be a heroic man of action when he has to be.

Even more radically conceived is Alexander Engel’s *This is It*, which tells the surprisingly complex story of two ill-suited college roommates, Kip and Jules, in their first apartment. The obvious dramatic question is fairly general: Will these two guys get along as roommates? The action traces their deteriorating relationship and the conclusion, Kip sublets his room, confirms that they cannot live together. But there is more to this film than this simple story. The film is built around a series of quick scenes each posing a specific question: “Did you use my clippers?” “Did you drink my soda?” “Did you pay the electric?” “Can I borrow your tie?” “Man, did you see Marla tonight?” “What, do you like her?”

“Over break, could you water my plant?” “Are you cheating on Marla?” “Did you sublet your room?” and so on. Some of these questions are sincere, some rhetorical, and some passive aggressive, but to develop an entire story exclusively through questions is an audacious formal experiment. The very concept of the narrative style (the interrogative structure), in many ways, is just as captivating as the story itself. In other words, the story that is told is rather less compelling than the way the story is being told. Ultimately, it is the bold formal design of *This is It* that becomes the primary source of dramatic tension, and poses the most immediate dramatic question: Can the filmmaker actually pull this off? Can he tell an entire story exclusively with questions?

When filmmakers eschew a conflict-driven plot, they must replace the goal-oriented dramatic question, “Will the protagonist get what they are after?” with something else equally compelling. Here are a few story types that can work without direct obstacles to protagonist goals:

- Mysterious or ambiguous activity that is explained in the end
- A discovery that changes the perceptions of a character or the viewer
- An experience or series of events that changes a character or reveals their true nature
- A story that constitutes a puzzle to be solved
- Slice-of-life stories that are detailed, perceptive, and revealing portraits
- An allegorical journey
- A setup/payoff plot structure (setup/ironic twist, setup/epiphany, setup/humorous punch line, setup/perception shift, etc.)

Here’s another simple example. Maggie, a woman in her early fifties and her young daughter Maria (around 10) arrive at a cemetery and stroll to one of the graves. Along the way they talk casually about the girl’s school, the cemetery, and a stray cat. When they get to the grave they set out a little picnic including sandwiches and grapes (Maria’s favorite fruit). The feeling is that this is a regular, if infrequent, routine for them. The dramatic question is delicate (whose grave might they be visiting?) and there are clues in the dialogue that it could be Maggie’s father, whom she mentions in the past tense and whom the girl says she doesn’t remember. There is absolutely no direct or overt conflict. In fact, nothing much out of the ordinary happens as they eat, chat about Mom’s hair, and play games, except for two small details: during their picnic Maggie drinks something from her thermos that appears to be more potent than orange juice and she uses the F-word in front of her little girl. This certainly doesn’t constitute conflict, but it’s a bit out of place. In any case, eventually, Maria needs to pee and goes behind a tree and here, additional subtle tension enters the situation; Maggie responds strangely during a guessing game Maria is playing, and when they play patty-cake, Maggie breaks down and cries. But her lovely little girl is there to comfort her and Maggie lays her head on her daughter’s lap. Then camera briefly leaves them and scans the periphery of the cemetery before returning to the picnic site. But now Maggie is alone and folding her blanket getting ready to leave. When Maggie makes the small gesture of laying the grapes (Maria’s favorite fruit) on the gravestone, we realize that this is Maria’s grave and she had conjured the presence of her daughter for comfort (as it seems she does on each visit). This short film synopsis describes the *Maggie* episode from Rodrigo Garcia’s film *Nine Lives* (2005), a feature-length movie comprising nine slice-of-life vignettes of nine different women. Each episode is a self-contained 10- to 12-minute short film that represents a particularly critical and revealing moment in each woman’s life. Some of the segments involve traditional conflict-driven storylines, while others, like the *Maggie* episode, do not (Figure 1-6).



■ **Figure 1-6** The *Maggie* episode from Garcia’s *Nine Lives* contains very little in the way of direct obstacles, yet it delivers a devastating conclusion that inverts everything we thought we understood about the situation.

The structure here is simple: setup/perception shift. The setup is filled with activity that seems completely commonplace but contains a few off-balance moments. Then in one stirring and surprising moment, the filmmaker unveils the total perception shift for the viewer: the grave is actually Maria's. What we assumed was real and true, wasn't. But the perception shift is narratively satisfying because as we reflect on the subtle clues embedded in the story we see that it makes perfect narrative and emotional sense.

A Final Note on Essential Dramatic Principles

This discussion of dramatic principles, of course, is only a basic guideline. As an emerging filmmaker, you should be testing these boundaries and possibilities yourself. Cinematic storytelling allows lots of flexibility and room for experimentation. The legendary filmmaker Jean-Luc Godard is commonly paraphrased as saying that films do indeed need a beginning, middle, and end, but not necessarily in that order. Just as the subject matter of drama is virtually unlimited, so, too, are the ways that we can approach these subjects in cinema. The way you tell stories on film can vary depending on what you want to say, how you want a viewer to feel along the way, and what is appropriate for the ultimate point of your movie. As one of my writing professors, the novelist Alan Cheuse, once said of writing in general, "There is only one absolute rule to telling stories—make it work." Nonetheless, an understanding of the basic principles and the conventions that inform most cinematic narratives is an essential starting point. Obviously, it is not even remotely possible to exhaust this subject in one short chapter, which is all a book like this can afford. There are countless books on the shelves exploring in great detail the form, structure, and elements of cinematic drama. I have included some of these books in the recommended readings and, of course, all the films cited throughout this book serve as excellent examples to study.

■ IDEAS WITHIN LIMITATIONS

The second sentence from the Kiarostami quote, which opens this chapter, "Our second job is to think of a film that can be made," refers to one of the most important skills a filmmaker can develop: identifying ideas that can both be great movies and be accomplished within the filmmaker's real-world limitations. No matter how good your idea, if it is beyond your resources and experience you will not have a movie to show in the end. Always keep in mind, from the very first stages, that there is a symbiotic relationship between ideas and resources. One must work, from the beginning, with *what one has* rather than *what one wishes one had*. Such resourcefulness will go a long way to ensuring that you will, in fact, make movies.

Every film project, from a student's first film exercise to huge-budget Hollywood productions, works within limitations. The smart filmmaker will take these limitations into consideration from the very conception of the idea and the earliest development of the screenplay. A filmmaker's job is always to make the best film possible within the realistic limitations of the particular circumstances. You may have a big-budget, epic film waiting to burst out, but if you are taking only your second film class, and your project is due in three weeks, and you're using sync sound for the very first time, and you lost one-third of your film funds fixing your car, it may not be the right moment to go for the Oscar. But every project, large or small, is an opportunity to show that you can master the craft of filmmaking, the art of cinematic storytelling, and your specific circumstances to deliver an effective film.

Study the examples of the films that I've gathered for the *Voice & Vision* companion website. Yes, they were all chosen because they're terrific short films, but many were chosen because they work intelligently and expressively with very low budgets and an economy of means, and as such they are great models for student filmmakers. For example:

This is It: Three minutes, two main characters (and a few other small parts), one easy to find interior location (apartment) and one easy to find exterior location (sidewalk), easy to acquire costumes and props, tiny crew, minimal equipment.

The Black Hole: Three minutes, one character, no dialogue, one easy to get interior location, easy to acquire costumes and props, basic crew.

Winner Take Steve: Two minutes, three characters, minimal dialogue, one easy to find exterior location (no lights), easy to acquire costumes and props.

The Wake: Seven minutes, two main characters, four minor characters and extras (included members of the producer's real family), one easy to find exterior location (no lights), easy to acquire costumes and props.

You do not need unlimited resources to be a successful filmmaker; you need to be smart about the resources you have. The following sections describe some real-world circumstances that a filmmaker should consider from a project's earliest conceptual stages.

Story Scale and Film Length

Running-time restrictions for a project can be imposed for a variety of reasons, from a professor setting a time limit, to standard television broadcast time limits, which demand accuracy to the fraction of a second. If an advertising agency hires you to make a 30-second commercial spot, you will not be allowed to hand in a 32-second spot, no matter how brilliant the extra 2 seconds are. If you've imagined a terrific idea for a feature film but only have the resources to make a 15-minute film, it's not a good idea to try to condense your long story into a short form. The story must fit the size and scope of your production.

Short films can be about almost anything, but they tell simple stories with a strict economy of means. They revolve around a single idea, quickly recognizable characters, and a sharp turning point to make one moment resonate. Short film concepts, of necessity, are narrowly circumscribed because they must be expressed in a matter of minutes. You do not have time to complexly develop or slowly transform a character, nor can you examine every angle of a situation or involve too many extra elements outside of the basic story engine. You don't have room for multiple story layers or for developing a historical context. What we look for in a short film is an idea that can be expressed with simple narrative elements and vivid imagery: characters and a situation that we can recognize quickly, a conflict that is streamlined, and actions that are revealing all on their own without explication. Short films can be just as profound as features, but they must be tight, simple, and efficient.

If you consider the short films I've gathered for the online examples, you'll see a wide variety of characters, themes, story types, visual styles, and running times; but they are all sharp, efficient, and clear in what they are trying to communicate. *Plastic Bag* is an allegorical journey with sweeping themes about mortality, existence, and pollution; in two-and-a-half minutes, *The Black Hole* delivers a humorous story with a sharp ironic twist and a moral message; *When I Was Young* conveys a complex, detailed, intimate, and sympathetic understanding of a woman by representing only two very brief, and even mundane, moments in her life; and *Waking Dreams* explores a large existential theme in only a few quirky encounters between an unlikely duo. *The Wake* shows how even if a person doesn't "fit in" with the social norms, they can make a profound difference for the better if they remain sincere. In every case, not a single scene or detail or moment is wasted or unnecessary and yet, as compact as they are, every one of them accurately reflects the unique artistic sensibility of the filmmaker.

Production Time

One of the most common mistakes young filmmakers make is underestimating how much time it takes to make a film and overestimating how much they can accomplish in a prescribed production period. Your production period can be defined by any number of factors: the limitations of a semester, the availability of an actor, changes in the weather, the availability of equipment or crew, delivery deadlines, and, of course, financial resources. Be realistic about the amount of time you have to complete a project and let this inform



■ **Figure 1-7** Deren's *Meshes of the Afternoon* (left) is a landmark American film; it has no synchronized sound and is only 18 minutes long. Marker's *La Jetée* (center), one of the great films of the French New Wave, tells its complex story in 28 minutes, almost exclusively through still images. Polanski won many film awards with *Two Men and a Wardrobe* (right), a short made while at the Lodz film school. Despite nominal resources, all of these short films have an established place in the history of cinema because of their beauty and innovation.

the idea you choose to develop and the scale of the story you write. If you remain aware of your limitations, you can do remarkable things in brief (but intense) shooting periods. Every one of the four films listed earlier was shot in one or two days.

Financial Resources

Being realistic about your financial resources is a vital consideration because it determines many factors that figure into the film concept and, eventually, the screenplay, including the number of characters, the locations, and the props, as well as the time, crew, and equipment necessary to execute certain stories. But working with a limited budget should not stop you from making a great film.

It's obvious to anyone who goes to the movies that bigger budgets alone don't necessarily make better movies, so it also stands to reason that less money doesn't necessarily result in a film of inferior quality. Limited funds should never dampen your creativity; in fact, quite the opposite. The fewer financial resources you have, the more creative you have to be, and this often makes for ingenious filmmaking, which is why modest means have often led to enormous innovation. *La Jetée* (1962) by Chris Marker, *Two Men and a Wardrobe* (*Dwaj ludzie z szafa*) (1958) by Roman Polanski, and Maya Deren's *Meshes of the Afternoon* (1943) are all black-and-white shorts shot with tiny production crews, minimal financial resources, and no synchronized sound, yet they are considered classics of the short form for their incalculable contributions to the art of the cinema (Figure 1-7). The key with each of these films is that their basic idea was smart, sharp, and elegant and worked intelligently with minimal resources.

Equipment, Location, Props, and Other Resources

You may have a wonderful idea for a short film—say, about a timid oceanographer who wins the heart of his one true love by taking her on a deep sea dive and showing her the wonders of the ocean floor—but if that movie requires real underwater photography and you have no access to an ocean (because you live in South Dakota) nor the equipment you need to shoot underwater, then maybe it's not the best idea to go with, even if it is a winner. Also, keep in mind that there is a direct link between the number of locations and the amount of time and money you will spend. A short film idea conceived with two locations in mind is easier to accomplish than one that involves 12 locations.

Cast and Crew

Small crews can only do so much. There will be many times, especially on low-budget projects, when crew members need to double up on responsibilities, but you need to be aware, as you write your screenplay, that there is a law of diminishing returns when it comes to overextending your crew. Developing story ideas that require sync sound, moving cameras, careful lighting, crowd management, costumes, makeup, and so on will require crew to address each need. If you are expecting your cinematographer to take care

of the camera and the logging and to set up all of the lighting alone and to do the special-effects makeup and arrange the furniture, don't be surprised if something goes wrong with the camera work.

Also, keep in mind that the number of characters you write into a film has a direct impact on the financial and logistical burden of the project. The more people you have in front of the camera, the more time and money you can generally expect to spend.

The enemy of art is the absence of limitations.

Orson Welles (From "The Independent Filmmaker," by H. Jaglom, 1992)

Keep It Manageable

If you're just starting out in filmmaking, it's best to keep your projects manageable. A tight, effective, stylistically exciting five-minute film in which all of your story and technical elements work together to tell a convincing and involving little story is *always* preferable to a sloppy 30-minute film which loses its way because the filmmaker did not have command of all the cinematic details. Even worse is a film that cannot even be completed because its demands exceed the limits of the filmmaker's resources. Your first opportunity to establish the logistical, financial, and labor parameters of your production happens right in the beginning, as you develop your idea and begin scripting. It's wonderful and important to be optimistic about your projects, but you must also be realistic.

In general, novice filmmakers, still honing their craft, work on short films between two and 15 minutes in length. I do not use the word "novice" in any pejorative sense; every filmmaker is a novice in the beginning—even a celebrated master like Abbas Kiarostami. His first film was a ten-minute short called *Bread and Alley* (1970)² (Figure 1-8). The film is about a young boy, carrying a loaf of bread, on his way home from school (*goal*). To get home he must travel down a labyrinth of narrow and deserted alleyways. In one alley he is confronted by a big dog that chases him back and then lies down in the middle of the alley (*major obstacle/conflict*). Frightened, the boy can't proceed home past the dog. He looks around and sees that there is no alternate route and that the alley is so narrow that he cannot sneak around the dog (*location as obstacle*). Other people travel past the dog without a problem, but he cannot (*inaction revealing his fear*). He's stuck and it's getting late. Just then an old man walks by and the boy decides to follow closely behind him to get past the dog (*action*). But just as they reach the dog, the old man turns down a side alley into his house, leaving the boy alone again and face to face with the dog (*conflict intensifies*). Knowing he must do something quickly, the boy breaks off a piece of bread and throws it to the dog (*action*). With the dog now distracted by eating the bread, the boy scampers past. Finished with the morsel of bread, the dog takes off after the frightened boy, who feeds the dog more bread as he heads toward home (*action*). Before long the dog's tail is wagging happily and the boy reaches his house, where the door is safely closed between him and the dog (*resolution*). The dog lies down in the alleyway until along comes another food carrying boy, the dog growls at him and the whole thing starts again ... (coda).

Bread and Alley is a good example of a filmmaker following his own advice. The film involved only elements that were easy for Kiarostami to obtain, especially crucial because this was his first film. The movie is only ten minutes long and it was shot in black and white, without



■ **Figure 1-8** *Bread and Alley*, Abbas Kiarostami's first film as writer/director.

² Kiarostami's *Bread and Alley* is not on the *Voice & Vision* website, but it does show up on YouTube frequently (no promises, though).

sound, without lights, and, for Kiarostami, in an easily obtainable location. He shot the film in one day with only two crew members, one boy, and a couple of extras. Kiarostami needed some bread, some milk, and, the film's toughest requirement, a dog. But, of course, the most important thing he had from the outset was a simple yet elegant and touching story idea.

in practice

Robert Rodriguez's *El Mariachi* (1992), a feature film produced for \$7,000 (and he was shooting on film!) went on to win major awards and serious Hollywood studio contracts for its director. The first secret to Rodriguez's success is that he came up with an idea that he could make into a film using what he had at his disposal (Figure 1-9).

How do you make a cheap movie? Look around you, what do you have around you? ... Your father owns a liquor store—make a movie about a liquor store. Do you have a dog? Make a movie about your dog. Your mom works in a nursing home, make a movie about a nursing home. When I did El Mariachi I had a turtle, I had a guitar case, I had a small town and I said I'll make a movie around that.

Robert Rodriguez
(From Robert Rodriguez's
10 Minute Film School)

By doing the shooting, directing, and editing himself, he required only a small crew of five people; he used few artificial lights, did not shoot with synchronized sound, and used locations that were nearby and easily accessed. The small crew was so lean that Rodriguez could work fast—a method that he calls “frantic filmmaking.” The second quality that made his film so successful is that he turned all of these “limitations” into an opportunity to create a flamboyant style that perfectly matched the story and mood of the film. Nowhere

is this more apparent than in his energetic camera style, which swoops, pivots, glides, and shoots from a stunning variety of angles. Rodriguez had no lights, no sound (and therefore no sound crew), and a small camera. Realizing that his camera was free of these shackles, he also freed it from the tripod, allowing it to move, handheld, anywhere and everywhere.

On Mariachi I had two lights, regular light bulbs; they were balanced for indoor film, so [they] look fine. In fact everyone said the lighting looked moody because there was very little light. Your mistakes, your shortcomings suddenly become artistic expression.

Robert Rodriguez
(From Robert Rodriguez's
10 Minute Film School)

When Kelly Reichardt read the short story “Old Joy” by Jonathan Raymond, she knew right away that she not only *wanted* to adapt it into a film, she *could* actually make the film. The story, which is about two old friends who reunite for a weekend camping trip in the Oregon forests, attracted her on many levels. One was the idea of making a film that would involve bringing a very small cast and crew together for a condensed period of time in a very special, somewhat isolated, place—in this case, the old-growth forests of Oregon. The result was Reichardt's ultra-low-budget and intensely moving feature film *Old Joy* (2006) (Figure 1-10).



■ **Figure 1-9** A turtle, a guitar case, and a town. Robert Rodriguez crafted the story of his successful *El Mariachi* around things he knew he had access to or could borrow.

All of the requirements were within Reichardt's grasp: a small cast of two principal actors, a car, a dog, and the Pacific Northwest wilderness. She had one more crew person, six, than Rodriguez had, because she was shooting with sync sound and needed another person to record sound. She also brought to the project Peter Sillen, a cinematographer with extensive experience on documentaries, so was expert at working with natural light and "working small." True to her original inspiration, Reichardt brought her small cast and crew to Oregon, where they lived together in friend's houses and in a church retreat in the Oregon forests. The film took a mere ten days to shoot. Reichardt had only two lights, which she used in only two scenes. The rest of the time she shot in the magnificent old-growth forests of Oregon under cloudy skies. The location and the quality of natural light made her low-budget film look like a million bucks—nature itself (the birds, rivers, and foliage) became like another character in the film.

Working small also allowed the cast and crew to be especially agile and made it possible to work in the rugged terrain and around the sudden downpours, which were frequent in Oregon. However, the primary benefit to emerge from the limits of her working conditions involved the intimacy of the group. Reichardt described the situation to me this way: "Everyone schlepped equipment up and down the

paths, even the actors. And when it rained, all of us would pile into the car and go over lines, do rehearsals, and discuss the film until it stopped." The intense and close working conditions created a strong collaborative energy between cast and crew, which encouraged everyone to contribute to the film. "We knew we were all in this together. We were in a special place having a great experience together. I knew something would come out of it." These sessions generated a deep understanding of the script and some powerful improvisational exchanges, which wound up in the film. So much of what goes on in *Old Joy* is only barely and delicately revealed, and Reichardt's close-knit, small-scale production approach created the perfect environment for nurturing this tone. "I think the intimate approach we took to making the film comes through in the film itself. The limitations all somehow work out for you in the end. Although I sometimes had my doubts, it did work out that way in the end" (Figure 1-11).

With both *El Mariachi* and *Old Joy*, the aesthetic and conceptual approach to the film necessarily responded to the real-world limitations of the production resources, yet each style is so perfectly integrated with the story being told that one doesn't feel pennies being pinched or corners being cut. The stories are right for the resources and the approaches are just right for the stories. We can't imagine these films told any other way.



■ **Figure 1-10** In *Old Joy*, Reichardt maintained a minimal crew that was isolated in Oregon's Cascade Mountains for the duration of the shoot, creating an atmosphere that complemented the intimate tone of the story.



■ **Figure 1-11** Director Kelly Reichardt conferring with lead actor Daniel London. The bond developed by the close-knit crew and cast of *Old Joy* created an intimacy that was evident on screen.



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The Screenplay

A **screenplay** is the literary expression of the story, characters, actions, locations, and tone of your film written in a specialized dramatic script format. Whether you write the script yourself or work with someone else's material, it's important to remember that the screenplay is not the final product. It is an intermediate step in the production of a film and serves many functions in all stages of the project's development. It is often said that the screenplay is the blueprint for the entire process of making a film, in the same way that an architect's rendering serves as the blueprint for the construction of a house. In many ways this is true; however, unlike an architectural blueprint, a screenplay should remain a rather more flexible document throughout the process. It's important to keep in mind that screenplays evolve. They should be revised and rewritten, at every stage of a film's progression, as new ideas or circumstances emerge.

■ STAGES OF SCRIPT DEVELOPMENT

There are a number of stages in the evolution of a screenplay, and each stage usually requires various drafts. Each stage has a specific purpose as you proceed, step by step, from a general outline of your story to a script that contains the full dimensions of your film, including locations, actions, dialogue, sounds, and movements. This process of working and reworking your film's story material, adding, cutting, or refining details along the way, is called **script development**.

Concept

The **concept** is a very brief outline of the basic elements involved in your story. It describes, in no more than a few sentences, the essential dramatic engine that will drive the movie: Who is your main character? What is the central dramatic question around which all the action revolves? And how does it end? A good concept outlines the general shape of the narrative material. These are the elements that translate an idea for a film into something that is in fact a dramatized, filmable story. The descriptions of the basic story elements for *Pieces of April* (page 13) and *Bread and Alley* (page 19) are good examples of concepts.

Here's an example from one of my students, George Racz, who was making his very first film with synchronized sound. George has a 4-year-old niece and he was enchanted by her vivid imagination. He had the idea to somehow capture in a movie her belief in wondrous and magical things. His intention was to charm an audience by allowing us to see the world for a moment through the eyes of this innocent, imaginative girl and, as George told me, "Through Panna I want to invite the viewers to rediscover those small magical moments which they once believed in" (**Figure 2-1**). George's intentions were clear, but it was not yet clear how he would accomplish this on film. *What* would he point the camera at? *What* would the little girl do? *What* would the audience actually see on screen that would charm them or make them see the world as Panna sees it? In short, what's the story? George quickly turned his general ideas into a specific film concept.

At a big toy store, a four-year-old girl helps the toy store magician with a trick and believes that she has just learned to perform real magic. Later, she tries out her new magical powers to help a poor panhandler on crutches, and it works!



■ **Figure 2-1** *The Miracle* (2006), George Racz (writer/director).

The important thing to remember is that ideas in their raw form do not constitute a film story. Once you have an idea, you need to translate it into a film concept with basic, but specific, story elements (see page 6). This is the beginning of your script development process. Once your concept is working, then you are ready to write a treatment where you'll develop more specific details.

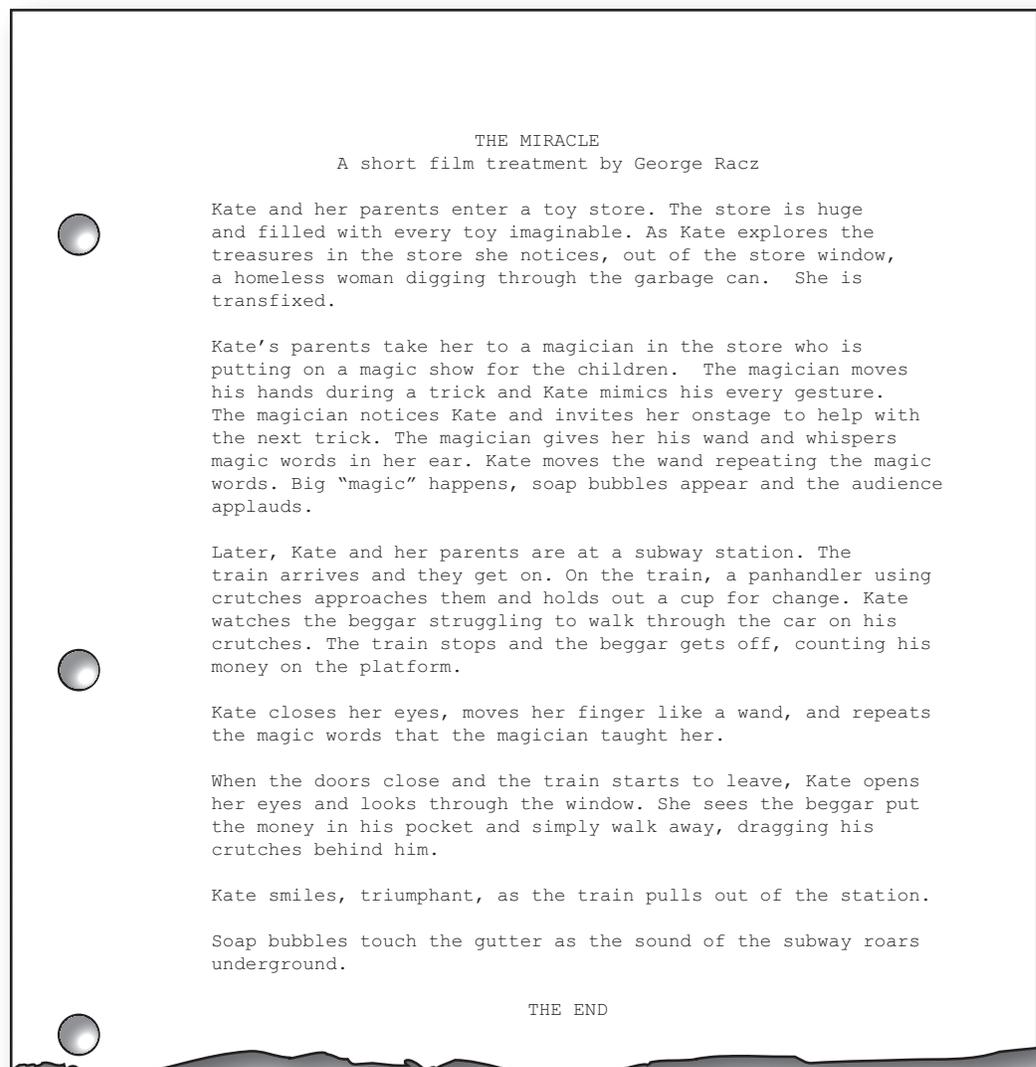
Treatment

The **treatment** is a prose description of the plot, written in the present tense, as the film will unfold for the audience, scene by scene (Figure 2-2). A treatment is a story draft where the writer can hammer out the basic actions and plot structure of the story before going into the complexities of realizing fully developed scenes with dialogue, precise actions, and setting descriptions. The treatment is the equivalent of a painter's sketch that

can be worked and reworked before committing to paint on canvas. It's much easier to cut, add, and rearrange scenes in this form than in a fully detailed screenplay.

■ Figure 2-2

A treatment is a simple but comprehensive prose description of a film's plot. Racz' treatment for *The Miracle* is a good example of the concise language used.



Generally, a treatment involves writing a few sentences for each major dramatic event, also called a narrative beat. A **narrative beat** is a dramatic event in which the action, decisions, or revelations of that moment move the plot forward either by intensifying it or by sending it in a new direction. In other words, a treatment sketches in the essential events. For a short film, a treatment might be one to three pages long. For very simple short films, you can simply write one sentence describing each narrative beat. This shorter version is called a **step outline** or a **beat sheet**.

Author's Draft to Final Draft

The **author's draft** is the first complete version of the narrative in proper screenplay format. The emphasis of the author's draft is on the story, the development of characters, and the conflict, actions, settings, and dialogue. The author's draft usually goes through a number of revisions before it is sent out to producers, production companies, or funding agencies. The aim of an author's draft is to remain streamlined, flexible, and "readable." Therefore, technical information (such as camera angles, performance cues, blocking, or detailed set descriptions) is kept to an absolute minimum. It is important not to attempt to direct the entire film, shot for shot, in the author's draft. The detailed visualization and interpretation of the screenplay occurs during later preproduction and production stages.

If the author's draft is picked up by a producer, more rewriting is usually necessary. The screenwriter (or another one if necessary) writes several more drafts incorporating the notes and ideas of the producer and the director (if one is already attached). These re-writes still focus on story issues and remain mostly free from camera cues, blocking, and other technicalities. Whether you are writing a script to be produced and directed by others or penned a short film for yourself to direct, the **final draft** is the last version of the script before it is turned into a shooting script.

Shooting Script

Once you have completed your re-writes and arrived at a final draft, you will be ready to transform it into a shooting script. The **shooting script** is the version of the screenplay you take into production, meaning it is the script from which your creative team (cinematographer, production designer, sound team, etc.) will work and from which the film will be shot. A shooting script communicates, in specific terms, the director's visual approach to the film. All the scenes are numbered on a shooting script to facilitate breaking down the script and organizing the production of the film. This version also includes specific technical information about the visualization of the movie, like camera angles, shot sizes, and camera moves. Chapter 5 deals with the process of creating the shooting script.

■ FORMATTING THE AUTHOR'S DRAFT SCREENPLAY

The screenplay is a multipurpose document. It is both a literary manuscript, conveying the dramatic story for a reader, and a technical document that anticipates the logistics of the production process and allows everyone involved in your project to see what they need to do. The technical functions of a screenplay are realized in the format of the script, which is standardized to facilitate common film production processes. This is why a screenplay looks unlike any other literary manuscript.

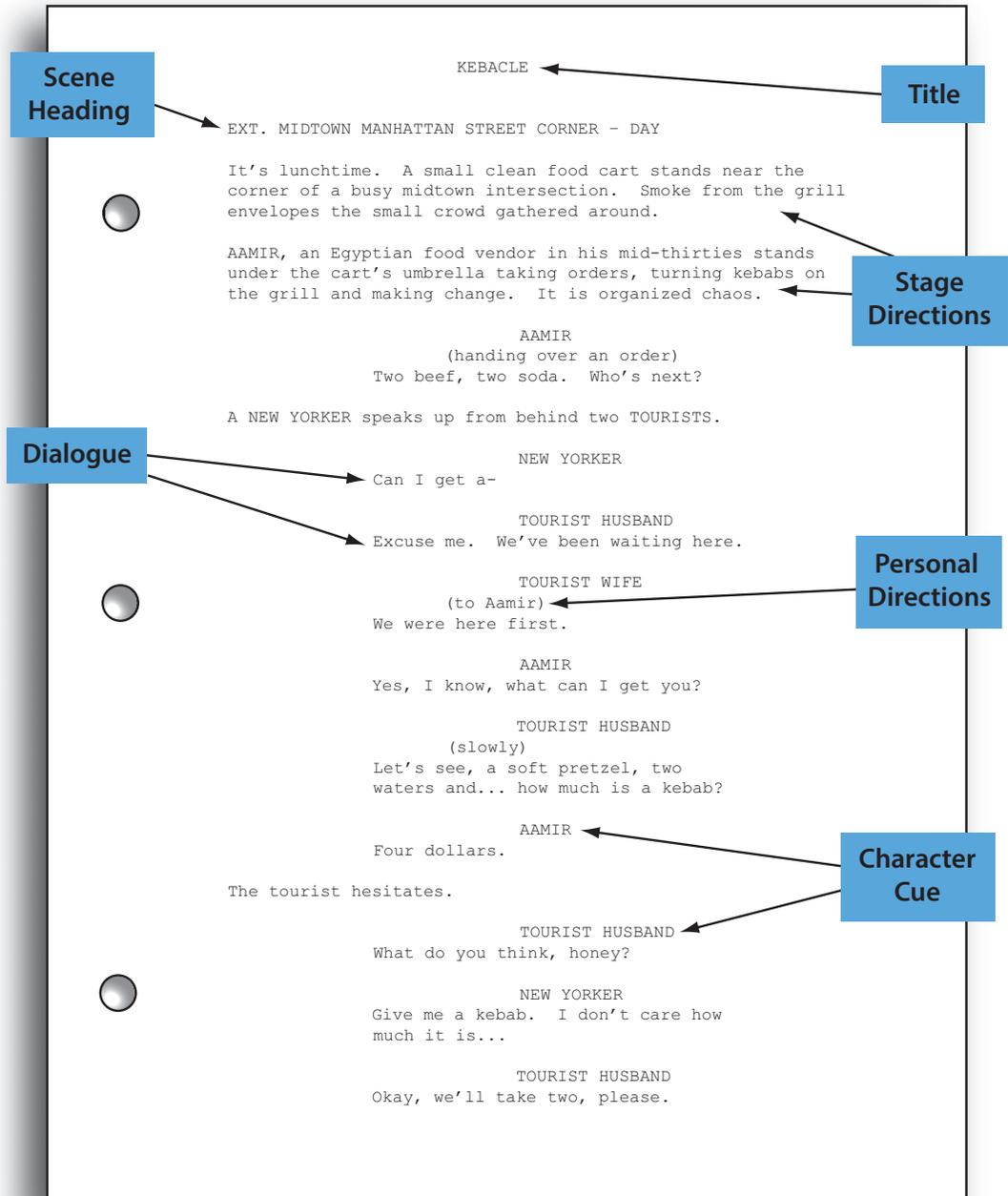
Beyond the technical formatting of a script, the language of the author's draft screenplay, its style and detail, communicates the *spirit* of the visual approach, tone, rhythm, and point of view of the final film. Embedded in the author's draft are your first thoughts on visualizing the story for the screen without the use of camera cues and technical jargon. If written well, an author's draft script should help everyone involved in your project "see" what you are striving for, thematically and visually.

Elements of an Author's Draft Script

There are six formatting elements used in the screenplay form: title, scene headings, stage directions, dialogue, personal directions, and character cues. Let's look at *Kebeacle* (2006),

■ **Figure 2-3**

Screenplay formatting elements. *Kebacle* (2006); a typical moment on the streets of New York City, vividly written in screenplay form by Alana Kakoyiannis.

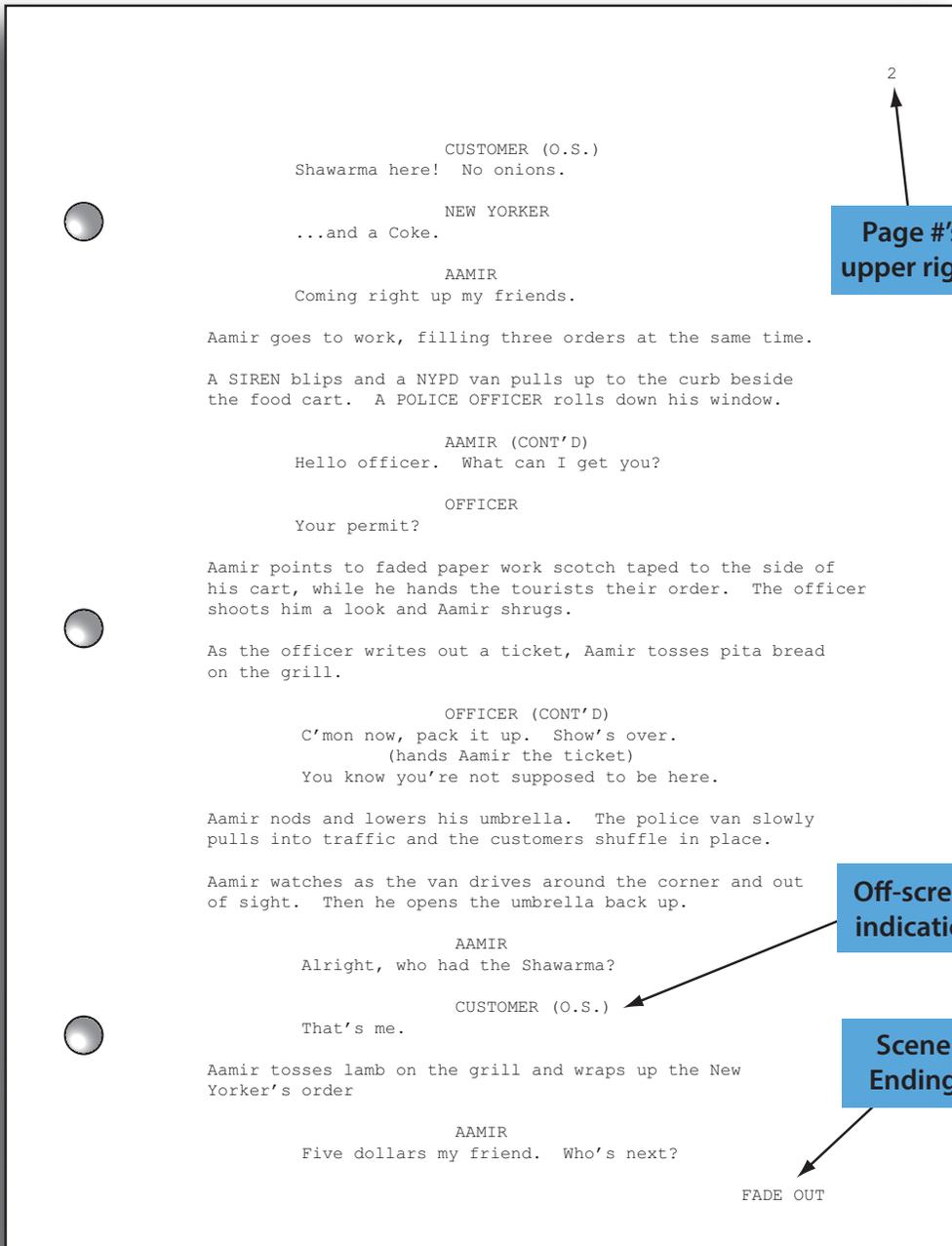


a simple screenwriting observation exercise written by my student Alana Kakoyiannis, and label each element. Alana was assigned to observe the people, activities, and interactions in the world around her for two weeks and then render one particularly interesting moment as a scene from a screenplay (Figures 2-3 and 2-4).

General Principles

A screenplay is written as the film would unfold to an audience. It is written in the present tense and must follow the progression of the film, moment by moment, scene by scene, as you wish it to appear before an audience. There is no literary commentary in a film script, and this necessitates two important practices:

1. The words on the page present each scene, action, image, character, and series of events to a reader as they would appear to the viewer of the film. Notice that Alana does not anticipate what is going to happen later by introducing Aamir saying:



■ **Figure 2-4**
Screenplay formatting elements. *Kebacle* (cont'd).

Aamir is an unlicensed vendor who shouldn't be serving food to people on a public sidewalk.

We will get to that detail only when it is revealed to the audience. The screenplay builds its story one moment at a time in the same way the film will, and in the beginning all we see is a food vendor serving people.

2. *There should be nothing in the script that the film's audience will not see or hear.* In general, nothing goes on the page that cannot be realized on the screen in images and sounds. These are the fundamental tools of a filmmaker, and therefore they are the tools of the screenwriter as well. In prose fiction and poetry it is common for an author to explain to the reader what people are feeling, what personal history might be informing an action, what characters are secretly thinking, or even what subconsciously motivates them. In film we must dramatize these internal states. **To dramatize**

is to externalize and reveal the internal, through actions, dialogue, and visual context. Notice that Alana does not describe what any character is feeling, their state of mind, or their intentions. She does not write, for example,

The New Yorker is impatient and anxious to get back to work so he calls out his order out of turn.

If you are true to the moment and to the voices of the characters, the intentions behind each line should be apparent. We can already feel the impatience, verging on pushiness, in the words and actions of the New Yorker, so there is no need to announce them. It would, in fact, completely ruin the scene if Alana were to write something like:

Aamir only pretends to close down by lowering his umbrella because he knows that as soon as the police van drives away, he can get back to business.

While these internal feelings and intentions may be part of what is going on in the scene, expressed this way, they are not cinematic. However, the filmable actions of Aamir folding his umbrella and watching the police drive away, then immediately reopening his umbrella to resume business without missing a beat, all vividly reveal what he was thinking and intending to do. Presented this way we also understand that this interaction is routine for him. It is far better to simply show it as it happens and let the audience discover his intentions for themselves—just as Alana did when she witnessed the scene.

Now let's look at each script element used in an author's draft individually.

Scene Headings (or Slug Lines)

The scene heading is our first introduction to each and every scene and establishes the fundamental time and location information in order to set the scene. What is a scene? **A scene** is a dramatic moment that has unity of both time and location. If you make a jump in time, say from day to night, you need to begin a new scene. Change location, and you must begin a new scene—even if that change is only from the living room to the kitchen of the same house. In addition, scene headings play a vital role in the disassembly and reorganization of the script in preparation for creating production shot lists and shooting schedules (see Chapter 5).

- *Interior or exterior setting:* **EXT.** Interior and exterior are always abbreviated and simply tell us if the scene takes place indoors or outdoors.
- *Location:* **EXT. MIDTOWN MANHATTAN STREET CORNER—**
The next bit of information is a brief but specific name of the location. We do not describe the location in detail here, but we must be precise. For example, **EXT. NEW YORK CITY** is brief, but it lacks the specificity to establish the location accurately. Where in New York City does this take place? Brooklyn? Staten Island? Upper East Side? On the street? In a park? All of these are very different locations with very different associations.
- *Time indication:* **EXT. MIDTOWN MANHATTAN STREET CORNER—DAY**
The final bit of information is an indication of whether the scene takes place during daylight hours, nighttime, or in between. Do not get too specific by writing things like **THREE AM** or **TEN-THIRTY PM**. Only **DAY**, **NIGHT**, **DAWN**, or **DUSK** are generally used. If you need the audience to know the exact hour, then you must put it elsewhere, like an image (a clock) in stage directions or in dialogue.
- *Other time indicators:* **CONTINUOUS**, **LATER**, and **SAME** are additional time indicators that are commonly used instead of **DAY** or **NIGHT** when necessary. We use **CONTINUOUS** in cases when one scene follows the previous one (from one location to another) without any break in time whatsoever. **LATER** is used when we remain in the same location, but we leap forward a little bit in time (i.e., less than day to night), and **SAME** is used when two scenes are happening in different locations, but it must

be understood that they are happening at precisely the same time. Here is a quick example:

INT. SCHOOL HALLWAY – DAY

Matt races down the empty hallway, past the sleeping hall monitor and turns into...

INT. CLASSROOM – CONTINUOUS

...a classroom full of students already working on their exams. Just as Matt takes his seat his teacher places a five-page exam on the desk in front of him.

Matt looks it over and swallows hard. He pulls out a pencil and gets to work.

INT. CLASSROOM – LATER

All the students are gone, except Matt who is still struggling with the exam. The only other person in the room is the teacher, who impatiently checks his watch.

EXT. SCHOOL PARKING LOT – SAME

Suzie sits in her idling car, with her friend Jill, watching as the last few students exit the school.

SUZIE

Where is he?

JILL

He's not coming. I told you Matt's no good.

SUZIE

Maybe you're right.

Suzie sighs, puts the car into gear and drives off.

Stage Directions

Stage directions are where most of your creative writing takes place. This is where you describe, always in the present tense, the actions of the characters, the settings, the images, and all non-dialogue sounds. In short, this is where you write what we see and, other than dialogue, what we hear. We will discuss the role of style and the art of visual writing in more detail later, but as a general rule, you should not elaborate on actions, settings, and movements in extreme detail. Too much extraneous description will bog down your script. When you write a screenplay, words and space are at a premium, so include only the *essential details* to tell your story. Notice in the *Kebacle* example that Alana describes Aamir's pushcart simply as:

A small clean food cart.

Combined with Aamir's cooking actions, his professionalism, and the food details along the way, there's enough information for a reader (and a set designer and cinematographer) to conjure just the kind of pushcart this man would run and exactly how it would look down to the smallest detail. We don't need to know where the napkins are or which side the pretzels are displayed or list every item on the posted menu. Later, in the production process,

these details and more will be decided, but in the script, they're not essential. The umbrella detail, however, is important to the story, but not, for example, its color.

In terms of essential actions, notice how the author doesn't trace every detail of every action. While we see Aamir give the tourists their order (to show that he doesn't stop working even as he's getting a ticket), we don't need to write out the entire transaction, including getting money and making change, for example. Also, the author says that he:

...wraps up the *New Yorker's* order.

But we don't need to know if he uses foil or wax paper, nor do we need to describe him putting the kebab in a bag and then the soda, followed by two napkins and a straw. Sure, these details will need to be worked out on the set, but it's not essential to the script.

The *Kebacle* screenplay is exemplary because its language is lean and yet the scene is vivid. We'll look closely at how this is accomplished in the "Screenplay Language and Style" section.

Other Stage Direction Rules

There are certain instances when words and names need to be written in all capital letters in the stage directions. Again, this is part of the technical function of the screenplay:

1. Character introductions.

The first time a character actually, physically appears in the film you must use all capital letters for their name in the stage directions. This allows a producer and casting agent to see at a glance how many characters there are in a given script, and it also allows actors to quickly find their first scene. Once you have introduced a character using all capitals, then you write the character's name normally for the rest of the screenplay. This rule applies to minor characters as well, but not to extras.

In our *Kebacle* example, Aamir, the tourists, the *New Yorker*, and the officer are in all capital letters the first time they appear in the script, but they're never written in all caps again in the stage directions. The other customers are not capitalized because they are **extras**, which means that they are performers who do not have a dramatic role in the film; they simply populate the environment for atmosphere and authenticity.

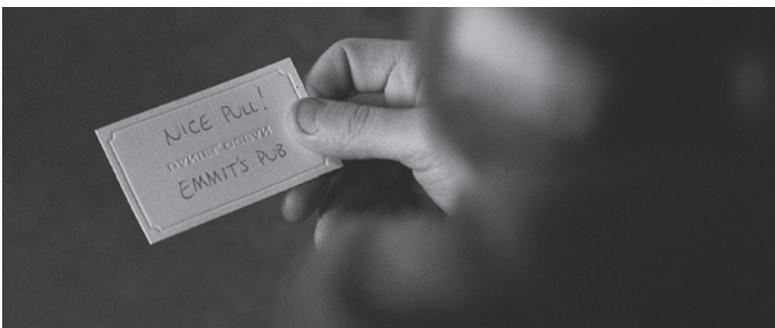
2. Sound cues.

Any time you have a sound that is not created by a character actually in the scene, like the **SIREN BLIP** in the example, it needs to be capitalized. This is a reminder that although the sound is not in the scene as you shoot, the performers will still have to account for it during shooting. If, for example, you are shooting a scene in which a character hears **CHURCH BELLS** in the distance, the bells will not likely

be sounding during actual shooting, yet the characters still need to react as if they were. Also, this is an indication to the sound designer to find this sound effect for postproduction.

3. Readable text.

Anything intended for the audience to read must be put in quotation marks. This reminds the director and cinematographer that they must compose the shot so that the audience is able to read the text of, say, a "Closed" sign on the door, a "Happy Birthday" banner, or a road sign that reads "WELCOME TO KANSAS" (Figures 2-5 and 2-8).



■ **Figure 2-5** Text intended to be read by the audience, like this shot from Soderbergh's *Ocean's Eleven* (2001), should be put in quotation marks in the script (see Fig. 2-8).

Character Cues

Character cues indicate which character speaks the lines of dialogue, which follow (i.e., **AAMIR**, **OFFICER**, **TOURIST WIFE**). These are simple, but there are a few rules to keep in mind:

1. *Keep the name consistent.*
If my character's name is Aamir Hassan and I give him the character cue **AAMIR**, then it must remain **AAMIR** for the entire script. I can't change it to **MR. HASSAN** later on.
2. *Only one character per name.*
If I have two characters, Aamir Hassan and Aamir Khan, then they both cannot have **AAMIR** as a character cue. You should refer to them by their last names.
3. *You may refer to characters by a role.*
It is common to refer to minor characters by their role, such as **OFFICER** or **TOURIST**.
4. *Additional information: Voice-over, off screen, and other delivery indicators.*
The character cue line sometimes carries other information about the delivery of the dialogue. Occasionally you will have a character speaking off screen or in a voice-over, or the dialogue may come over the radio. *Kebacle* has an example of this:

CUSTOMER (O.S.)
Shawarma here! No onions.

Off screen implies that the character is present in the time and place of the scene but is not visible from the camera's perspective (i.e., a voice from somewhere in the crowd or from behind a door). **Voice-over** implies that the person speaking is not speaking from that time or place, like a narrator commenting on the events of a scene from the perspective of memory (**Figure 2-6**).

Off screen and voice-over indications are always abbreviated—(O.S.) and (V.O.), respectively—and are located after the character cue. You can also indicate (TV) or (RADIO) if the dialogue is being broadcast.

INT. ANDREW'S BEDROOM - NIGHT

Andrew rushes into his bedroom, pulls his suitcase out from under the bed and starts stuffing it with clothes from his dresser. He hears a **NOISE** from the bathroom – he freezes.

ANDREW
Who's in there?

RUTH (O.S.)
It's just me Andy. I'll be right out.

Andrew goes to the window and cracks the blinds. He eyes a car passing slowly in front of his house.

ANDREW (V.O.)
After that phone call I started losing my mind. I was suspicious of everyone; even Ruth seemed to be spying on me.

Dialogue

Dialogue is what your characters say. Using proper margins and single spacing are pretty much the only formatting rules that apply here. However, dialogue is the other area where your creative writing and stylistic skills come into play. When you consider that dialogue is the “voice” of your character and that everything from the dialogue's content, tone,



■ **Figure 2-6** “Are you righteous? Kind? Does your confidence lie in this?” In *The Thin Red Line* (1998) a Japanese soldier appears to communicate from beyond the grave through voice-over narration, a staple of Malick’s films.

grammar, rhythm, and accent all serve to define the person speaking those lines and establish their credibility, then you begin to realize that determining “what your characters say” is not so simple. The main principle for stage directions—stick to the essentials—also applies to dialogue. One common mistake early screenwriters make is to overwrite dialogue. We will discuss working with dialogue in more detail later in the chapter.

Personal Directions

Personal directions are always very brief, placed in parentheses, and do not have any capital letters unless

you use a proper noun. They refer only to the person speaking the lines within which they appear. Personal directions are one of the most misused elements in a screenplay. Novice writers tend to use personal directions to tell the actors how to perform their lines. This is a mistake in two respects. First, the line itself should evoke the emotional tone of the delivery (sorrowful, joyful, wistful, etc.) without you having to label it as such. If a line is not sarcastic, then labeling it with the personal direction (sarcastically) will not make it sarcastic. Also, generally speaking, actors will try to make the best emotional decisions for the lines and the scene. When you use an emotional cue like (sorrowfully), you are closing the door to an interpretation of the line that could, in fact, enrich the moment. The emotional approach should be evident in the situation and dialogue itself, and if there is room for interpretation, then this is worked out between the director and actors in rehearsal and should not be codified in the author’s draft. So, when *do* we use personal directions?

1. *Important, but very small, actions that must happen on a precise line of dialogue.* For example, in *Kebacle* (**Fig. 2-4**):

OFFICER

C’mon now, pack it up. Show’s over.
(hands Aamir the ticket)
You know you’re not supposed to be here.

It’s a nice touch that Alana placed this action right here. The officer’s second line is slightly more personal than the others and indicates that they’ve been through this before. The fact that the ticket is exchanging hands at this moment makes the line seem even more person to person.

2. *Receiver of dialogue in group scenes.* Occasionally it may not be clear to whom your character is speaking, especially in group conversations, so instead of constantly embedding the name of the receiver of the dialogue in the lines, we can simply indicate it in personal directions. For example, in *Kebacle* (**Fig. 2-3**):

A NEW YORKER speaks up from behind two TOURISTS.

NEW YORKER

Can I get a-

TOURIST HUSBAND

Excuse me, we’ve been waiting here.

TOURIST WIFE

(to Aamir)

We were here first.

AAMIR

Yes, I know, what can I get you?

TOURIST HUSBAND

(slowly)

Let's see, a soft pretzel, two waters and ... how much is a kebab?

AAMIR

Four dollars.

The Tourist hesitates.

TOURIST HUSBAND

What do you think, honey?

NEW YORKER

Give me a kebab. I don't care how much it is...

One of the things that makes this moment so sharp is the way the Tourist Husband confronts the New Yorker while the wife appeals to Aamir. They attack on two fronts at once, a strategy that tells us that this is an important matter of principle to them and they *really* feel entitled to order first. If we had left out the personal direction (*to Aamir*) then the wife's dialogue would appear to be directed to the New Yorker and would have a different effect. Notice also how Alana understood that it was not necessary to write (*impatiently*) or (*exasperated*) when the New Yorker places his order. The emotional tone of the line is obvious in the words and context. (*slowly*) is not so much an emotion as it is an indication of pace. Alana wants to really draw out this moment, knowing that it adds tension to the situation. Other nonemotional, personal directions you'll see are words like (*whispers*), (*yells*), and (*stutters*).

I have outlined only the basics of screenplay formatting in this chapter. It's definitely worth your time to locate one of the books I mention in the recommended readings section for more detail.

Margins, Fonts, and Spacing



Margins, fonts, and spacing are an important part of formatting because they ensure that each script page reflects one minute of screen time, more or less. A 15-page screenplay will yield a 15-minute film, approximately. There are many commercial software programs that automate this aspect of formatting (e.g., *Final Draft*, *Movie Magic Screenwriter*, *Fade In*). You can also find free script formatting software online for download or working on the cloud (e.g., *Celtx*, *Adobe Story*). You can even set margins yourself manually on your own word processing program or, if you like, a typewriter, but no matter how you do it, you must get the margins and spacing correct. (Go to the *Voice & Vision* companion website for formatting specs.)

■ SCREENPLAY LANGUAGE AND STYLE

Visual Writing, Character, and Action

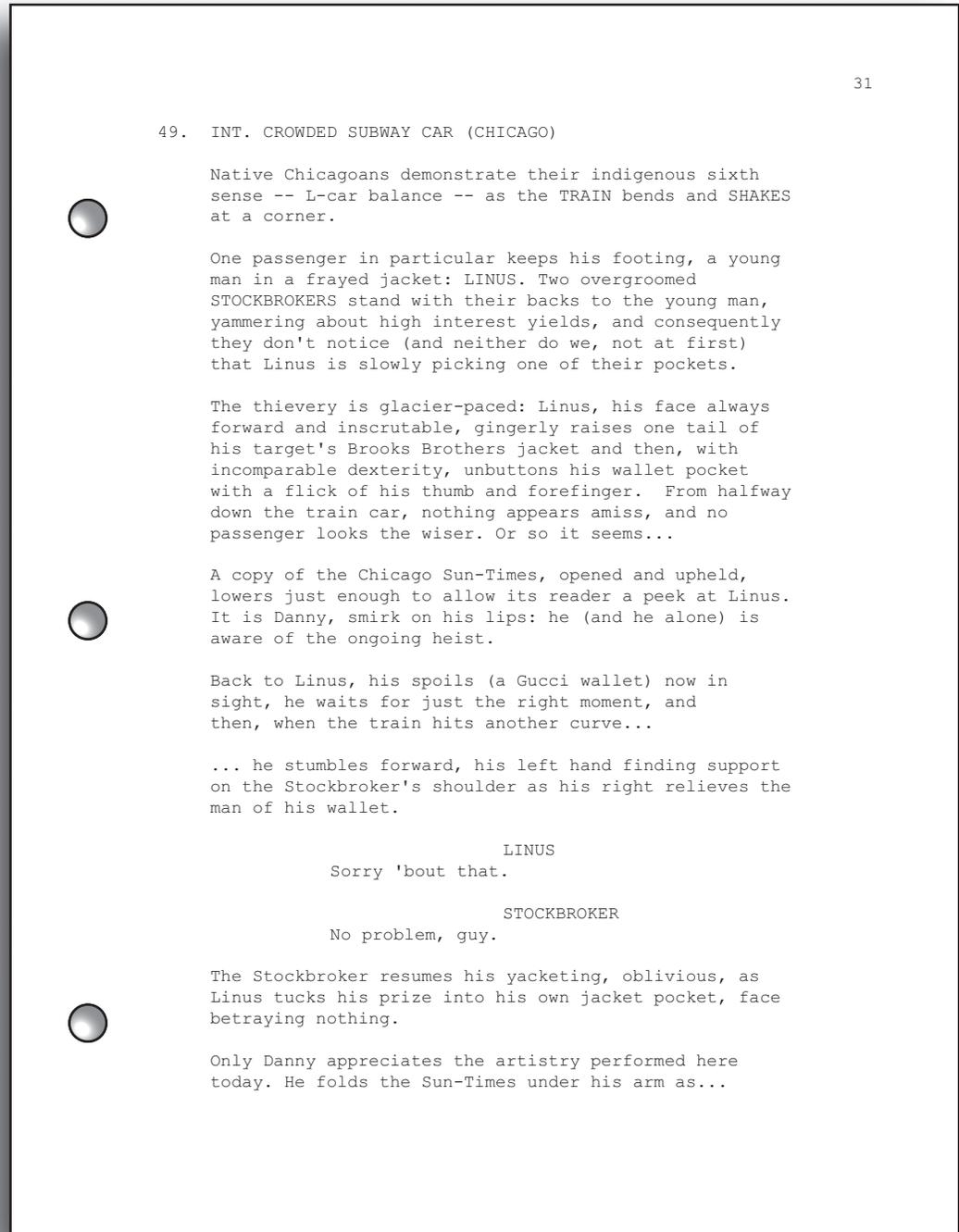
“Show Me, Don't Tell Me”

In film, as in life, actions speak louder than words. Someone can announce, “I love you,” and it sounds great, but can you trust it? “I really, really love you”: pretty words but perhaps too easy to say. But if that person actually shows their love by leaving a great job, their beloved city, and all their friends to follow you to another state because they can't live without you, then you might think, “Gee, you did that for me? You must really love me.”

When you write a script, try to do as much as possible with actions. Converting feelings, intentions, and character traits into actions and behavior is at the heart of screen drama and is essential to establishing an indelible understanding of character. In the *Kebacle*

Figure 2-7

Excerpt from *Ocean's Eleven*. Granted courtesy of Warner Brothers Entertainment Inc.

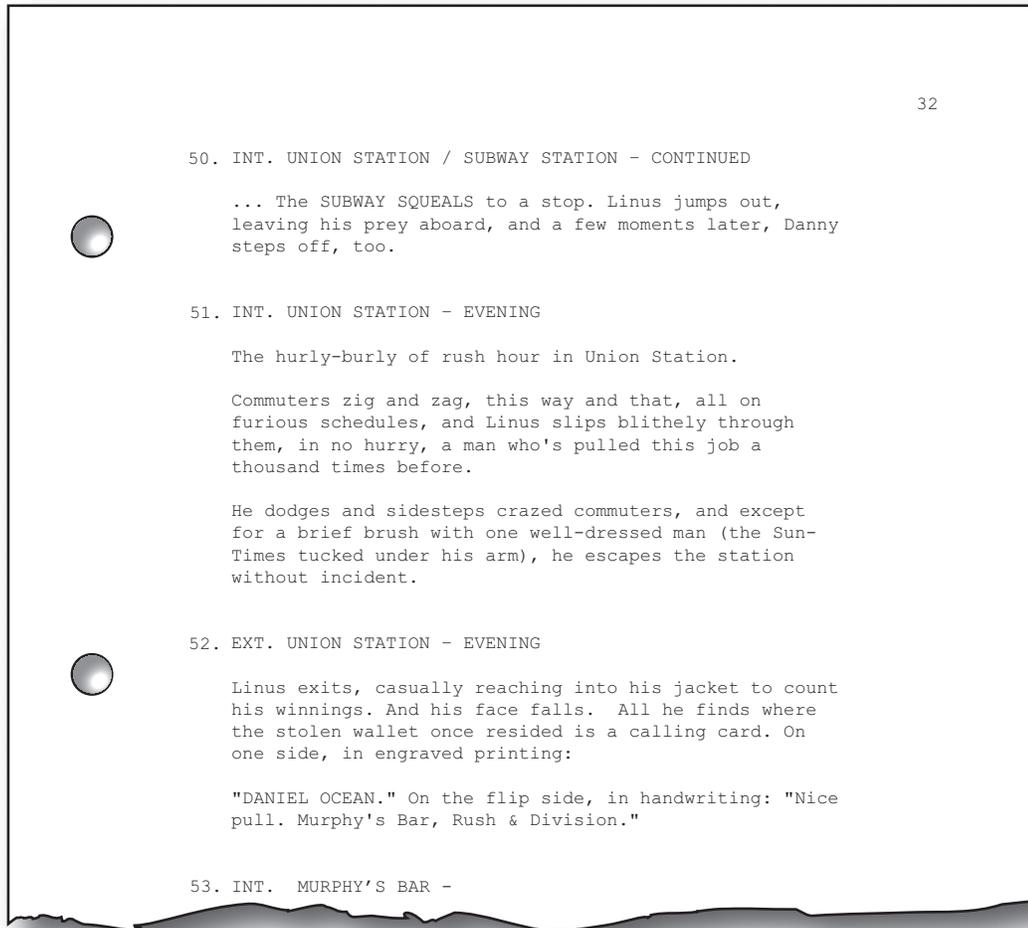


example, just the casual action of Aamir starting business up again after the police van drives away tells us a lot about his essential character: How afraid he is of the law, what he feels he needs to do to run his business, and what his work routine is.

Let's look at some principles for showing character through actions. The focus here will be on the craft of writing visually and on what is revealed through what we see and how it is presented. We will use a brief sequence from *Ocean's Eleven* (screenplay by Ted Griffin, 2001) (**Figures 2-7** and **2-8**).

- *Write with precision.*

The first thing to remember is that when you are writing a screenplay, you are a writer. As a writer, your tools are words, so you need to be precise with your language and



■ **Figure 2-8**
Excerpt from *Ocean's Eleven* (cont'd). Granted courtesy of Warner Brothers Entertainment Inc.

find the specific words that will convey not just the action, but also the tone or mood of the situation. The author of the *Ocean's Eleven* script does not say,

Linus lifts up the man's coat, opens his pocket, reaches in, and pulls out his wallet.

Yes, that's basically what happens, but put this way, the reader would imagine that Linus is a hapless clod who could not possibly get away with this. So instead he writes,

Linus, his face always forward and inscrutable, gingerly raises one tail of his target's Brooks Brothers jacket and then, with incomparable dexterity, unbuttons his wallet pocket with a flick of his thumb and forefinger. [And he eventually] ... relieves the man of his wallet.

The author has written only the actions, but the precision of the passage allows us to really "see" the crime and it also shows us Linus' expert abilities at picking pockets, a skill he will need later on in the film.

Keep in mind that not all actions and details are equally important. In stage directions we stick with only the essentials. The amount of time and words you use to describe something determines its importance in the scene. Lavish special attention and language only on those moments that are really critical to the storyline.

- *Use images, not camera cues.*
In an author’s draft, we avoid as much as possible the inclusion of camera cues—indications such as **CLOSE-UP ...** or **ZOOM IN ON ...** or **CAMERA PANS TO REVEAL ...**, etc. However, that doesn’t mean you can’t indicate a close-up or a wide shot if you really feel that it is necessary in the telling of the story. As a screenwriter you need to describe, in prose, an image or action that suggests to the reader or a director a close-up or a long shot or whatever else you intend. This is the essence of visual writing. In the *Ocean’s Eleven* example, Ted Griffin writes:

(a) Linus, his face always forward and inscrutable, gingerly raises one tail of his target’s Brooks Brothers jacket (b) and then, with incomparable dexterity, unbuttons his wallet pocket with a flick of his thumb and forefinger. (c) From halfway down the train car, nothing appears amiss, and no passenger looks the wiser.

This passage is written to invoke three different shot sizes. In order to show his inscrutable face and lifting up the coattail (a), we’d need something between a long shot (full body) and a medium long shot (from the knees up). Then, for us to really “see” the dexterity in something as small as the flick of a thumb (b), we would need an extreme close-up. Finally, to take in the image of other passengers and half the train (c), we’d need a long shot; we cannot visualize this image with the close-up. So the language shows us the shots in prose, rather than labeling them. Again, be careful not to overuse this technique. Invoke a precise image only when you really need it to tell the story.

- *Paragraphing stage directions and audience point of view.*
We use paragraphing in stage directions for three reasons. The first is to distinguish different locations within a single location. Notice how each time the author shows Danny, who is standing at the other end of the train watching, there is a new paragraph. The paragraphing shifts the reader’s point of view off Linus and onto Danny, who occupies a different end of the train car. The second reason we use paragraphing is to distinguish dramatic beats and shape the progression of the scene. Paragraphing helps the reader feel when one dramatic moment has ended and a new moment has begun. Yes, this episode on the train is one large dramatic unit; Danny watches Linus pick a businessman’s pocket. But tension is created by breaking this task down into smaller dramatic beats and slightly rearranging the details to reveal the situation to the audience in a more suspenseful way.
 - (Beat 1, paragraph 1) Average day on a Chicago subway. (Nothing is amiss.)
 - (Beat 2, paragraph 2) Introduces Linus and the stockbrokers and Linus is picking this guy’s pocket. (Uh, oh—a crime and now tension.)
 - (Beat 3, paragraph 3) Shows us that Linus is skilled and cool. (Character development.)
 - (Beat 4, paragraph 4) He’s not alone; Danny is watching the whole thing and likes what he sees. (The plot thickens with this big shift in point of view; now Linus is not just picking a pocket, he’s unknowingly being auditioned for a part in a bigger score.)
 - (Beat 5, paragraphs 5 and 6 with dialogue and 7) Linus completes the lift and is even polite. (Mr. Smooth the whole way, a real pro.)
 - (Beat 6, paragraph 8) Danny is very impressed (and so are we) (**Figure 2-9**).



■ **Figure 2-9** Linus (Matt Damon) and Danny (George Clooney) in the subway scene in Soderbergh’s *Ocean’s Eleven*.



■ **Figure 2-10** In Demme's *The Silence of the Lambs*, Dr. Lecter presents himself as a sophisticated gentleman when he greets Clarice. Later, we see Hannibal the Cannibal's true nature as he savagely murders his guards.

The third reason to paragraph is to further highlight very important moments or details. *The dramatic question* in this scene, for Danny, Linus, and the reader, is: Will Linus successfully lift the wallet? So *the climactic moment and action* is when he actually picks the pocket. For this reason, the screenwriter has set that moment off in its own paragraph.

Character versus Voice

In the *Ocean's Eleven* example, the actions we see Linus perform tell us who he is. He's a thief, a skilled thief, who is using his abilities to pull off petty crimes. We believe it because we saw it. **Character** is defined through actions. **Voice**, on the other hand, is the way in which people present themselves to the world. This could be through their style of dress, the way they decorate their apartment, and, of course, the way they speak. Dialogue can be written in harmony with what we understand of that character through their actions, or it can provide another layer of complexity, or it can even be contradictory to what we see. With his "frayed jacket" and polite apology, Linus presents himself as an average, nice guy (which the brokers believe), but we know better because we've seen him in action.

Another good example is Hannibal Lecter (**Figure 2-10**) in *The Silence of the Lambs* (1991, written by Ted Tally). Through his dialogue, Hannibal presents himself as an erudite, cultured, refined, courteous gentleman. At their first meeting he even tells Clarice Starling, "discourtesy is unspeakably ugly to me." This is no one we should fear, right? Until we see him literally rip the face off a police guard! Lecter is a great example of the tension you can create with the dissonance between character and voice. So if you are able to establish your character's essential nature through actions, then dialogue, your character's voice, can be used to add and refine other facets of their personality. Action = Character, Dialogue = Voice.

Working with Dialogue: Revealing Emotions, Not Announcing Them

Ideally, dialogue should *reveal* a character to us. It should illustrate what that person is thinking, feeling, and wanting instead of broadcasting these things directly. In this way, the *show me, don't tell me* principle also applies to dialogue. This scene from the Academy Award-winning screenplay for *Sideways* (2004), written by Alexander Payne and Jim Taylor, is a great example of dialogue that is, on the surface, about one topic, in this case wine, but in fact reveals an enormous amount about the internal yearnings and struggles of the lead character, Miles (**Figure 2-11**). Although Miles is clearly lonely, he is finding it impossible to get over his recent divorce and resume his life. In this scene, Miles, who is a wine aficionado, finds himself alone with Maya, an attractive acquaintance, while his buddy Jack is having casual sex in another room



■ **Figure 2-11** Miles (Paul Giamatti) talks about pinot noir but reveals his soul. *Sideways*.

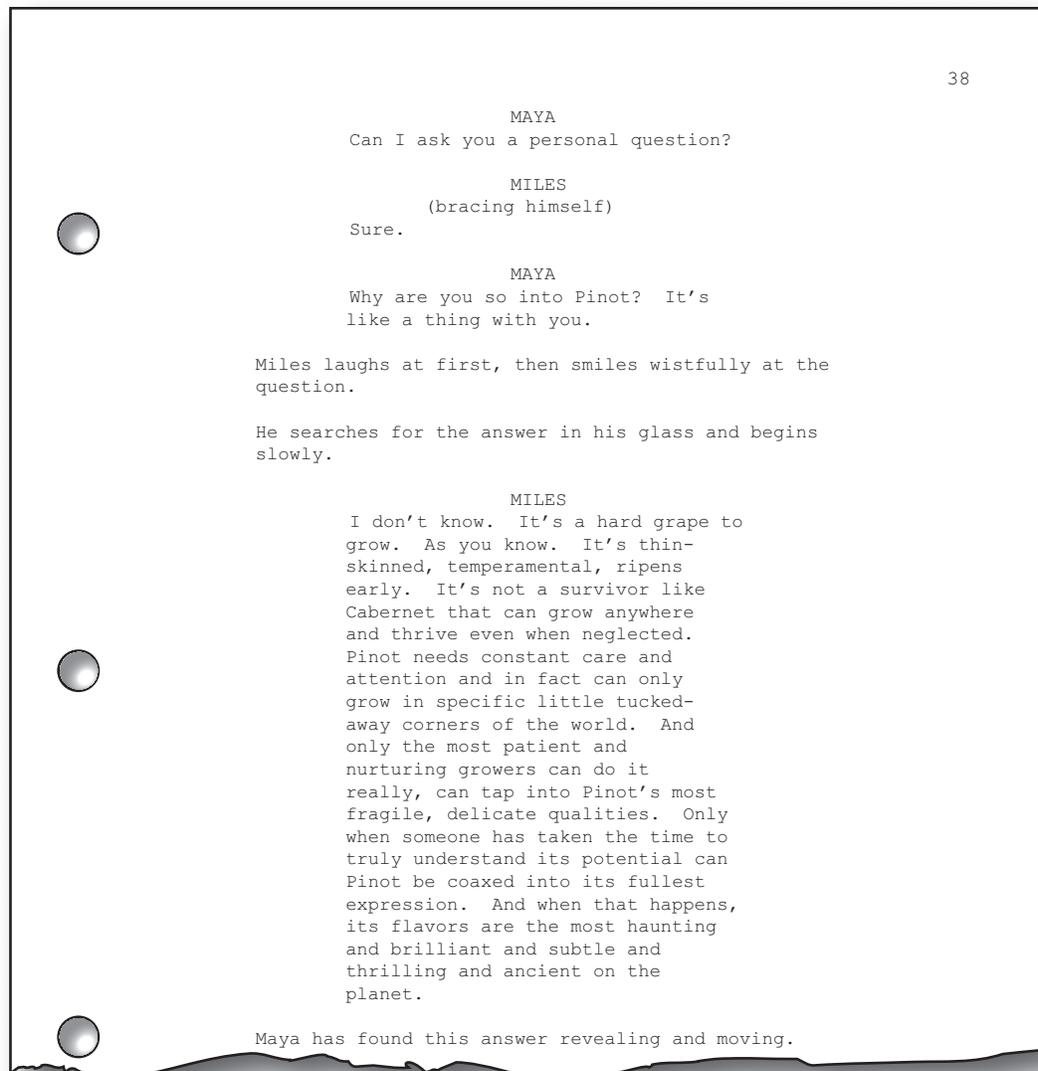
with a woman he only met that day. Miles and Maya are sitting on the front porch, drinking wine (Figure 2-12).

Miles laughs at first because the “personal question” he braced himself for turns out to be *only* about wine, yet Maya finds his answer surprisingly revealing and so do we. Through Miles’ passionate description about the Pinot noir grape he unwittingly reveals his loneliness and that he, like the Pinot grape, is difficult to nurture but ultimately well worth the time and care. So the question ends up being deeply personal after all and his subconscious revelation betrays his romantic interest in Maya. Also his answer poses questions of his own to Maya: Are you patient and caring enough? Will you “take the time to truly understand [my] potential?”

The other interesting nuance in this monologue is the comparison of grape varietals, which serves as a comparison of Miles’ personality with that of his friend Jack. His buddy in the other room, who easily picks up women to have sex, is clearly the cabernet grape, which can “grow anywhere and thrive,” while he is more like the Pinot, “thin-skinned, temperamental,” and “needs constant care and attention.”

Words and Grammar Define Voice

As with stage directions, your choice of language is crucial in dialogue. The words your characters use and the grammar they employ express their unique identity—both who



■ **Figure 2-12**
Excerpt from *Sideways*
© 2004, courtesy of
Twentieth Century Fox.
Written by Alexander
Payne and Jim Taylor.
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they are and how they wish to be seen. Aamir’s “my friend” and the officer’s “C’mon now, pack it up. Show’s over” are precise and put flesh on the bones of their characters. Their lines also establish their credibility with the audience. We believe them as people.

Throughout *Sideways*, Miles is an exceptionally nervous and awkward character—especially around women. In the scene before our example, he stumbles over himself to describe the novel he is working on to Maya. However, in this scene, Miles is in his comfort zone. He is eloquent, even literary, when speaking of wine. This reveals to the audience that not only is he knowledgeable about wine but that, yes, hidden under all the anxiety, Miles also is a passionate, thoughtful, and interesting guy—but it’s not easy for him at this moment in his life—he must be “coaxed into [his] fullest expression.”

Dramatizing the Story

I am always reluctant to single out some particular feature of the work of a major filmmaker because it tends inevitably to simplify and reduce the work. But in this book of screenplays by Krzysztof Kieslowski and his co-author, Krzysztof Piesiewicz, it should not be out of place to observe that they have the very rare ability to dramatize their ideas rather than just talking about them. By making their points through the dramatic action of the story they gain the added power of allowing the audience to discover what’s really going on rather than being told. They do this with such dazzling skill, you never see the ideas coming and don’t realize until much later how profoundly they have reached your heart.

Stanley Kubrick (Foreword to Kieslowski & Piesiewicz, *Decalogue: The Ten Commandments*, 1991)

In his response to the *Decalogue* screenplays written by the filmmaker Krzysztof Kieslowski and his screenwriting partner Krzysztof Piesiewicz, Stanley Kubrick succinctly sums up the primary dramatic task of the screenwriter. As I mentioned in Chapter 1, to dramatize is to tell a story about characters in conflict through action, dialogue, and visual detail and it applies to screenplays of any length or genre. Revealing a story through actions, being precise and true to your characters’ voices, and using visual detail in meaningful ways are all part of what is necessary to dramatize a story. Audience involvement is diminished when characters discuss the conflict, their motivations, or thematic points in direct or expository ways. It’s easy to undercut the believability of your story with characters who are too aware and verbally articulate of the dilemma they’re in and their responses to that dilemma. Yes, of course, you can always get the basic point of an encounter across in a simple and utilitarian way like this:

INT. KITCHEN – NIGHT

A man and woman, both in their mid-fifties, sit in a dark kitchen drinking whiskey.

WOMAN

I’m so mad at you right now.

MAN

Why?

WOMAN

Because the baby’s hungry, we’re broke, and you lost one month’s pay at a stupid card game, that’s why. How could you do this to us again?

MAN

I can win all my money back next week, and more.

WOMAN

You have a gambling problem and I'm sick of dealing with it. I'm going to leave you - for good.

If characters announce their feelings and intentions, if they discuss the story they are in (rather than just being in it), then the audience has no reason to become emotionally involved in the unfolding tale. Believable and engaging characters inhabit, act, and react within the world of the film and the events that swirl around them. They “do things,” and the viewer pieces together this display of human behavior to determine why they do what they do. This dynamic is critical to encouraging audience investment and involvement in our story. Many times a gesture or a look will expose, in much more eloquent and human ways, what someone is feeling than the verbal articulation of that feeling. Often what *is not said* speaks louder than an explanation ever could. Also, visual details like locations, clothes, and objects can reveal an enormous amount about the specific dramatic situation and context.

INT. KITCHEN – NIGHT

A man and woman, mid-fifties, sit in the shabby kitchen of an old single-wide trailer drinking whiskey as a baby whimpers from a crib in the corner. The man stares into his glass while the woman's gaze is fixed hard on his face.

MAN

It's only one month's pay. I can win it back next week – and more. The odds will be better –

The woman knocks back her whiskey and throws the empty glass at him, narrowly missing his head. It shatters against the wall and the baby wails!

She goes to the crib and comforts the screaming child as the man pours himself another shot.

INT. BEDROOM – DAY

The baby lies on the bed, sucking on an empty milk bottle. Next to him is an open suitcase packed with clothes. Crying to herself, the woman places one more item into the suitcase and closes it up. She looks at her little baby and wipes her eyes dry ...

We know there is a baby, because we see the baby. We see a woman throw a glass at her husband and we can't help but feel that she is really mad. We know he has a gambling problem because his dialogue employs the logic of a habitual gambler. The woman packs her bags, and we realize that she's leaving him. She does not need to verbalize any of it, she simply feels it and acts on it and we get it.



Let's look at the principle of dramatization through actions and visual details in two of the short films I have provided as examples online: *The Black Hole*, by Phil and Olly, and *Waking Dreams*, by John Daschbach (see these films on the *Voice & Vision* companion website). *The Black Hole* is the

most obvious example of a story revealed through action because it does not rely on dialogue at all to convey the step-by-step transition of its main character from bored office clerk to greedy thief. First, the drab office location, the way the character is dressed, and the act of photocopying late at night are all details

that establish the character as a low-level office clerk within seconds. Then, this bored clerk simply responds to the cosmic delivery of a strange black hole and one action leads to the next. These actions are so revealing that we can easily imagine his thoughts at each critical dramatic beat: there is the “What is that?” moment when the black hole comes out of the photocopier and the “What the heck happened?” moment when he drops the cup into the hole. Then he thinks, “Should I? Do I dare?” when he wonders if he should retrieve the cup, and, of course, the big “OMG, it’s magic!” moment when he sticks his hand into the black hole for the first time. After he easily snags himself a candy bar, we clearly understand that greed is overtaking him. When he scans the office, we know exactly that he’s thinking, “What else can I do with this? I want more!” He does not verbally express these feelings and no one is explaining this story to us, it is simply unfolding through actions that are revealing of character and intention, and therefore we are actively involved in putting the story together. We anticipate what he’ll do based on what we’d probably do. So when he spies the locked door with the sign “Keep out” we can practically hear him say, “Oh, yeah, jackpot! Come to daddy!” We easily follow his trajectory, because his behavior (shown exclusively through actions) is painfully human: he discovers power, he tests power, he abuses power, and the ironic twist is that he is undone by his own power and greed (Figure 2-13).

In *Waking Dreams*, Mr. Saroyan never directly states the emotional turmoil he is in nor does he articulate the questions that hang over his head: Do I or don’t I believe this woman? Will I or won’t I go in the ocean? Instead, we understand that this kooky proclamation of his impending death has rattled him because he can’t simply dismiss it. We witness him call Becky back to his office several times, first

to uncover a prank by a colleague, “who put you up to this?” (that would expose her premonition as a trick), then to imply that she’s not in her right mind “How are you Becky?” (that would assure him that she’s just imagining things) and then to use reason “Premonitions are fate, right?” (as if logic is the antidote to ominous predictions). And then, in a very funny moment, he uses executive-speak to try and brush it aside with the standard bureaucrat’s phrase, “Thank you for your input. I appreciate it, and I’ll take it into consideration.” These are not expository lines of dialogue; these verbal exchanges are active attempts to discredit Becky’s premonition and each of these moments only further reveals to us that he is truly bothered by her predictions, so much so that he may indeed alter his vacation plans. The more he tries to deny it, the more we understand that he believes it. But why does he, on some level, believe her? And why do *we* too suspect she could be right? Here, small details plant the seeds for plausibility. Becky’s slightly disheveled state (compared with his super controlled self-presentation), her idiosyncratic logic delivered with total assurance (“What people call fate is just time plus free will”), the small but essential moment when she looks at the telephone seconds before it starts ringing, the unexplained cigarette butt and shark’s tooth in his mini Zen garden, and the fact that it is clearly established that he is a single man vacationing alone—all these details create an atmosphere in which a premonition of portentous events should be taken into consideration. Mr. Saroyan doesn’t need to articulate his feeling of existential drifting—we see it in his response to this eccentric temp. So although *Waking Dreams* is a dialogue-driven film, the dialogue constitutes action and behavior rather than explanation. Again, the “show me don’t tell me” principle does *not* mean “don’t use dialogue”; it means reveal the story to me through behavior and not by explaining the story verbally.



■ **Figure 2-13** *The Black Hole* (left) and *Waking Dreams* (right) are two of the short films examples that can be viewed on the *Voice & Vision* companion website.

REWORKING AND REWRITING

Whether a project is a three-minute chase scene with no dialogue or a complex, character-driven, emotional drama, narrative filmmakers are storytellers, and the unfolding of events that make up film stories are first hammered out and polished on the page. The first steps in narrative film production involve developing your ideas on paper in concept and

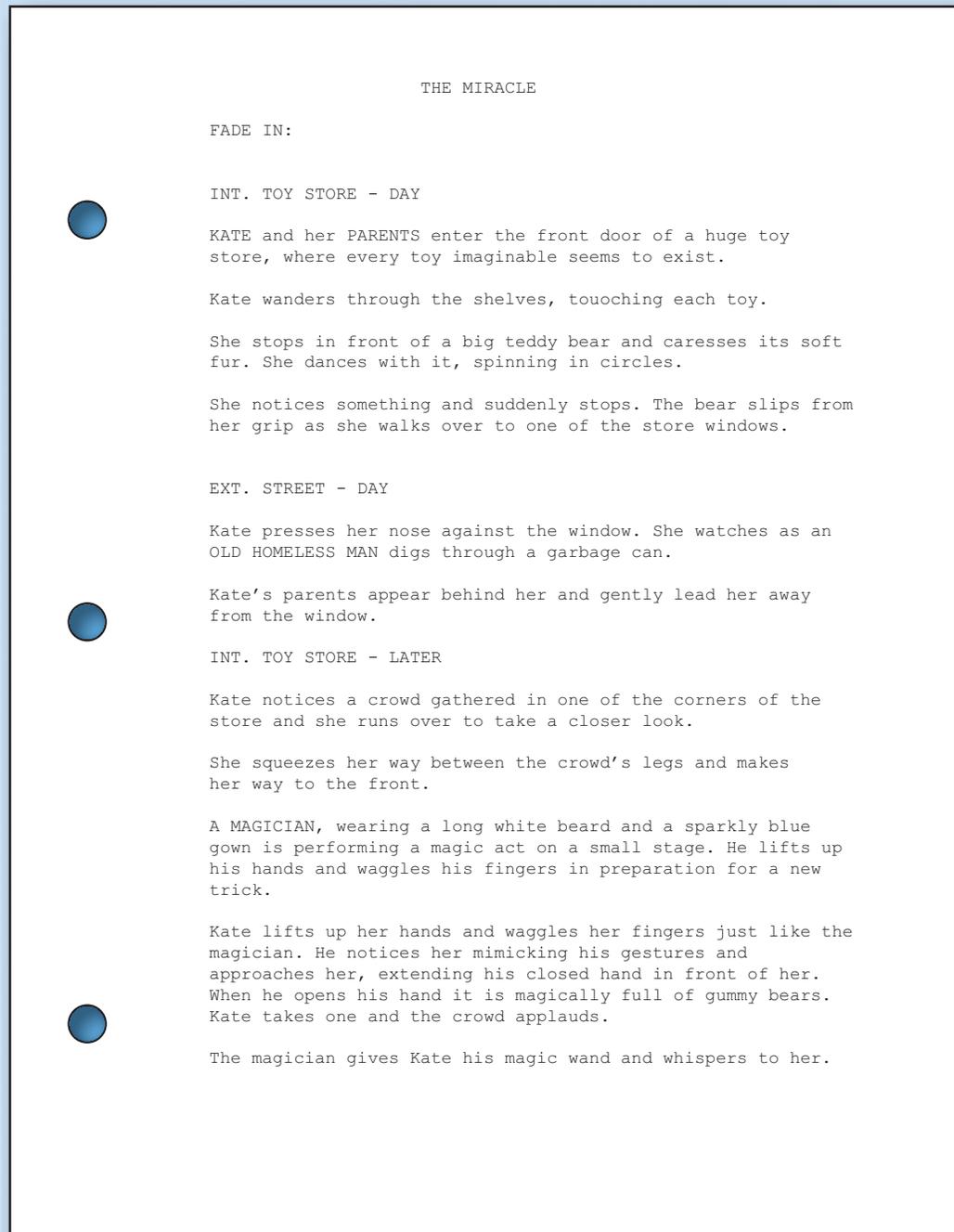
in practice

Now that you've seen George's concept and treatment (pages 23 and 24), here is how his final script turned out. Keep in mind that this was a short film written and produced for an intermediate film production class. This was the first time George was

working with color film and synchronized sound. In addition, he had a crew of four people and only one semester, 13 weeks, to go from a concept to a rough cut of the movie. So George kept it short and simple (Figure 2-14).

Figure 2-14

Screenplay for the short film *The Miracle* (2006), written by Georges Racz.



2

MAGICIAN
Siribi-siriba-pick-pack-puck!

Following the magician's gestures, Kate moves the wand in circles, and repeats...

KATE
Siribi-siriba-pick-pack-puck!

Suddenly, soap bubbles fill the air and the audience erupts into applause. Kate smiles.

EXT. SUBWAY TRAIN - DAY

Kate, her parents, and her new teddy bear board a subway train and take their seats.

As the train pulls out, Kate watches a PANHANDLER make his way through the car, holding a cup for change. He is on crutches and walks with great difficulty. Kate's father gives him a few bills and he continues on.

When the train pulls into the next station, Kate watches the panhandler exit the car.

Kate closes her eyes and, using her finger as a wand, draws circles in the air.

KATE
Siribi-siriba-pick-pack-puck!

When the doors close and the subway starts to leave, Kate opens her eyes and looks through the window.

She sees the panhandler put his money in his pocket and simply stride away, dragging his crutches behind him.

Kate smiles and embraces her teddy bear.

EXT. CITY STREET - DAY

Soap bubbles touch the gutter as the subway train RUMBLES underground.

FADE OUT.

THE END

■ **Figure 2-14, cont'd** Screenplay for the short film *The Miracle* (2006), written by Georges Racz.

treatment forms and then writing a screenplay. Each of these steps constitutes a reworking of the story. When it comes to the script itself, an often-repeated axiom is that *writing is rewriting*. It's important to remember that a screenplay is not written in stone. It is not unusual for screenplays (shorts or features) to go through many rewrites. Students in my intermediate production class will typically pen five or six drafts of their ten-minute film before heading into production. Some of these re-writes are simply to improve the script, while others are in response to real-world exigencies (like losing an important location), which must be worked into the script in such a way that they *also* improve the script. Screenplays should remain flexible and can be rewritten at every stage in the production process—including the editing phase—to respond to new ideas, creative collaboration, production circumstances, practical concerns, and spontaneous inspiration. The better the script, the better your film will be. So it is essential not to shortchange these crucial creative steps out of impatience and eagerness to get on a set. It's better to postpone a shoot in order to give yourself the time to get your script in shape.

The Visual Language and Aesthetics of Cinema

Film is a medium. . . . A medium is based on an agreement, a contract that has developed over a long period during which the speaker and the listener, the picture maker and the viewer, performer and audience, have established a system of meanings: a vocabulary, syntax and grammar of the language being used. For this reason, language emerges slowly, and will continue to evolve for as long as audiences and authors develop new ways of expressing themselves.

Alexander Mackendrick (From *On Filmmaking*, 2004)

Filmmaking has its own grammar, just as literature does. Everybody knows what basic coverage should be and just because you have some idiosyncratic ideas that might work even though they're breaking rules, the fact remains that there are rules that are there and that work. . . . But of course, following the rules does not guarantee that the film will work. That would be too easy.

Ethan Coen (From *Moviemakers' Master Class*, by L. Tirard, 2002)

■ SHOTS, SEQUENCES, AND SCENES

Film scholars and practitioners alike have long referred to the cinema as a language, which means that it is a shared system of terms, symbols, and syntax used to communicate thoughts, feelings, and experiences. In written language we use letters, words, sentences, and paragraphs. In the visual language of cinema we have four basic elements: the **shot**, the **shot sequence**, the **scene**, and the **dramatic sequence**.

The **shot** is the smallest unit of the film language. A shot is a continuous run of images, unbroken by an edit. Technically speaking, a shot is the footage generated from the moment you turn on the camera to the moment you turn it off—also called a **camera take**. However, these shots are often divided into smaller pieces, which are used independently in the editing stage, and each one of these pieces is also called a shot. Shots can be as short as a few frames or as long as your imaging system will allow before you run out of film or tape or data storage space. The famous shower sequence in Alfred Hitchcock's *Psycho* (1960) lasts about half a minute, but contains more than 50 shots, while the film *Russian Ark* (2002), directed by Aleksandr Sokurov and shot on high-definition video, is a 96-minute feature film comprising only one continuous shot!

Crucial to understanding the potential impact of the shot is the concept of **mise-en-scène** (a term derived from a French theatrical phrase that means “put on stage”), which in film terms can be defined as everything visible in the frame of a shot: the subject, actions, objects, setting, lighting, and graphic qualities. The *mise-en-scène* of a shot contains information, a certain meaning, derived from a combination of what we see in the shot and how it is presented.

Take a look at the very first shot (after the credit sequence) from Darren Aronofsky's 2008 film *The Wrestler* (**Figure 3-1**). This shot, unbroken by any edits, introduces us to the main character, professional wrestler Randy “The Ram” Robinson, after a wrestling bout. The choices Aronofsky and cinematographer Maryse Alberti made for this critical shot are precise and convey specific information. The blackboard, toys, and children's drawings which



■ **Figure 3-1** The opening image from Aronofsky's *The Wrestler* (2008). The mise-en-scène reveals much about the central character Randy "The Ram" (Mickey Rourke) in just a few seconds. See the color insert.

dominate the mise-en-scène tell us that the location is an elementary school classroom, which means that his match was probably in a rented gym and he's forced to use the classroom as a locker room. This is not the locker room of a big-time, national pay-per-view championship wrestling arena, so the narrative meaning of this location effectively places him on a very low tier local wrestling circuit, where matches take place in VFW halls, community centers, and school gyms. Randy's hunched posture and the accentuation of the slack aspects of his physique also tell us that this is not a wrestler in prime physical condition. The other aspect of the mise-en-scène that reveals his diminished stature as a wrestler is his position in the frame. Randy is far from the camera and appears very small. He does not command the frame any more than the toy dump truck does. To the right of the truck is another prominent feature of the mise-en-scène, a pair of little kid's stirrup tights. Costume is an important element in mise-en-scène, and Randy is wearing tights too, sequined tights. Sequined tights on big men makes sense in the ring, but in this setting, next to the kiddie's tights, they feel a little like child's play. Finally, the lighting of this scene does not reflect the show-time spectacle and theatrics of big-time wrestling; instead it is as bland and flat as one would expect in this environment, which only accentuates the banality of his dreary circumstances. Everything about the mise-en-scène of this one shot tells us that here is a small time wrestler, isolated and at rock bottom. The crucial concept behind mise-en-scène is that everything you put in a shot has the potential to add story information, so in a very real way you tell much of your story in the shot.

A **sequence** is an expressive unit made up of editing together multiple shots to define a unified action or event, or passage of time or place. Sequences can be designed to make multiple points. The *Psycho* shower sequence just mentioned not only shows us Marion's murder, but Hitchcock, a master of the macabre, also wants us to feel her terror and simultaneously wants to establish a new dramatic question: Who was that woman who killed Marion?

Each shot in a sequence builds on the others, so that by arranging shots in a particular order (or sequence), you can contextualize each individual image to create meaning that is greater than the sum of its parts. Film theorists refer to this concept as **montage** (from the French word "montage," which simply means editing). Broadly defined, montage is the film technique in which meaning is derived from the accumulation of information of the various shots in an edited sequence. (For more on the term "montage," see page 513.)

The term **juxtaposition** is often used when talking about sequences. This means placing two or more shots next to each other so that you highlight a link or contrast between the content in each shot. It's essential for a filmmaker to really understand and put to use the fact that a viewer does not simply interpret each image individually but almost instinctively



■ **Figure 3-2** In Malick's *The Thin Red Line* (1998), the long shot of a navy ship is followed by a shot of Sergeant Welsh (Sean Penn) in a dark location. Although there are no physical clues to indicate exactly where he is, we assume Sgt. Welsh is somewhere inside the ship, because of this juxtaposition.

creates additional connections between individual shots. If we first show a shot of the United Nations Building, followed by a shot of a group of people seated around a conference table, the audience automatically assumes that this is a conference being held inside the U.N. building. No one needs to announce it; it just becomes a presumed fact. This is a very simple example that, on the surface, seems completely common and obvious, and in fact it is, but on closer analysis you will come to understand the power in the mechanism and the broader creative implications between what's on screen and how an audience assumes connections and actively creates meaning (**Figure 3-2**).

Take a look at **Figure 3-1** again. We've already analyzed the *mise-en-scène* information, but add to this the fact that this shot is juxtaposed with a previous shot (as the credits roll). The previous shot is a long, close-up pan over a collection of magazine and newspaper clippings revealing that Randy "The Ram" Robinson was a wrestling superstar in the 1980s; he fought in the biggest arenas, headlined star-studded events, was named "wrestler of the year," and had many fans. Then, when we cut to 20 years later and see that small, hunched, slack figure in the elementary school classroom, the juxtaposition of only two shots effectively traces 20 years of a man's wrestling career from the glory days to the skids. In two shots, without even seeing the man's face, we already know that this is a wrestler who had a glittering career but is now an old has-been.

The "meaning" derived by the juxtaposition of two shots need not only be logistical or expository, but the context created by putting one shot next to the other can also elicit an emotional understanding from the audience. The most famous examples of this phenomenon are the early film experiments of Lev Kuleshov, who in the early 1920s shot the expressionless face of actor Ivan Mozhukhin and juxtaposed the very same, emotionally neutral shot with various other images. When the face was juxtaposed with a bowl of soup, people saw the face as that of a hungry man; when the same shot was juxtaposed with a child's coffin, people read his expression as sorrowful. Each new juxtaposed image inflected Mr. Mozhukhin's neutral expression with a different emotion. It is important to always remember that images and editing are used in tandem to create meaning and communicate your story, in specific terms, to your audience (**Figure 3-3**).

Because images and editing function in tandem, they must both be considered as we devise our visual strategy during **previsualization**. That's not to say that we try to precisely edit our film, shot for shot, before we go into production (although Hitchcock very nearly did just that on most of his films), but it does mean that we need to consider not only what we will shoot (*mise-en-scène*) but also how these shots might fit together (montage). This is what is referred to as **shooting for the edit**.

As stated in Chapter 2, a **scene** is a dramatic unit in which action ostensibly happens in continuous time and within a single location. A scene is usually composed of multiple shots, which guide the audience's attention, and there are principles of visual grammar that we employ in putting these shots together to make coherent sense of time, space, and actions (Chapter 4 explores these principles in detail). Depending on the style of the



■ **Figure 3-3** The immovable mask of Darth Vader is sufficiently neutral to take on a variety of emotions, depending on the context created through juxtaposition. In Marquand's *Star Wars: Episode VI—Return of the Jedi* (1983), Vader's mask reveals evil megalomania as he tries to convince Luke Skywalker to join the dark side (top left & right), but later in the film we detect feelings of paternal concern and alarm on the very same Vader mask as he watches his son Luke slowly being killed with "force lightning" (bottom left & right).



■ **Figure 3-4** The "Jack/Zak" scene from Jarmusch's *Down by Law* (1986) is 2 minutes and 45 seconds long and is accomplished in only one shot.

film, a scene, even one that includes a variety of camera angles, can also be accomplished in a single shot (Figure 3-4). This approach has been used throughout the history of cinema, from Robert Bresson to Hou Hsiao-Hsien, but is less commonly used.

A **dramatic sequence** is made up of a series of scenes that create a larger dramatic unit. The relationship between the scenes can vary, because of cause and effect (the result of one scene triggers the beginning of the next) or parallel action (in which the actions in two or more scenes, happening simultaneously, relate to each other), or the scenes can have other associative connections.

Just as in written language, where we put words together to create sentences, and sentences together to create paragraphs, in film we put shots together to create sequences and scenes, and scenes together to create the larger dramatic events of our story. Theoretically, one could certainly shoot any image at all and place it next to any other image, just as one could configure any string of letters to create sounds that resemble a word—for example, *fluugeproit*. This "word" *fluugeproit* doesn't directly communicate anything, and a sentence like "Bilious for at cake one" makes no sense at all either, even though the meaning of each individual word is perfectly understandable. Neither the "word" nor the "sentence" works within our language's shared system of practices.

Likewise in cinema, there are many commonly understood principles that we use for putting the visual pieces together to communicate coherently. This chapter and Chapter 4 explicate some of cinema’s “shared systems of practices,” including the most pervasive and fundamental visual system, known as *continuity style*. **Continuity style** shooting and

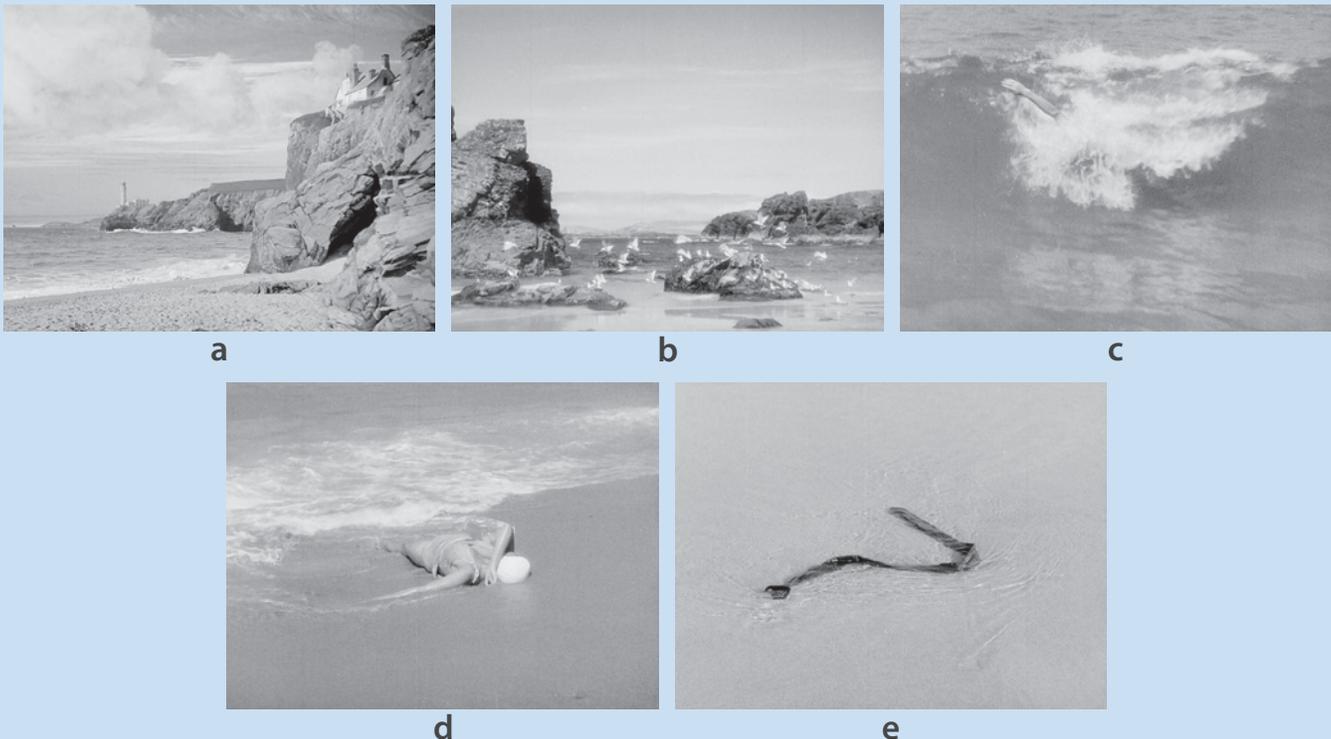
in practice

■ BUILDING MEANING THROUGH MONTAGE

Alfred Hitchcock is known as a master of montage for the way he was able to conjure complex mysteries through visual means—primarily the precise juxtaposition of simple shots that, with a few edits, accumulate complex meaning. In the second scene of Hitchcock’s 1937 film *Young and Innocent*, we are presented with a series of shots that, on their own, don’t mean so much, but together they mean murder and mystery! A perfect day, a beautiful beach, a lighthouse, and seagulls. These shots resemble kitsch postcards of a summer vacation spot. Wish we were here (*shots 1 and 2*)! Waves break along the shoreline and then an arm flops against the water. The shot tells us that there seems to be a swimmer in the ocean. The swimmer, it turns out, is an unconscious woman who is being tumbled by the waves (*shots 3 and 4*). Now the viewer starts to ask questions. The swimmer washes onto the shore. Her body is limp and clearly lifeless. Did she drown, or was she bitten

by a shark? We can’t know yet. But a question has been raised, “What happened to this poor woman?” Then, a belt washes up on the shore (*shot 5*)!

The shot of the belt all by itself simply means that a belt washes up on a beach—no big deal. Juxtaposed only with the first shot it could mean that the beach is more polluted than we thought, given the beauty of the “postcard” shot, but placed here, next to the shot of the woman’s body, it seems to answer our question, “What happened to this poor woman?” The belt immediately and clearly becomes a murder weapon and Hitchcock suggests that the swimmer who washed up on the shore was murdered *with it*! In addition, that idyllic beach becomes an ironic image because, for all its natural beauty, the location has become a sinister crime scene. Suddenly, all those questions, essential to any good mystery movie, flood into the minds of the audience. Who is she? How did she wind up in the ocean? Why was she killed? Whodunnit? All in just a few shots (**Figure 3-5**).



■ **Figure 3-5** In this sequence, from Hitchcock’s *Young and Innocent* (1937), each image efficiently adds vital visual information that guides the viewer to make specific and complex narrative assumptions.

editing provides tried and true principles for organizing our images to create a coherent sense of space, time, and movement in a way that is recognized and understood by nearly everyone. Keep in mind that, while continuity style is the fundamental cinematic language, there is always room for innovation and evolution. Only a few years ago “emoji,” “photobomb,” “twerking,” and “WTF” meant about as much as fluegeproit, but today you’ll find them all in the dictionary and most of us can actually understand a sentence like, “Hey, I tweet an awesome shot of me photobombing that girl who was twerking, and all you do is reply with an emoji? WTF! At least re-tweet!” Cinema, too, is a living language with an ever-expanding vocabulary and ever-evolving syntax—the fundamentals in this chapter are just the beginning of how we speak in film. Just as in writing, the cinematic language can be bland or expressive, prosaic or poetic, utilitarian or profound. The development of visual eloquence and your particular style begins with an understanding of the basic vocabulary and the creative possibilities of the film language. And the best place to begin is with the frame.

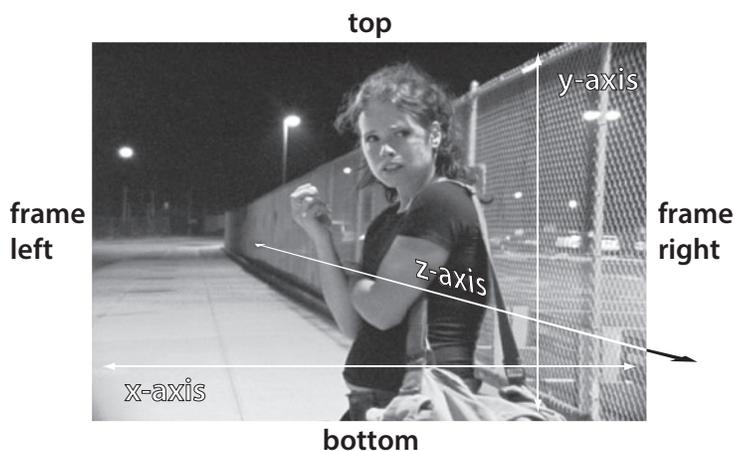
■ THE FRAME AND COMPOSITION

Cinema is a matter of what is in the frame and what is out.

Martin Scorsese¹

Dimensions of the Frame

Aesthetic considerations concerning the graphic and compositional aspects of your shots begin with the frame. **The frame** has two definitions. The *physical frame* is each, individual, still image captured on film or on video, which, when projected as a series, creates the illusion of motion (see Chapter 8). The *compositional frame* (Figure 3-6) is a two-dimensional space defined by its horizontal (**x-axis**) and vertical (**y-axis**) dimensions. Within this space we can perceive a third dimension, depth (**z-axis**); however, depth and distance are created through graphic illusion. The frame is your canvas, the rectangular space in which you determine the parameters of the viewer’s perspective. We refer to each of the four edges of the frame as **screen left**, **screen right**, **top**, and **bottom**. The frame essentially crops the real-world environment and determines what the audience sees (*mise-en-scène*) and doesn’t see, referred to as **off screen**. Framing your shot, deciding what to show and what *not* to show, is a significant creative decision.



■ **Figure 3-6** The compositional frame. Although we work with only two dimensions (the x- and y-axes), we can imply depth by emphasizing the z-axis. Still from Mercado’s *Yield* (2006).

Aspect Ratio

The relationship between the width and the height of the frame is called the **aspect ratio** and is derived by dividing the width of the frame by the height. Historically, there have been quite a few different aspect ratios used in film and video, but for this book I’ll only explore those that are most common today (Figure 3-7).

The aspect ratio of a full frame of 35mm film, 16mm film, and the old, standard definition broadcast video is **1.33:1**—fairly square-ish dimensions. In video parlance, this ratio is expressed as 4 × 3. In any case, the horizontal (width) is about one-third longer than the vertical (height). All silent films were shot with this aspect ratio, but the introduction of sound required the addition of a soundtrack down the edge of the film,

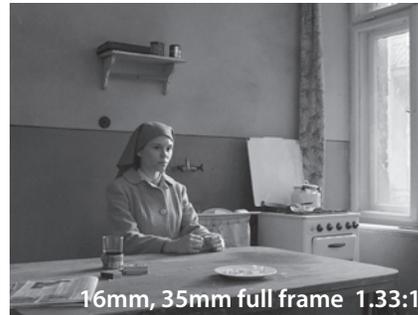
¹ “Cinephile Follies,” Richard Brody, *The New Yorker*, August 17, 2011.

and this necessitated a very slight shift of the frame dimensions. The adjusted aspect ratio for sound film became **1.37:1**; also known as **Academy Aperture** (from the technical standards set by the Academy of Motion Picture Arts and Sciences). For today's production and display formats, the 1.33:1 and 1.37:1 aspect ratios are mostly a relic of the past, but if you work with archival footage you will certainly come across it. That said, some filmmakers choose to use this aspect ratio from time to time as an aesthetic choice. A few recent examples are Kelly Reichardt's *Meek's Cutoff* (2010), Lázló Nemes' *Son of Saul* (2015), and Pawel Pawlikowski's *Ida* (2013) which, along with the black-and-white photography, uses the 1.33:1 frame to visually evoke the early 1960s era of the film.

Much more common for movies intended for HDTV broadcast, film theatrical release, or D-Cinema theatrical projection are aspect ratios that are generally referred to as "**widescreen**" formats, meaning that they are wider along the horizontal dimension. The **HDTV broadcast** aspect ratio standard is **1.78:1** (also referred to as 16 × 9). This is the most common HD shooting and display ratio and the one you will most likely come across as a film student. The **theatrical film release** aspect ratio and the **DCI** (or Digital Cinema Initiative) display standard is **1.85:1** (even wider). This is the most common aspect ratio for commercially produced and distributed films. In addition, both film theatrical release and D-Cinema projection allow for an **anamorphic (scope)** aspect ratio of **2.39:1** (also **2.35:1**), the widest of all the common aspect ratios.² We will discuss HD aspect ratios in more technical detail in Chapters 8 and 9.

Shot Composition and the Graphic Qualities of the Frame

Working within the parameters of a given aspect ratio, a filmmaker has a broad pallet of aesthetic choices when designing the composition of a shot. There are no absolute rules concerning visual style except that the choices you make should emerge from the dramatic needs of the script and should reflect your own creative ideas. Each compositional principle is expressed in precise terms, and it's important that you use the proper terminology when applying them to your script and communicating with your crew.



■ **Figure 3-7** Common aspect ratios: (top) 1.33:1 from Pawlikowski's *Ida* (2013), (top middle) 1.78:1 from Sokurov's *Russian Ark* (2002), (bottom middle) 1.85:1 from Lonergan's *Manchester by the Sea* (2016), and (bottom) 2.39:1 widescreen from McQueen's *12 Years a Slave* (2013).

² Anamorphic widescreen involves a system and requires specialized anamorphic lenses, which are usually out of reach for most beginning filmmakers, so I will not be discussing this process here.



■ **Figure 3-8** A closed frame contains all essential information within the frame, as shown in Jarmusch's *Stranger Than Paradise* (1984) (left). An open frame implies the existence of space and information outside the frame, like the identity of the person holding the gun in this shot from Melville's *Le Samourai* (1967) (right).

Closed and Open Frames

A **closed frame** means that all of the essential information in the shot is neatly contained within the parameters of the frame, and an **open frame** means that the composition leads the audience to be aware of the area beyond the edges of the visible shot (Figure 3-8). This is not necessarily an either/or choice. A shot can begin as a closed frame and then an unexpected intrusion from beyond the edge of the frame can suddenly disclose the larger off-screen environment. Also, sound or dialogue coming from off screen can serve to open a frame, because it asks the audience to imagine the space beyond the edges of what is visible.

Deep Frames and Flat Frames

We refer to a frame that accentuates the compositional element of depth (z-axis) as a **deep frame** and one that emphasizes the two-dimensionality of the image as a **flat frame**. The graphic factors that are used to create the illusion of depth are the same ones that are minimized to create a flat frame (Figures 3-9 and 3-10):

1. *Receding planes, overlapping objects, and diminishing perspective.*

We can achieve a feeling of deep, receding space by creating a *mise-en-scène* in which there are objects placed along the z-axis that define foreground, midground, and background planes. By reducing the z-axis space to two or even a single plane, we flatten the perspective and the space appears shallow. Related to this is the idea of **object overlapping**, which is the understanding that objects nearer the foreground will partially cover or overlap objects farther in the background. Also, related to the notion of receding planes is **diminishing perspective**, which is the perceptual



■ **Figure 3-9** Accentuating depth by using receding planes (left, from Kalatozov's *The Cranes Are Flying*, 1957) or by the foreshortening of a subject (middle, from Malmros' *Slim Susie*, 2003) creates deep frames.

understanding that objects will appear to be smaller the farther they are from the viewer, and conversely, objects will appear larger the closer they are to the viewer. For example, a chicken walking across the foreground of a shot will appear larger than a locomotive far in the background. **Foreshortening** is the same compositional phenomenon but with respect to a single object in which one part of the object appears large because it is very close to the viewer, while another part of the same object appears small because it is farther away, creating a dynamic sense of depth within the frame.



■ **Figure 3-10** Limiting the number of z-axis planes produces a flatter perspective, as in this shot from Östlund's *Force Majeure* (2014).

2. Horizontal and diagonal lines.

Shot head on, horizontal lines or objects in a horizontal arrangement will obviously look, well, horizontal. But shot from an angle, a horizontal line appears to recede into the distance on a diagonal. For example, if we shoot five people standing against a wall for a police lineup head on, the composition will appear flat; if we move the camera 45 degrees (or more) to the side, so that the lineup now recedes diagonally along the z-axis, then we've created depth in the frame (**Figure 3-11**). This is a simple yet powerful way to create a sense of deep space. Shooting horizontals head on minimizes the sense of depth.

3. Deep and shallow focus.

The depth of the focus range of a shot can add or eliminate attention to background and foreground information (**Figure 3-12**). When focus is deep we can see objects along the z-axis, from foreground to background, in crisp detail. Deep focus gives us an awareness of deep space because it is clearly visible. When focus is shallow,



■ **Figure 3-12** Manipulating depth of focus can direct the attention of the audience to selected areas of the composition. The deep focus in Zvyagintsev's *The Return* (2003) (left) lets the audience see the source of the subject's despair (his friends are leaving him behind), whereas the shallow focus used in Leigh's *Naked* (1993) (right) hints at the isolation that exists between the subject and society.



■ **Figure 3-11** Shooting horizontal lines head on creates flat compositions. Changing the shooting angle so that horizontal lines recede into the distance reinforces the depth of the frame, creating a sense of deep space (frames from Singer's *The Usual Suspects*, 1995).



■ **Figure 3-13** Lighting is critical to accentuating dimensionality in the frame. Eliminating shadows conceals texture, creating a flatter image (*top*). Positioning lights to create deep shadows adds texture and depth to a subject (*bottom*). Both frames from Coppola’s *Tetro* (2009).



■ **Figure 3-14** Although Cameron’s *Avatar* (2009) is a groundbreaking 3D film, it nonetheless uses all the same depth cues as regular cinema. Notice the receding and overlapping planes, the deep z-axis diagonal composition, and the use of shadows to create depth.

meaning that only a single vertical plane is sharply defined and objects in front of or behind that plane are blurry, our attention is limited to a narrow and flat area (see Chapter 10 for information on how to control “depth of field”).

4. *Shadows.*

Shadows add depth to just about any image because they accentuate the dimensionality of your subject and their environment (**Figure 3-13**). Eliminating shadows, therefore, conceals dimensionality and leads to a flatter image (see Chapter 13 for information about controlling light and shadows).

Depth in 3D

Although **3D filmmaking** utilizes exactly the same depth cue techniques as standard filmmaking (or 2D cinematography), the difference is that 3D technology replicates one additional element of our ability to visually perceive depth and dimension: stereopsis. **Stereopsis** is a visual perception phenomenon created by viewing objects with two eyes that physiologically are placed slightly apart—like human eyes. The distance between our two pupils is called the **interocular distance**, and the two lenses on a 3D video camera try to replicate this physical occurrence (see **Fig. 9-37**). Hold your right finger, pointing at the ceiling, 6 inches in front of your nose. Look at your finger with the left eye only and you will see more of the creases on the underside of your finger. Now, use only the right eye and you will see more of the tops of your knuckles. Each eye has a different perspective because the angle from which we view an object is slightly offset between our two eyes. This horizontal discrepancy creates a strong dimension cue when our brains combine these two perspectives into one image incorporating both perspectives (creases and knuckles simultaneously). There are several different 3D technologies for filmmaking (anaglyph color filter glasses, polarization glasses, LCD shutter glasses, etc.), but they all involve some method of creating and then displaying two of the same image, a right eye signal and a left eye signal, slightly horizontally offset.

During display, it is necessary to present each eye with one discrete signal isolated from the other (**Figure 3-14**). Despite the technology, however, the same compositional principles I’ve discussed apply if you wish to create deep frames in 3D.

Balanced and Unbalanced Frames

The principle of **compositional balance** begins with the understanding that objects in your frame carry a certain visual weight. Size, shape, brightness, and placement can all affect the relative weight of an object in the frame. How you distribute this visual weight within the frame will give your composition a sense of stability or instability—which can reinforce the dramatic tone at that moment. Frames in which all volumes are distributed equally are called **symmetrical** compositions and frames where there is an uneven distribution are **asymmetrical** (**Figure 3-15**). There is no value judgment attached to balanced and unbalanced frames; neither is “better” than the other. Like all of the other aesthetic principles in this section, the right choice is the one that is appropriate for the story you’re telling and the mood you’re creating.



■ **Figure 3-15** The distribution of objects or subjects in the frame can create a sense of visual balance or imbalance, according to the needs of the narrative. In Green's *La Sapienza* (2014) (left), the stylized symmetry of the compositions, here used ironically, reflects the protagonist's passion for the harmonies of Italian baroque architecture. In Antonioni's *L'Eclisse* (1962) (right), the placement of the subjects at a corner of the frame hints at an uneasy relationship with their surroundings.



Rule of Thirds (Looking Room, Walking Room)

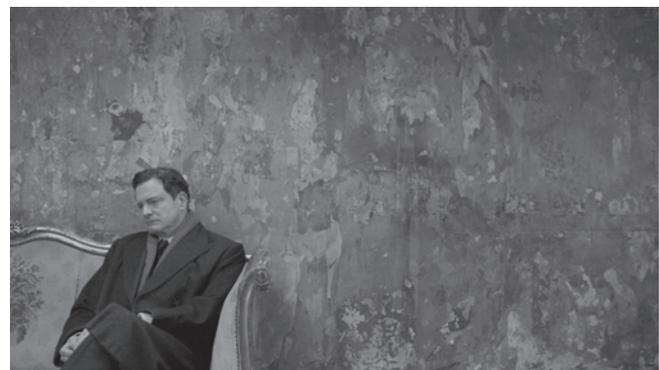
Cinematic composition, as with any other art form, has certain classic principles that have developed over time. Film, being a two-dimensional representational art form, developed after painting and photography, has been influenced by many of their ideas of classical form. One such idea is the **rule of thirds**, which is often used as a guide for framing human subjects and for composition in general. The rule of thirds creates compositional balance and harmony, yet it's not as overtly stylized as perfect symmetry.

First, we divide the frame into thirds with imaginary lines (sometimes referred to as “sweet spots”) along the horizontal and vertical axes and then we place significant objects, focus points, and elements of interest along these lines. For the human form, for example, this would mean placing the eyes along the top third horizontal line. If your subject is looking or moving toward one side of the screen, then the vertical placement of the figure should be along the left or right vertical third line *opposite* the direction in which the subject is looking or moving (**Figure 3-16**).

This extra vertical space, to one side or the other, is called **looking room** (or **walking room** for a moving figure). This space provides a sense of balance because the direction of the gaze, or movement, itself carries a sort of compositional weight. This space also keeps the viewer from feeling like the subject is pushing, or about to go beyond, the edge of the frame. Of course, you may *want* to create that uneasy sense. For example, if you want to accentuate the urgency of a character running, you might want that person bumping up against the front edge of the frame, as if the camera itself can't keep up with them! But this is an expressive deviation (**Figure 3-17**), which is made possible by the common application of the rule of thirds. Again, the rule of thirds is just a guide, a convention, and not really a rule at



■ **Figure 3-16** Typical use of the rule of thirds. Note how the “sweet spots” created by the intersection of the lines located at the thirds of the image are used to position the subject, giving her proper headroom and viewing room. Still from Mercado's *Yield*.



■ **Figure 3-17** Breaking the rule of thirds for dramatic impact. In this scene from Hooper's 2010 film *The King's Speech*, Prince Albert “Bertie” (Colin Firth) is boxed in by the bottom left edge of the frame and the corner of the sofa, reflecting his extreme discomfort at having to go to the office of a commoner to receive speech therapy. Notice how the elimination of looking room further accentuates his sense of unease.

all, and while it is often employed and can be a useful starting point, it is by no means a requirement for a well-composed shot.

Shot Size

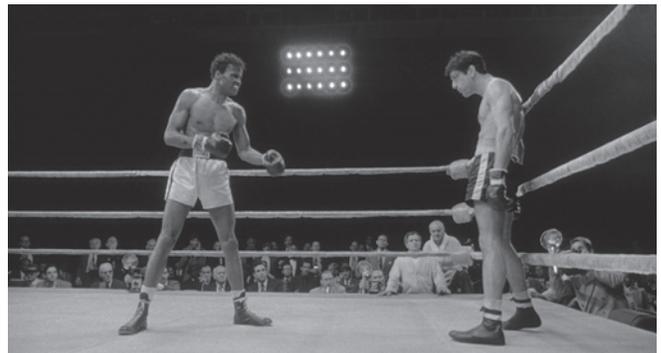
Shot size refers to the size of your subject in the frame. The size of your subject is determined by two factors: (1) the proximity of subject to camera (the closer the subject is to the camera, the larger it will appear) and (2) the degree of lens magnification (the more your lens magnifies the subject, the larger the subject will appear). These two approaches are not the same and the differences in their visual perspectives are discussed in detail in Chapter 10. Dramatically speaking, one selects a shot size based on the narrative emphasis, visual information, and emotional impact needed from a particular shot at a particular moment in the story. As the following figures show, most films are made up of a wide variety of shot sizes.

The frame of reference for any discussion of shot size is traditionally the human form, but the following shot designations work for nonhuman subjects as well:

- An **extreme long shot** or **wide shot (ELS)** is a shot that shows a large view of the location, setting, or landscape (Figure 3-18). Even if there are people in the shot, the emphasis is on their surroundings or their relationship to their surroundings.
- A **long shot (LS)** is generally a shot that contains the whole human figure. It's a good choice when you need to show larger physical movements and activity (Figure 3-19).
- A **medium long shot (MLS)** frames your subject from approximately the knees up (Figure 3-20). This shot is sometimes called a “cowboy shot” because, as legend has it, of the need to always see a cowboy’s gun belt in the western genre pictures. The French call this shot an “American shot” because of its frequent use in genre movies of the 1930s and 1940s.
- A **medium shot (MS)** frames your subject from approximately the waist up (Figure 3-21). This shot can show smaller physical actions and facial expressions, yet maintain some



■ **Figure 3-18** An extreme long shot (Scorsese's *Raging Bull*, 1980).



■ **Figure 3-19** The long shot (Scorsese's *Raging Bull*).



■ **Figure 3-20** The medium long shot (Scorsese's *Raging Bull*).



■ **Figure 3-21** The medium shot (Scorsese's *Raging Bull*).

connection with the setting. However, location is clearly no longer the emphasis of the shot, as the viewer is now drawn closer to the subject.

- A **medium close-up (MCU)** is generally from the chest or shoulders up (Figure 3-22). The emphasis of this shot is now facial expression, but some connection to the broader physical “attitude” of the body is maintained.
- A **close-up (CU)** places the primary emphasis on the face or other part of the body (Figure 3-23). Small details in features, movements, and expressions are the subjects of this very intimate shot.
- An **extreme close-up (ECU)** is a stylistically potent shot that isolates a very small detail or feature of the subject (Figure 3-24).
- **Two shots, three shots, and group shots:** As these labels clearly state, the two shot includes two subjects, the three shot includes three subjects, and shots that include more than three people are referred to as group shots (Figure 3-25).



■ Figure 3-22 The medium close-up (Scorsese's *Raging Bull*).



■ Figure 3-23 The close-up (Scorsese's *Raging Bull*). Close-up of a person (left) and an object (right).



■ Figure 3-24 The extreme close-up (Scorsese's *Raging Bull*). ECU of an object (left) and a person (right).



■ Figure 3-25 Two shot, three shot, group shot. These shots are named according to the number of subjects included within the frame (Scorsese's *Raging Bull*).

Shot Size and Character Identification

When framing a human subject, the shot size is especially important in establishing the level of intimacy and identification you wish the audience to have with that character. Obviously, an ELS and an LS cannot show a character's facial expressions with any detail and therefore these shots convey a feeling of distance and remoteness from the subject. With an MS we are close enough to clearly see them, but we're still at an observation distance, which is why this frame is rather neutral in terms of creating an emotional connection with a character. When using an MCU and CU we enter the very intimate, personal space of a character allowing us to see emotions and reactions through facial expressions. At this proximity, audience identification is quite strong. An ECU is so close that it can be either extremely intimate or, in its own way, mysterious and distancing—especially if the ECU obscures a character's eyes. It depends on the subject and composition of the shot. Understanding this, a filmmaker is able to precisely modulate not only the focus of attention within the frame but also the degree of emotional involvement the audience has with any particular character at any given moment by carefully selecting shot sizes.

Camera Angles

The orientation of the camera to the subject, the horizontal and vertical angles you are shooting from, has a dramatic effect on your image no matter what size the subject is in the frame. Simply moving the horizontal or vertical position of the camera, relative to your subject, can be a powerfully expressive technique that establishes the viewer's relationship to your subject.

High and Low Angles

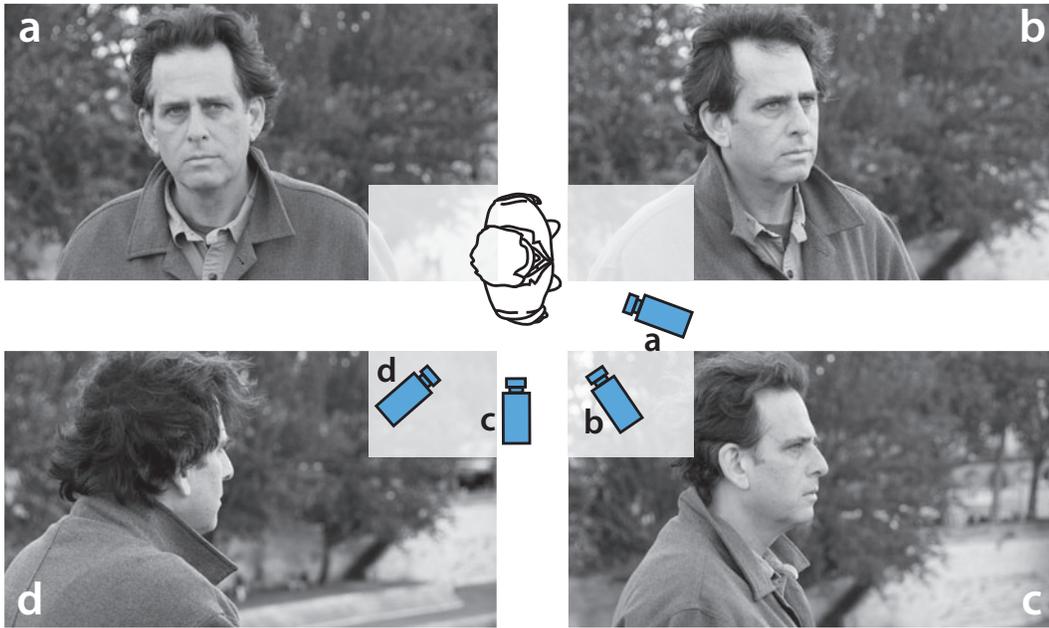
Let's look first at vertical angles ([Figure 3-26](#)). Again, using the human form for our reference, the **eye-level** shot is one in which the lens of the camera is positioned at eye level with your subjects, regardless if they are sitting, standing, or lying down. Raising the camera above eye level yields a **high-angle** shot and below eye level gives us a **low-angle** shot. An eye-level shot can encourage a connection with a subject, while extreme high or low angles tend to be more emotionally remote, but they can make for very dynamic frames.

Front to Back Angles

One of the most critical camera angle decisions we make is the horizontal position of the camera—especially when shooting people. The camera can be anywhere from directly in front of your subject to directly behind them and as we move the camera angle from frontal, to profile, to the back of the subject, we drastically change the viewer's relationship with the subject. Looking directly at a subject's face—**frontal** and **three-quarter frontal** angles—is an intimate perspective and can elicit strong engagement; a **profile shot** is a somewhat neutral point of view, and hiding facial features by shooting from a **three-quarter back** position or **directly behind** can create a sense of distance, remoteness, or mystery ([Figure 3-27](#)). Keep in mind that these back view positions can also encourage the audience to identify with a character by aligning their visual point of view with that of the subject.



■ **Figure 3-26** High-angle, eye-level, and low-angle shots. In an eye-level shot, the camera is positioned at the eye level of the subject (*middle*), regardless if the subject is standing, sitting, or lying down. Positioning the camera above eye level produces a high-angle shot (*left*), while putting the camera below eye level produces a low-angle shot (*right*). Examples from Wenders' *Wings of Desire* (1987).



■ **Figure 3-27** Camera position has a significant impact on the emotional connection a viewer makes with your character. Here, a man witnessing a disturbing encounter shot from four different angles: (a) frontal, (b) three-quarters frontal shot, (c) profile shot, and (d) three-quarters back shot. Notice that frontal shots involve actors looking slightly off the side of the lens, not directly into the lens.

A shot in which the subject looks directly at the camera is called **direct address**. Eye contact with the audience is quite rare and is especially powerful in narrative films because it shatters the fictive world by creating an open frame that includes the viewer. Direct camera address is the cinematic version of the theatrical concept of “breaking the fourth wall.” Much more common are **frontal shots**, in which the camera looks directly at the face of your subject but the subject’s sightline glances just off the edge of the frame. Compare the direct camera address in **Figure 3-28** with the frontal shot in **Figure 3-27**.

One other camera angle that we can consider adjusting is the lateral positioning of the camera. Tilting the camera laterally so that the horizon of your composition is oblique is called a **canted angle** (or **Dutch angle**) (**Figure 3-29**). This sort of shot can create a feeling ranging from slight imbalance to extreme spatial disorientation, depending on the extremity of the lateral tilt of your camera. A canted shot can infuse tension, imbalance, or disorientation into a scene.

Creating New Frames and Aspect Ratios

So far, we have been looking at working within the given aspect ratio of the film and video frame (1.78:1, 1.85:1, etc.), but you are not entirely restricted to these compositional dimensions. Many filmmakers find interesting ways to alter the aspect ratios of the area that frames their subjects. Because we cannot physically change the aspect ratio of the film or video frame, this technique involves using some element of the location or lighting to crop the existing frame to new proportions. This is called a **frame within a frame** (**Figure 3-30**).



■ **Figure 3-28** A character looking right into the lens is known as direct camera address, or breaking the fourth wall. While this device is highly unusual in narrative film, it is frequently used in Miller’s *Deadpool* (2016) which relentlessly pokes fun at genre conventions.



■ **Figure 3-29** In *The Artist* (2011), Hazanavicius uses canted angles for a scene in which the famous silent film star George Valentin (Jean Dujardin) finds himself in a nightmare world of sound, without any voice of his own.



■ **Figure 3-30** Frames within frames. The filmmaker is not restricted to the aspect ratio of the shooting format. Through careful use of composition or lighting, it is possible to alter the dimension of the frame to create a dramatically compelling way of presenting a subject. *Left* from Fassbinder's *Ali: Fear Eats the Soul* (1974); *Right* from Hausner's *Lourdes* (2009).

in practice

■ EXPRESSING CHARACTER THROUGH CAMERA ANGLE

Low angle shots are frequently used in film to suggest a sense of the strength, power, or resolve of a character. However, Orson Welles and D.P. Russell Metty's frequent use of a low angle camera to frame police Captain Hank Quinlan in *Touch of Evil* (1958) is especially unnerving. This classic film noir tells the story of abject police corruption along the Mexican border and the brutal retribution leveled at the honest Mexican narcotics officer Mike Vargas and his wife when Vargas starts to uncover Quinlan's dirty dealings. Quinlan's burly physical girth is further accentuated by low camera angles that make him appear to loom with dominating malevolence over everyone around him—including the viewer. The film, however, builds a deeper context and these images emphasize more than the character's perversity and

power, they further reflect the deep entrenchment and intractability of the entire corrupt system and the danger it poses to true law, order, and civil society (**Figure 3-31 left**).

Controlling POV through Camera Angles

In their film *The Son* (2002), the Dardenne brothers tell the story of Olivier, a carpentry mentor at a rehabilitation center for juvenile delinquents. One day the boy who killed Olivier's son during a botched robbery is released from prison and winds up in his carpentry shop as one of his apprentices. On the boy's first day the camera follows Olivier, who is following the boy, as he tries to get a glimpse of the kid who killed his son years ago. For extended sequences the camera remains behind Olivier, shooting from a three-quarter back angle or completely from behind (**Figure 3-31 right**). This camera angle



■ **Figure 3-31** The low angle shots in *Touch of Evil* evoke power, corruption, and domination (*left*). Shots from behind Olivier (Olivier Gourmet) in *The Son* bring the audience into his point of view, yet obscure his reactions (*right*).

choice allows the audience to feel like they're peering over Olivier's shoulder, seeing the world from his perspective; however, this angle does not allow us to see how Olivier is reacting to seeing his son's killer. Through this camera angle, the Dardenne

brothers and director of photography Alain Marcoen build enormous tension and suspense by frustrating our need to see what emotions are playing across Olivier's face.

■ THE MOVING FRAME

A shot in which the framing remains steady on the subject without moving or shifting perspective is called a **static shot** (or **fixed frame**). We can certainly use two static shots edited next to each other to shift the viewer's perspective from, say, a man working at his desk, to the dark window behind him. But there are often important dramatic and stylistic reasons to shift the perspective of the frame and therefore the viewer's attention—horizontally, vertically, or even along the z-axis—during the course of a shot. This is called a **camera move**. Shifting the viewer's perspective, in one continuous motion—from the man at his desk, across the empty room, to the dark window behind him—might provide extra information or a visual connection, which could be vital to fully develop that particular dramatic moment. For example, by scanning the room between the man and the window, we can see that he is completely alone.

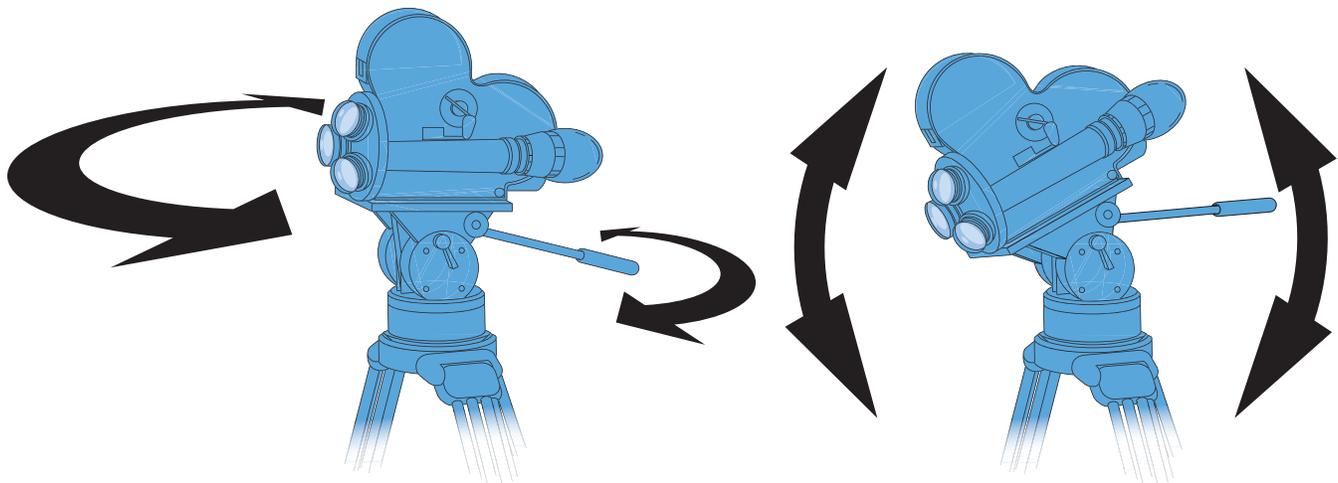
Camera Moves

There are two kinds of moves: stationary camera moves and dynamic camera moves.

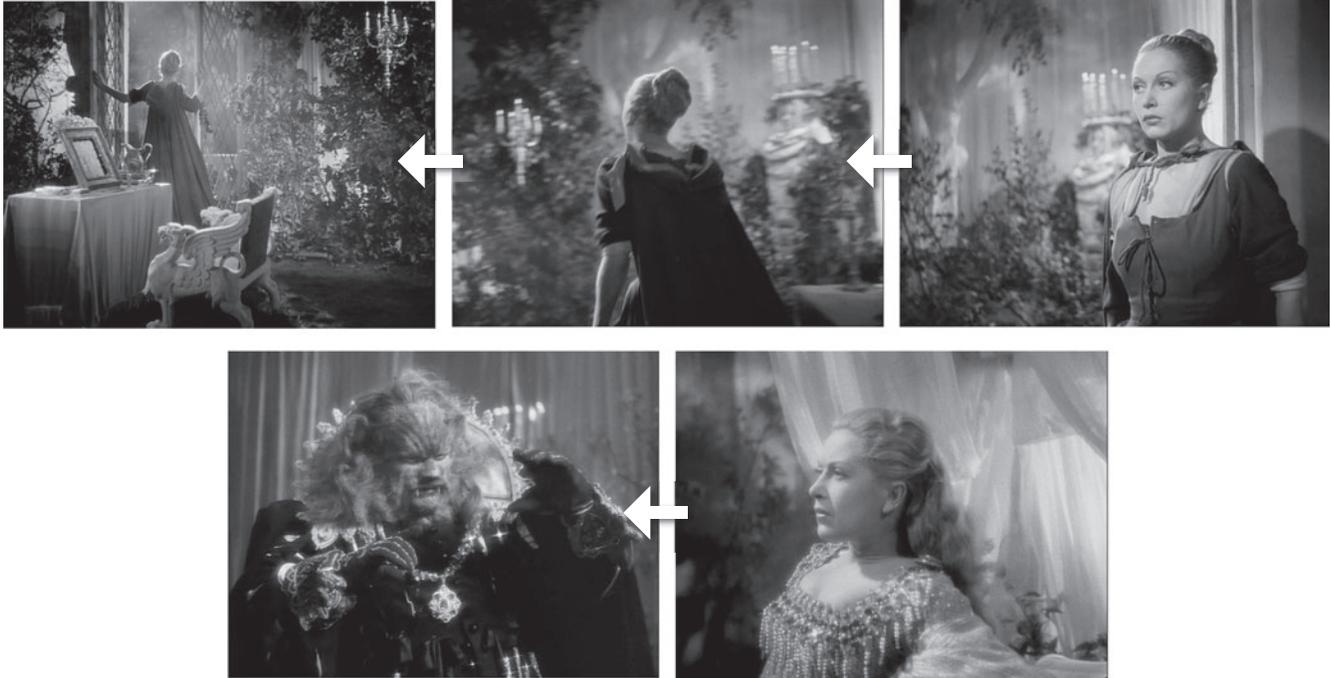
Pivot Moves

Pivot camera moves (also **stationary camera moves**) involve pivoting the camera, horizontally or vertically, from a stationary spot while the camera is running. This can be done on a tripod or with a handheld camera as long as the location of the camera doesn't change, just its horizontal or vertical angle.

A **pan** scans space horizontally by pivoting the camera left or right (*pan left* and *pan right*). A **tilt** shifts the camera perspective vertically, with the lens facing up or facing down (*tilt up* and *tilt down*) (Figure 3-32). A pan or a tilt that moves from one subject to another is called **panning from/to** and **tilting from/to**. For example, you pan *from* the man at his

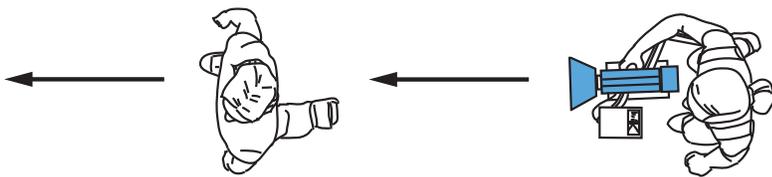
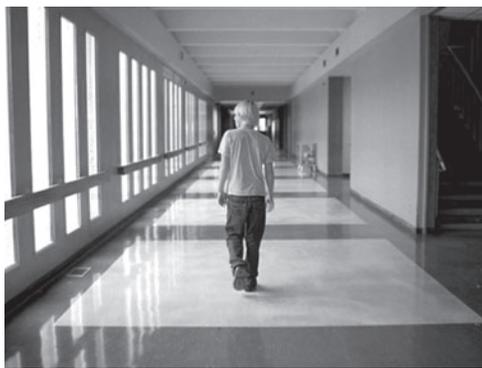


■ **Figure 3-32** Panning and tilting. In a pan, the camera scans space left or right on the tripod's axis. A tilt shifts the camera's perspective vertically on the tripod's axis.



■ **Figure 3-33** Follow pan: In Cocteau's *Beauty and the Beast* (1946), the camera pans from right to left *with* Beauty (Josette Day) as she explores the Beast's castle. The camera keeps her centered in the frame as she moves from the door to the window (*top frames*). Pan to: In a later scene, the camera pans *from* Beauty *to* the Beast (Jean Marais) standing across the room. The camera move follows Beauty's look and reveals the Beast, which heightens the surprise and tension of their encounter (*bottom frames*).

desk, *to* the dark window across the room. A pan or a tilt that follows a subject as they move within the space is called a **pan with** or **tilt with** (this move is also called a **follow pan** or **follow tilt**). For example, the man at his desk thinks he hears a funny noise outside. We can pan *with* him as he walks from his desk to the window to look outside (**Figure 3-33**).



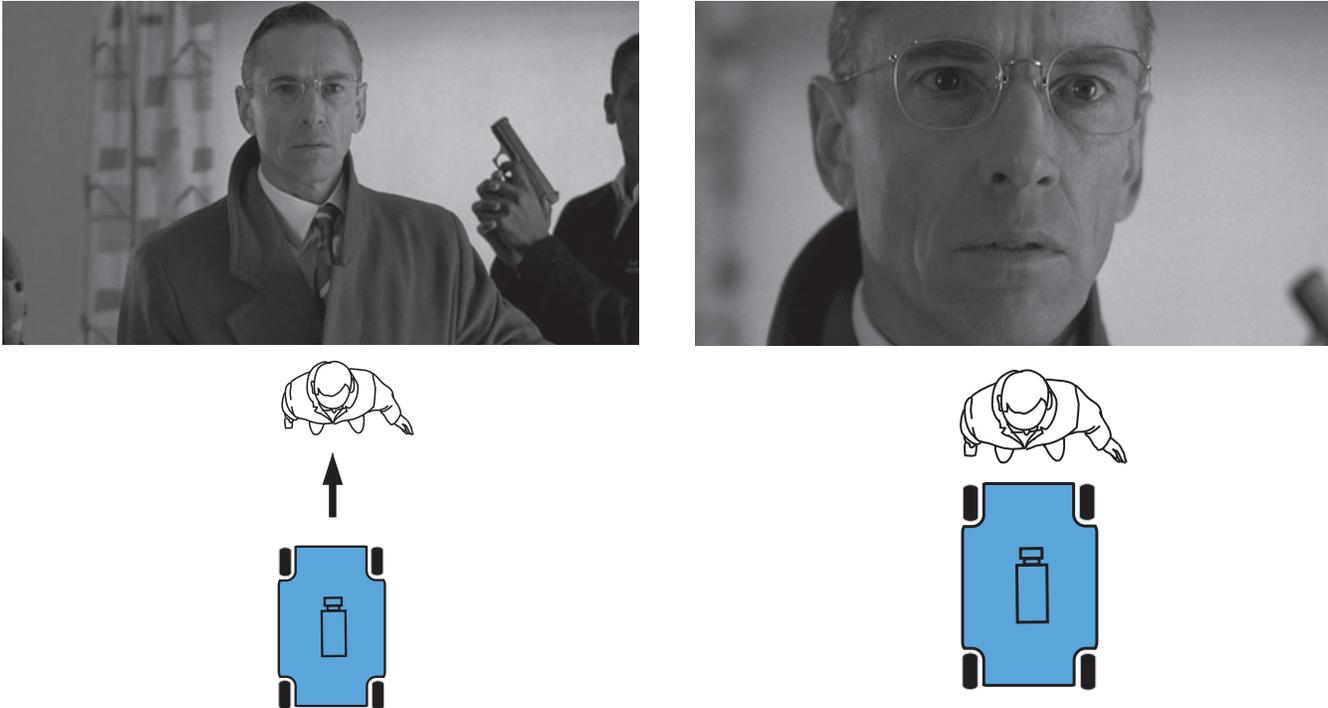
■ **Figure 3-34** Tracking is when the camera follows a subject as it moves. Tracking shots can be accomplished with dollies, wheelchairs, vehicles, handholding the camera, or, in the case of Van Sant's *Elephant* (2003), with the use of a Steadicam system.

It is also possible to move in closer or farther away from a subject while your camera remains in a stationary spot. **Zooming in** or **zooming out** requires a variable focal length lens (see Chapter 10 for details). This lens is common on DV cameras but less common on film cameras. Just as with any other move, one can *zoom from/to* subjects or *zoom with* a moving subject.

Dynamic Moves

Dynamic camera moves involve a mobile camera, which means literally moving the entire camera in space, horizontally (left or right), closer or farther (forward or backward), or even vertically (up and down). These moves can be accomplished with special camera mounting equipment or with a handheld camera.

A **tracking shot** is a term used when you move the camera in order to *follow* or *track with* a subject (**Figure 3-34**). You can *track*



 ■ **Figure 3-35** In a dolly shot, the camera is moved away or closer to a stationary subject. In this example, from Demme's *The Silence of the Lambs* (1991), a dolly-in move was used to underline the dramatic moment in which Jack (Scott Glen) realizes they've just seized the wrong house and put Clarice (Jodie Foster) in grave danger.

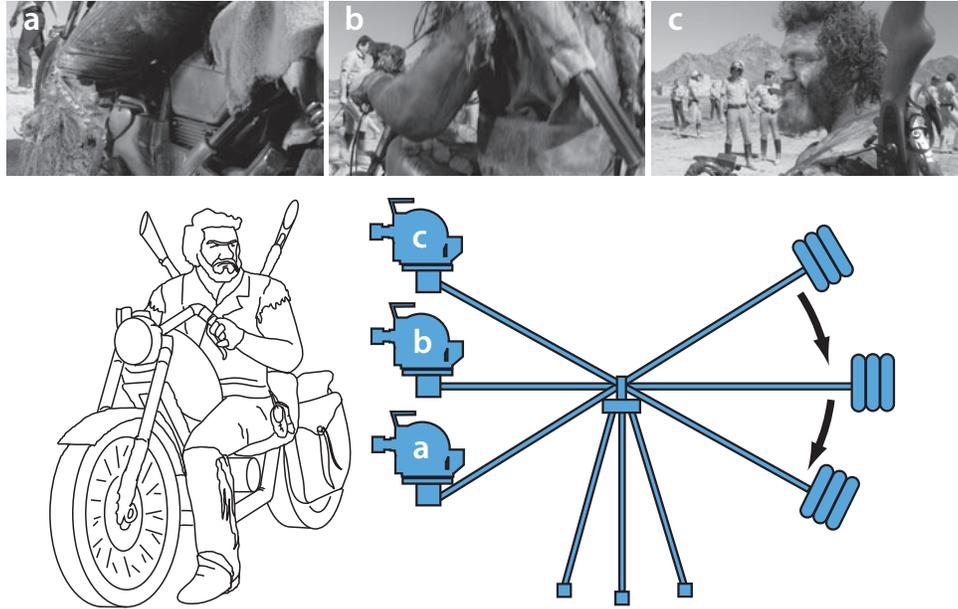
left, right, forward, or backward to follow along with the movement of your subject. Gus Van Sant's film *Elephant* (2003) makes frequent use of long tracking shots, following characters as they walk through the hallways of their high school. Tracking shots can also be from/to shots. **Dolly shots** are generally moving shots in which the camera moves closer or farther away from the subject (Figure 3-35). To *dolly-in* or *dolly-out* means to move the camera closer to or farther away from, respectively. Dolly, however, is a slippery term because it also refers to the wheeled apparatus on which we mount the camera to move it. We can certainly move a camera closer or farther away from our subject without using a dolly, for example, with a handheld camera. So you'll also hear people say *push-in* or *pull-out* for this camera move, especially when an actual dolly isn't being used.

Lifting the camera up and down is called **booming** (*boom up* or *boom down*). This can be done with a handheld camera or mechanically with a boom or jib arm (Figure 3-36). A **crane shot** is one in which the camera is raised very high in the air, certainly above a human subject's head. This usually requires a special, and expensive, piece of equipment called a crane. The specific equipment and techniques used for dynamic camera moves are discussed in more detail in Chapter 11.

All of these moves—pans, tilts, dolly, tracking, booming, and zooming—are often combined. For example, following the trajectory of a helium balloon just as a child lets go of it would require panning and tilting simultaneously—one might even want additionally to zoom in. Executing more than one move at a time is referred to as a **combination move** and is very common.

The Moving Frame and Perspective

Although the general directions of the frame shifts are similar (i.e., left to right or up and down), there is a big difference between stationary camera moves (pans and tilts) and dynamic camera moves (dolly, track, and boom). Think of the camera as essentially the seat from which an audience member views the world of your film. With pivoting camera moves this perspective point of reference remains fixed. Panning or tilting the camera is

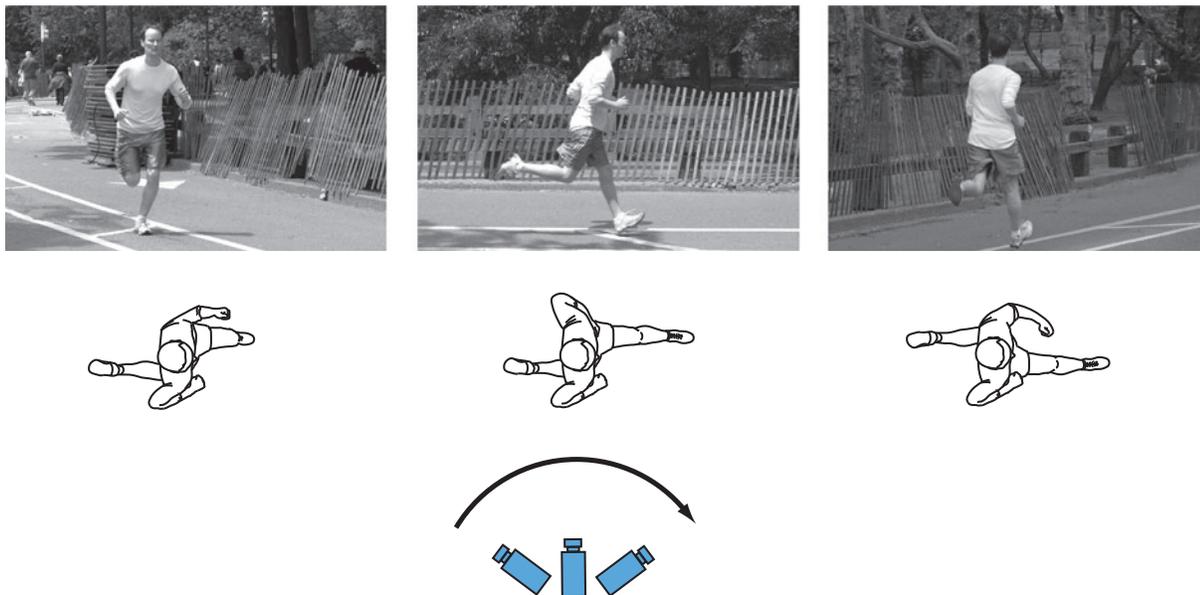


 **Figure 3-36** This boom shot, from Coen's *Raising Arizona* (1987), reveals the bounty hunter Leonard Smalls (Randall "Tex" Cobb) from boots to beard. The camera move not only scans his arsenal of weaponry but also emphasizes his fearsomeness.

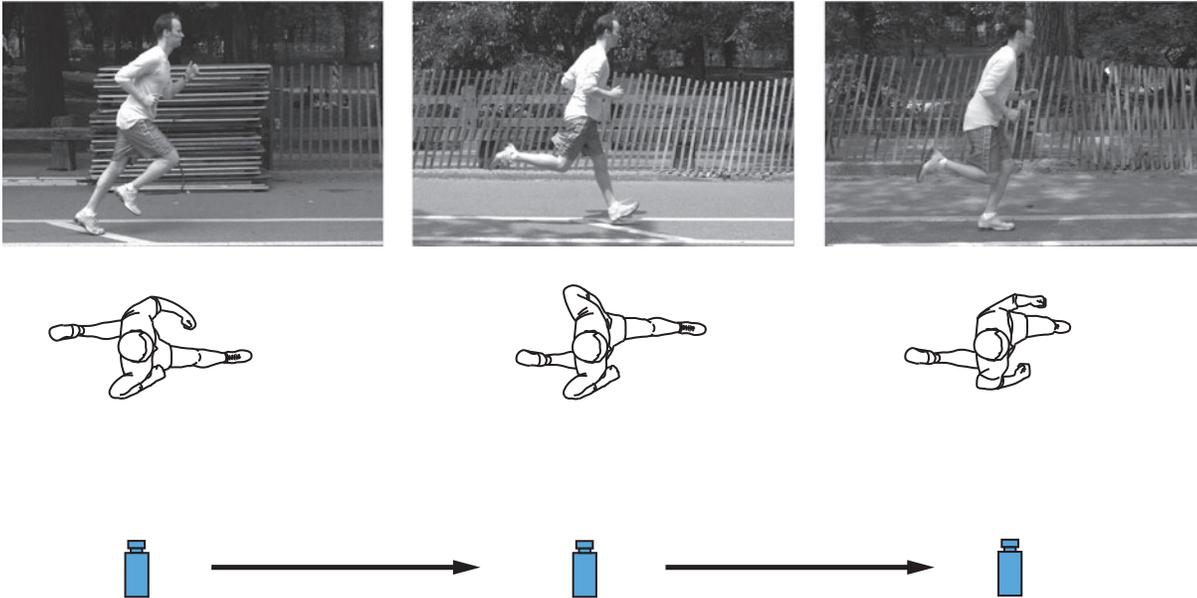
the equivalent of placing the viewer in one spot and then having them turn their head left and right or up and down. Their viewer's seat becomes the pivot point as they scan the world horizontally or vertically. With a mobile camera, you are essentially moving the viewer's seat through the space of the fictive world of the film. This makes for an extremely dynamic feeling of traveling through space.

Here's an example of the difference. Let's say we are filming a runner, jogging down a street. First, let's shoot the run with a follow pan, placing the camera at the halfway mark along his path (**Figure 3-37**).

The beginning of the shot is quite frontal, looking into the runner's face. When he hits the midpoint mark, directly in front of the camera, he will be seen in profile and, continuing,



 **Figure 3-37** In a pan, a subject is seen from different angles from a stationary point as the shot progresses. In this example, the runner is facing the camera at the beginning of the shot and is seen from behind at the end of it.



 ■ **Figure 3-38** Here the camera tracks with the runner, maintaining a consistent profile angle.

when he reaches the end of his path, we will be looking at his back. It's the perspective of a stationary spectator—as if we were sitting on a bench watching him run past us.

Now, let's go back to the beginning of the runner's path and shoot his run with a tracking shot (**Figure 3-38**). We begin alongside the runner, in profile, and as he moves, our camera tracks along with him. As he reaches the midway point and then the end of the path, the runner remains in profile all the way because we have been following parallel to him. In this shot, the viewer, like the camera, is a runner too, a participant—moving through space just like the runner.

 For video examples of pivot and dynamic camera moves, go to the video and interactive figures tab on the *Voice & Vision* companion website. You can review: pan and tilt (follow and from/to) interactive **Figure 3-28**; track, dolly, and boom interactive **Figures 3-34**, **3-35**, and **3-36**; and panning versus tracking comparison interactive **Figures 3-37** and **3-38**.

Motivation and the Moving Camera

Camera moves can look very cool, and because they do, they are one of the most over-used techniques in film. Your film, after all, should be about what happens to the characters and not about what's happening with the camera. So like all film techniques, you need a good reason to employ a moving camera. Camera moves should be **motivated** in two ways. First, conceptually speaking, a camera move must have a narrative function, meaning that it serves as an important storytelling technique. If it is included just because it looks snazzy, then it will be a distraction rather than an enhancement. Second, the moment the physical camera move actually begins needs to be motivated within the scene.

Narrative Motivation: Reveal, Conceal, or Dramatic Punctuation

A camera move, whether it's a pan, track, or zoom, is a promise—it promises the viewers that they are going to get a new piece of information, a new perspective, or a new understanding by the end of the camera's little trip. Let's say we're shooting a wide shot of a mountain range and we pan right; the pan promises the viewer that we'll see something in addition to those mountains: maybe the pan reveals a forest fire raging on the south slopes or maybe a cowboy comes into view in the foreground, or perhaps the pan of the mountains goes on and on and on and the move reveals that our character is surrounded by mountains on all sides. But if you just pan from some mountains to a few more mountains and the

move accomplishes nothing more than a static shot would, then the move breaks its promise of showing something else, and it is considered an unmotivated move. Although camera moves are often used to **reveal** new (and sometimes startling) information within a single shot, they can also be used to **conceal** actions and details for dramatic effect. What, how, and when you reveal or conceal details are very important factors to consider when you devise camera moves of any sort (see the “Reveal and Conceal Camera Movement” box).

Short camera moves, like a short dolly-in to a character’s face or a short arc around a character can be used to punctuate an important or highly emotional moment. These shots do not change the image composition very much; rather, they infuse a little jolt of energy at critical points in the narrative. Florian Henckel von Donnersmarck’s 2006 film *The Lives of Others* revolves around East German Stasi (secret police) officer Captain Weisler (Ulrich Mühe) and his covert surveillance of a couple: the playwright Dreyman (Sebastian Koch) and his lover Christa-Maria (Martina Gedeck), an actress. Early in the film Captain Weisler starts to feel sympathetic toward the two “subversives” he’s spying on and actually com-

forts Christa-Maria at a local bar as if he were just a friendly stranger. However, later in the film Weisler is asked by his superior to interrogate her directly. Weisler knows that she will recognize him as the stranger who spoke kind words to her in her hour of despair and this recognition could put them both in grave danger. The scene is already suffused with tension, but the short dolly-in electrifies the exact moment he reveals himself to her in his official capacity as a Stasi officer (Figure 3-39). Notice also that as the camera pushes in, Weisler does not make eye contact with Christa-Maria until the very end of the movement, thus motivating the cut to her reaction.



■ **Figure 3-39** The short dolly push-in underscores a particularly dramatic and pivotal moment in a scene from von Donnersmarck’s *The Lives of Others*.

Move Motivation

The moment the camera begins to move also needs motivation within a scene. A move that begins arbitrarily can feel artificial and make the camera apparatus itself very apparent to viewers, causing them to become aware of the filmmaker manipulating the world of the film. Camera moves can be motivated by the physical movements of a character or even simply by their gaze. In the example from Cocteau’s *Beauty and the Beast* (Fig. 3-33 top), which was photographed by the inimitable Henri Alekan, the pan-with is motivated by the movements of Beauty who crosses from the door to the window prompting the camera to follow her. Narratively speaking, the purpose of the pan is to reveal more detail of the Beast’s castle, particularly Beauty’s room at the castle. During the pan we see that this is a magical place; with mist and flora obscuring walls and ceiling this is neither inside nor outside, but more like a fantastical dream space. The pan-to example from the same figure (Fig. 3-33 bottom) is from the scene where Beauty sees the Beast for the first time. The physical pan move is motivated by her seeing something off screen and the move follows her gaze to reveal the Beast. In cases like this we say that we “pan off her look.” The purpose for a pan like this is to place the camera, and therefore the viewers, closer to the subject’s point of view—we see what she sees because it is the force of her gaze that moves the camera.

■ CAMERA MOVEMENT: THE REVEAL

The 2009 film *Creation*, directed by Jon Amiel and shot by Jess Hall, is about Charles Darwin as he struggles to complete his life's work *On the Origin of Species*. Although he believes absolutely in the scientific evidence of his theory of evolution, his inability to reconcile the death of his beloved daughter Annie with the brutal natural cycle of survival of the fittest, which he is espousing, has caused serious trauma to his health and his ability to complete the manuscript. The opening frame of this scene shows Darwin alone, procrastinating with research he doesn't really need to finish his book, but as the camera dolly-arcs around him (frame right), it reveals another figure in the room with him—the spirit of his deceased daughter. This small perspective shift effectively moves us right into Darwin's psyche. At first, Annie remains out of focus, but as Darwin shares deeply personal thoughts with her, she comes into sharper focus. Through this surprising dolly “reveal,” Amiel manages to imbue a flesh-and-blood actor with the aura of an apparition who has just appeared, conjured by Darwin's troubled mind (Figure 3-40).



■ **Figure 3-40** A subtle dolly-arc to the right in Amiel's *Creation* serves to reveal the presence of Darwin's (Paul Bettany) deceased daughter Annie (Martha West) in such a way that we understand her to be an apparition from his imagination.

■ CAMERA MOVEMENT: THE CONCEAL

Camera moves that conceal space or action have been used since the very early days of cinema primarily to conceal a violent or sexual encounter that might run afoul of the censors. We've all seen it. A man and a woman enter a passionate embrace, kiss, and recline onto a bed as . . . the camera pans away to the window where a thunderstorm is raging. Quentin Tarantino and his director of photography Andrzej Sekula slyly wink at this tradition in *Reservoir Dogs* (1992). In this scene Mr. Blonde (Michael Madsen) has been dancing and taunting a captured cop with a straight edged razor. We know he'll use it, we just don't know when. The buildup to the horrific moment when Mr. Blonde moves in to slice off the officer's ear is nearly unbearable, but when the act finally happens, Tarantino dollies left, away from the action, to show a doorway with a sign along the top that reads, “watch your head.” The conceal is humorously coy for a director who obviously has no qualms about showing graphic blood and brutality, and the sign above the door encourages us to chuckle at the little joke, but we also know that a man's ear is being sliced off. With this ironic, concealing camera move Tarantino reduces the gore but exaggerates the sadism of the moment (Figure 3-41).



■ **Figure 3-41** This dolly-left in Tarantino's *Reservoir Dogs* serves to conceal the physical torture in this scene, yet manages to emotionally amplify this horrifically violent moment.

■ RATE OF MOTION

Beyond the basic elements of the cinematic language that I've outlined earlier, there are numerous customized techniques and special effects that films use for a dramatic purpose; certainly, I cannot cover all of them nor does their specialized nature qualify them for inclusion in a chapter on the essential film language. However, there is one special effect that has been so common throughout the history of cinema that it warrants mentioning here—the manipulation of the rate of speed either faster or slower than “normal,” namely **slow motion** (or overcranking) and **fast motion** (or undercranking). Shooting slow-mo or fast-mo footage is accomplished by changing the frame rate on your camera: a faster frame rate than the standard 30 (or 24) frames per second creates slow motion. The faster the frame rate the slower the motion becomes when played back at the standard 30 (or 24) fps. Conversely, shooting at frame rates slower than 30 (or 24) fps creates fast motion. I discuss the technical details of this effect on pages 191–192. It is true that one can achieve a slowing or quickening of a shot in postproduction by changing a clip's playback speed, but this is never quite as successful as using variable frame rates in camera.

Slow Motion

Slow motion is an extremely versatile and powerful technique when used at just the right narrative moment and, of course, in moderation. Because slow motion prolongs what would otherwise be a brief moment, it is commonly used to create narrative emphasis, replicate a character's emotional subjectivity, or create a protracted reaction in the viewer.

In the iconic “Dawn of Man” sequence from *2001: A Space Odyssey* (1968) Kubrick uses slow motion for the crucial moment when the man-ape Moonwatcher discovers that a bone can be used as a bashing tool generally and a weapon specifically. The slow motion in this scene clearly underscores the brutal power of the tool and the sense of dominance

that Moonwatcher experiences at this discovery; however the technique also adds majesty to a pre-historic moment that represents an enormous evolutionary leap forward in intelligence (**Figure 3-42 top**). Judging from its speed, this shot was likely shot around 120 fps (instead of the normal film rate of 24 fps).



that Moonwatcher experiences at this discovery; however the technique also adds majesty to a pre-historic moment that represents an enormous evolutionary leap forward in intelligence (**Figure 3-42 top**). Judging from its speed, this shot was likely shot around 120 fps (instead of the normal film rate of 24 fps).

Slow motion technique is also commonly used to create psychological emphasis and insight, particularly when the extended moment is shown from a character's point of view. Wes Anderson's *The Royal Tenenbaums* (2001) employed this very common device when Richie, waiting at the docks to reunite with his adopted sister Margot, finally glimpses her getting off the bus. As he watches her walk to him, time seems to slow down and without using a single word or voice-over explanation, we “feel” what he must be feeling—the unrequited love he holds for Margot is washing over him. What would have been an instant in real time becomes, in film time, a protracted and indelible moment of subjective emotional sensation (**Figure 3-42 center**).

More complexly, slowing time can also immerse the audience into a layered narrative dimension which opens up the possibility for thematic reflection in the moment. The final scene in *Women Without Men*, Shirin Neshat's 2009 film about the struggles of four women during the 1953 coup d'état in Iran, shows one of the central characters, Munis (Shabnam Toloui), falling from a rooftop to the street below in extreme slow motion. During this stunning and greatly extended fall through the air, Munis calmly contemplates,

■ **Figure 3-42** Slow motion moments in Kubrick's *2001: A Space Odyssey* (top), Anderson's *The Royal Tenenbaums* (center), and Neshat's *Women Without Men* (bottom).

in voice-over, the nature of death and destiny. As the ground slowly gets closer and closer, her fall becomes not a plunge to death but a state of grace, and the slow motion effect infuses this moment with a metaphysical dimension that speaks to the experiences of all four women represented in the film (**Figure 3-42 bottom**).

Fast Motion

Fast motion, the condensing of time, is used far less frequently, but when it is used it often adds comment or humor to an activity that would ordinarily take much more time.

Stanley Kubrick, again, gives us a classic example of this technique with his fast motion sex scene from *A Clockwork Orange* (1971). Kubrick used an extremely slow filming frame rate to greatly accelerate Alex's sexual encounter with two girls he picks up in a record shop. This super fast motion sex scene, hilariously underscored by a campy version of Rossini's *William Tell Overture*, effectively erases all possibility of prurience or voyeuristic titillation and the scene becomes a caricature of the sex act—so ludicrously perfunctory as to be farcical. Malcolm McDowell said that the actual scene was performed in a 28-minute, unbroken shot.³ Given that the resulting scene takes about 45 seconds (at 24 fps projection), it is evident that Kubrick must have been using a frame rate around 1 or 2 fps (**Figure 3-43 left**).

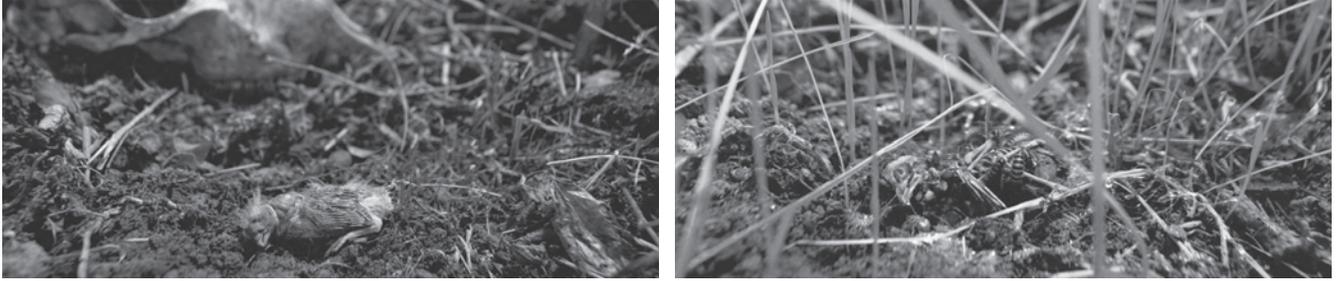
Like slow motion, fast motion is also effective at duplicating the subjectivity of a drug altered mind, as seen in Darren Aronofsky's *Requiem for a Dream* (2000) which follows four New Yorkers as each, in their own way, succumbs to the seductive and destructive influence of drugs: prescription and illegal. Whether following a middle-aged woman popping diet pills, a stoned young woman creating fashion designs, or a group of friends at a cocaine-fueled party, Aronofsky immerses the viewer into the warped, hyperdrive perspective of characters under the influence by accelerating actions through fast motion shots (**Figure 3-43 right**).

The extreme end of fast motion is **time lapse photography**. Actions that occur over long stretches of time, like a sun setting, or a plant growing to maturity, are condensed into seconds by taking images at extremely slow rates (like 1 frame every 45 seconds). Time lapse is not particularly common in narrative films, but it can be effective when you need to show, in very abbreviated screen time, an unbroken process that requires many hours. A thematically rich example of time lapse use can be seen in Jon Amiel's film *Creation* (2009), which chronicles Darwin's personal struggles finishing his magnum opus, *On the Origin of Species*. The scene shows a newly hatched bird chick accidentally fall from its nest. Unable to fly or eat it dies, and Amiel then uses time lapse to show the dead chick's complete physical decomposition in 22 seconds. In this time we witness both insects and plants feeding from the carcass (**Figure 3-44**). This moment not only succinctly illustrates



■ **Figure 3-43** Fast motion technique in Kubrick's *A Clockwork Orange* (left), and Aronofsky's *Requiem for a Dream* (right).

³ *Love and Death in Kubrick* by Patrick Webster (appendix 16: A Kubrick Miscellany).



■ **Figure 3-44** Time lapse photography in Amiel's *Creation* collapses a week-long process into 22 seconds.

the natural cycles of organic conservation of matter, it also reveals the harsh cruelty inherent in the principle of natural selection.

■ CONCLUSION

It is essential that anyone hoping to tell stories with moving images develops a deep working appreciation for the concepts of *mise-en-scène* and *montage*, because it is here where we truly connect with an audience on the level of story information, meaning, and emotion. In addition, being aware of the expressive power of camera angles and camera moves allows one to conceive of shots, sequences, and scenes that are narratively and emotionally eloquent. When it comes to the aesthetics of the frame—still or moving—we have only laid the groundwork in this chapter. There are many factors that contribute to the graphic qualities of your images—for example, choice of imaging format, lens selection, camera support, lighting design, exposure, and the physical location to name a few. It's all integrated, and these aesthetic tools will be discussed throughout the chapters of this book.

Organizing Cinematic Time and Space

■ SINGLE-CAMERA PRODUCTION AND THE CONTINUITY SYSTEM

Whether you are shooting on celluloid film or digitally, fictional narrative movies are generally shot using a single camera. This enables productions to be extremely mobile and to go to any location required by the script, as opposed to multicamera and control room productions like sit-coms and soap operas, which are produced in a studio. Single-camera shooting also allows the energy and expertise of the director and the entire creative team to be focused on each and every shot in the movie. Finally, shooting single-camera gives us maximum versatility in editing, because the film has been broken down into its smallest component parts—individual shots—whose intended sequence can be creatively rethought and rearranged throughout the postproduction process to improve the film.¹

The scenes and shots of a narrative film are rarely shot in the order in which they appear in the script or in the final film. Because of the expense, time, and labor involved in film production, a script is divided and rearranged according to major locations, camera angles, and, finally, shots, and the actual shooting order is organized primarily for efficiency (see Chapter 5). This means that scenes, sequences, and even specific actions are often divided into different pieces and are shot at different times. **Continuity-style shooting and editing** is a system that assures us that individual shots, when cut together, will give us the illusion of smooth and continuous time, movement, and space, regardless of the order those shots were taken. The continuity system has been devised to present a scene without any confusion about the spatial and temporal relationships of people, objects, and actions. Also, the hallmark of continuity style is to render each edit, the link from one shot to another, as seamlessly as possible. Although the principles of the continuity system can, at first, seem a bit like a needlessly complex jigsaw puzzle, they are, in fact, quite simple and can be mastered with relatively little shooting and editing experience.

■ PRINCIPLES OF CONTINUITY STYLE

Any discussion about the continuity system necessarily concerns both shooting principles and editing principles (there is no way to separate the two); therefore, the requirements of the editing process must be acknowledged in the shooting process. In other words, a director needs to get more than just a collection of great-looking shots; directors need to get shots that will work together in the edit.

Let's start with two shots connected by one single edit. We want to cut shot A with shot B as seamlessly as possible. Invisible edits are the traditional goal of continuity style. Shot A is a long shot (LS) of two men at a chess table in the park starting a game of chess. Shot B is a medium close-up (MCU) of the player with the white pieces making his first move and hitting the clock (**Figure 4-1**).

¹ There are some exceptions to this practice. Spike Lee's *Bamboozled* (2000), for example, was shot with as many as ten DV cameras simultaneously, but this is rare, even within the oeuvre of the director. Also, big action sequences that cannot be duplicated, like the spectacular train wreck in Andrew Davis' *The Fugitive* (1993), are often shot with multiple cameras from different angles.



■ **Figure 4-1** A simple edit. Cutting from a long shot (a) to a medium close-up (b).

Because shooting a movie can take a long time, it's not uncommon that two shots like these might not be shot one right after the other. Perhaps after we shoot the LS, we decide to break for lunch and shoot the close-up (CU) one hour later. Maybe during lunch our actor becomes ill and needs to go home. A week later he's better and we return to the park to get the CU. To assure that these two shots cut together seamlessly, no matter when they were shot, our first consideration is that the shared visual and aural characteristics in each shot remain consistent.

Continuity of Mise-en-Scène

Costume, Props, Sets, and Lights

The clothes our character wears, the things he touches, and his surroundings need to remain the same from one shot to the next. For example, our actor is wearing a necklace in the LS, but if he removes it during lunch, he might forget to put it back on when shooting commences. Cutting from an LS with necklace to a MCU without a necklace will break continuity.

Consumable props and set pieces can also cause difficulty. Cigarettes that are short in one shot but longer in the next, or a glass of milk that is half empty in the master shot but is suddenly full again in the CU, or a candle that is tall in the master but just a stub in the CU—all of these discontinuities are common problems and avoiding them requires sharp eyes and lots of extra props on hand. In the case of our chess player, the clock needs to be watched carefully. If it starts out showing five minutes but in the one cut it's down to one minute, then the illusion of continuous time is broken in a very literal way. For exactly this reason, you must be careful of clocks that appear in the background of shots. You can easily find yourself cutting between 10 a.m. in LSs and 3 p.m. in CUs.

The angle and quality of the light in shots A and B must also be consistent if you want to edit these shots together and create the illusion of continuous time. We might be able to shoot an hour later, especially if the chess table is in the shade of a tree, but we wouldn't want to shoot these two shots too far apart in the same day. If the sun is overhead in the master shot but it is setting in the CU (creating long shadows), then continuity will be broken and the shots won't cut. The angle of the sun is not just a concern for exterior scenes. Let's say you shoot your first shot in an interior space with the sun streaming in through the windows, but when you finally get around to the CU the sun has moved to the other side of the house or clouds have moved in. This is why it's common practice to block windows and then re-create the sunlight streaming in. If your "sun" is a 2,000-watt light on a stand, then that's a sun that'll never set. But even when using all artificial lights, you often tweak and rearrange a few lighting instruments between shots, so you need to remember to be consistent with lighting angles, exposures, and colors from shot to shot.

■ NOT LOOKING

One of my students was shooting a film and took a break between an LS and a CU to solve an unrelated logistical matter. During the break, the actor decided to go over his lines and put his glasses on to read the script. When shooting recommenced, he got into position for his CU and didn't even think about taking his glasses off. He had forgotten, and no one else noticed either, that he wasn't wearing his glasses in the LS. So in editing, the student was unable to cut to the CU without breaking continuity.

■ NOT THINKING

Another story from a student shoot happened on an advanced thesis project. The art department team had done a beautiful job creating just the right look for a kitchen scene, including placing a lovely bowl of fruit on the dining table. During the crew's lunch break, however, no one noticed that one of the production assistants, someone with very little filmmaking experience, decided to augment the crew meal provided by the producer with a few pieces of fruit from the set! Ultimately it wasn't a disaster—it was possible to cut around the missing bananas and grapes—but this does make a good case for using plastic food as set dressing and being careful whom you allow onto your set.

As much as we all try to maintain continuity as perfectly as possible, many films still have this sort of continuity error. In fact, there are dozens of “blooper” books dedicated to spotting, say, the stick that disappears and reappears in the reverse shots in *My Own Private Idaho* (Figure 4-2). But tiny continuity gaffes like this are often overlooked if your story is engaging, your performances are good, and the rest of your continuity technique is solid. The truth is, most people don't look for the little stuff if they're engaged in the drama of your film. However, glaring continuity errors can pull the audience completely out of the story. I remember the murmurs and chuckles in the theater during the opening chase scene in *New Jack City* (1991). The chase between Scotty and Pookie starts on a beautifully sunny day, not a cloud in the sky, but in one edit, as Pookie leaps over a fence, everyone on the street is suddenly holding umbrellas to shield themselves from the steady rain. No matter how exciting the chase is, it's hard to overlook a continuity error that big.

On a professional set, the **script supervisor** is responsible for keeping track of these continuity concerns, but small productions and student films rarely have a dedicated script supervisor, so it is important for everyone on the set (especially actors, the director, the cinematographer, and the art director) to be as vigilant and perceptive as possible to maintain the continuity of these *mise-en-scène* details. Digital playback can be a great help for continuity of shot content. If you break before completing all of the shots in a continuity sequence, simply review the footage of the master shot to remind yourself of what was in the scene, where it was, and how people moved.



■ **Figure 4-2** Continuity of *mise-en-scène*. In this shot/reverse-shot sequence from Van Sant's *My Own Private Idaho* (1991), the stick in Mike's (River Phoenix) hand (*left*) disappears when we cut to Scott (Keanu Reeves, *right*). Small continuity gaffes like this one are common, but audiences rarely notice them if they are fully engaged in the drama of the film.

Continuity of Sound

If you are shooting a film with sound, then the shared aural universe between shots A and B also must be consistent. This is especially difficult when it comes to ambient sound. **Ambient sounds** are the sounds that exist naturally in a given location. If you're at the beach, the ambient sound might include breaking waves, seagulls, and kids playing. However, the human perception of sound has developed such that we unconsciously ignore or "filter out" a lot of ambient sound and "focus" our ears on important sounds. This is a great ability for maintaining one's sanity, but it can be a disaster for the aural continuity of a film.

Let's say that all was quiet in the park when we took shot A and recorded our chess players' dialogue, but while we were setting up for shot B the grounds crew decided to trim the grass with a weed-wacker, or maybe a jet airplane is flying overhead at precisely the moment you shoot shot B. These are sounds that we can easily miss at the time, but they will break the illusion of continuous time when you cut the relative silence of one shot right next to the buzz of an off-screen weed-wacker in the next. For this reason, sound recordists are trained to hear absolutely everything in their environment, the same way a cinematographer observes everything in the frame. Many shots have been halted by a sound recordist who hears a plane flying overhead. There are ways to "fix" continuity sound problems, but fixes often involve time, money, and compromises. It's best to try to maintain the best possible sound match between the shots—so you should wait for the plane to pass before running the camera, or in the case of the weed-wacker, maybe it would be a good time to break for lunch and shoot the MCU when the gardeners are done trimming. Issues concerning continuity and audio recording, editing, and mixing are discussed in detail in Chapters 16, 17 and 23, respectively.

Continuity of Performance, Actions, and Placement

If we are to cut shot A seamlessly with shot B, then the *placement* and *physical actions* of our performer must be consistent. Our character moves the king's pawn with his left hand in the LS, so he must move the same chess piece with the same hand in the MCU, if we are to successfully cut in that spot. This ensures that the visible actions in the two shots match. Also, our character is sitting upright with his right hand in his lap in the LS, so he cannot be leaning forward, resting his chin in his right hand in the MCU. Cutting these two shots together would make us feel like there was a chunk of film missing, the chunk in which the character leaned forward in his seat to prop his chin in his hand.

Performance pace is another factor to keep in mind for continuity. If our character in shot A is in a hurry—makes a quick move and hits the clock, BAM!—but is leisurely in the CU, then it will seem strange that his pace has switched so abruptly, making the separateness of the shots very apparent. Also, the *emotional intensity* of a performance must be consistent from shot A to shot B. This can be very difficult to gauge, especially if a lot of time has elapsed between the various takes. Perhaps in shot A the actor is projecting a sense of chess mastery and confidence when he faces his opponent across the table. But during lunch he decides that his character at this point in the script should be fearful of his opponent and petrified to lose this game in public. Cutting directly from a man exuding confidence to a trembling, fearful wreck will break emotional continuity and confuse the audience. This sort of performance consistency issue is especially difficult when you are recording dialogue. The emotional range of the voice is very wide and it can be tricky to maintain consistency from shot to shot and day to day. Experienced film actors understand all of these issues and are trained to keep their performance consistent.

Spatial Continuity and the 180° Principle

Spatial continuity is a crucial tenet in the continuity system. For the viewer to understand the physical space of the scene and the relationships between characters and objects in that space, we need to maintain coherent and consistent spatial orientation. Spatial

orientation begins with the **180° principle**, which, in basic terms, means that we must shoot all of the shots in a continuity sequence from only one side of the action. In other words, when we begin shooting an action from one side, we cannot place our camera on the other side of that action for subsequent shots, or else the orientation of our characters and their actions (in fact, the perspective of the viewer) will be reversed and the shots will not cut together seamlessly.

Let's say you're watching a chess game and the man playing with the white pieces is to your left. When he looks at his opponent, he faces left to right. The opponent playing the black pieces is to your right—he faces right to left. When white makes the first move it is from left to right, and black's first move is from right to left. This is your spatial orientation from your side of the table. However, for the onlooker who is watching the game from the other side of the table, across from you, everything is reversed. White is to the right, looking and moving from right to left. When we make a film, the camera is the spectator, and to shoot this scene we cannot take some shots from one side of the table and others from the opposite side because that would reverse both the direction of the moves and the direction the players' faces.

To understand and utilize the 180° principle, we draw an imaginary line along our action—called the **180° line** (also called the **axis of action**) (Figure 4-3). We draw this line following the directional bearing of our subject, which is the direction a character is looking, called their **sightline**, or the direction the character travels in the frame, called their **screen direction**. The 180° principle tells us that, to maintain consistent sightlines and screen direction, all shots used in a sequence must remain on one side of the line, giving us a 180° arc where we can place our camera. Crossing the 180° line with the camera reverses both looking and moving directions of our subject and breaks spatial continuity.

If we shoot our LS from the near side of this line, then the viewer's perspective is defined by the man playing white facing screen right (shot A). To maintain this orientation, we must stay on the same side of the line for the MCU (shot B). If we place our camera anywhere on the far side of the line to take our CU, the sightline of the character and the orientation of all actions will be reversed. This is called **jumping the line** (Figure 4-4).

Notice in shot C that our character now suddenly faces screen left and the chess move, which we anticipated going from left to right, is now going from right to left. This shot will not cut with the first shot without causing spatial confusion for the viewer. The viewer might think that the players, for some reason, suddenly changed places or the edit could be construed, perhaps, as moving us forward in time, hours later, after the two players have switched positions. In addition to the direction reversal of the action, the total shift in background and the position of the clock will also throw off the illusion of continuous motion.

Keep in mind that we could have equally chosen to shoot our LS from the opposite side of the line, meaning that our character would be facing screen left, but then the CU would also need to be shot from that side of the line of action. It doesn't matter which side you choose; what matters is that you are consistent with all of the shots that make up a continuity sequence.

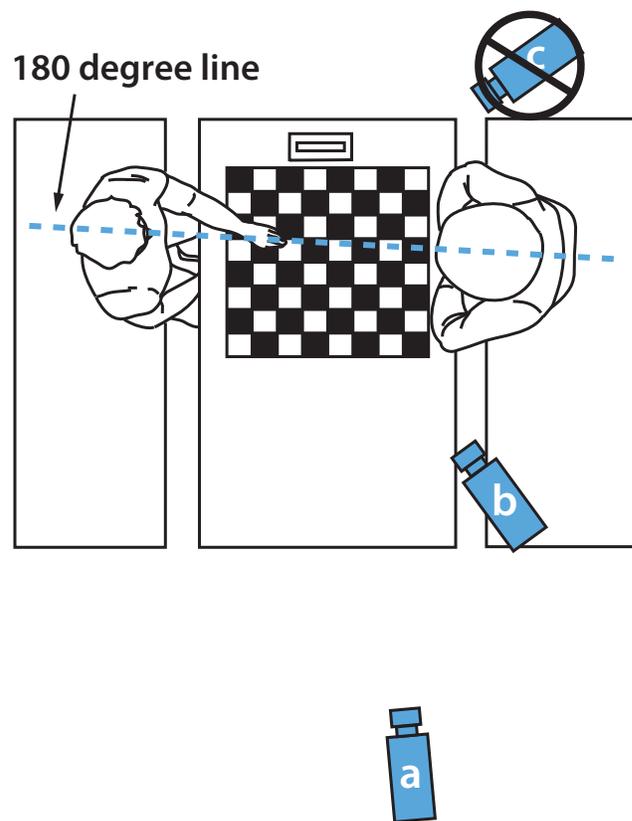


Figure 4-3 Overhead of shots (a), (b), and (c). Character sightlines establish the 180° line of action and shot (a) establishes on which side of that line all shots must remain. Shot (c) crosses the line, effectively reversing all sightlines and movements and potentially causing spatial confusion (see Fig. 4-4).



a



b



c



■ **Figure 4-4** The images taken from the overhead positions in **Fig. 4-3**. Note that while shot (b) cuts seamlessly with shot (a), shot (c) will not cut smoothly with shot (a) because character positions, sightlines, and movements are abruptly reversed.

20mm/30° Rule

Now let's put a slightly finer point on invisible editing and continuity technique. When we cut from one shot of a subject to another shot *of the same subject*, we need to make sure that each shot is a distinct composition in terms of frame size and camera angle. If we try to cut together two shots of the same subject when the frames are very similar, then the viewer has the feeling that a single shot has simply lurched forward a little bit—like a battered, old newsreel with missing bits of footage. This is called a **jump cut**, and the jarring awkwardness of the edit calls attention to itself (see “Cutting on Action” later). In some instances this may be a desirable aesthetic approach (see “Style Outside the Continuity System” on page 101), but for the continuity system jump cuts like this should be avoided. The 20mm/30° rule ensures that each shot is a distinct composition. Basically, the rule tells us that in order to cut from shot A (the men sitting at the chess table) to shot B (white making his first move), we must change the size of shot B by at least 20mm and the camera angle by at least 30° from its position in shot A (**Figure 4-5**).

Although the 30° rule is easy to understand, the 20mm principle needs a little clarifying. The 20mm indicates a shift in the degree of magnification of the lens that alters the size of the subject in the frame, but since we can also change shot size by moving the camera, it's better to think about this part of the rule in broad terms. Essentially, the principle is to avoid making the sizes of each shot too similar. Notice how, going from shot A to B, I'm cutting together an LS with a CU, very different sizes. If I were to try and cut together, say, a medium long shot (MLS) with a medium shot (MS), we might get a jump cut (**Figure 4-6 c**).

Cutting on Action

Cutting on action is an effective technique for creating a smooth sense of continuous time and movement from one shot to the next. The **match action edit** means dividing a single movement between two shots in order to bridge the edit. In a match action edit,

one part of a movement is in shot A and the continuation of that movement is in the adjoining shot B. Let's say our LS includes the actions of the player with the white pieces walking into the frame, sitting down at the table, looking up and acknowledging his opponent with a nod, moving the first piece, and hitting the clock. When do we cut to the CU? Technically there are four strong edit points where we can match the action from the wide shot to a tighter shot:

1. *Match action as he sits down.* Use an LS for the first half of his sitting action, then cut to the MCU for him landing in his seat.
2. *Match action as he looks up at his opponent.* Hold the LS until he tilts his head to make eye contact, then cut to a CU as he nods to his opponent. It could be a very small movement, but it's all we need for a smooth edit.
3. *Match action as he makes his first move.* Stay with the LS until he touches his first chess piece, then cut to a CU as he pushes it forward.
4. *Match action as he hits the clock.* Stay on the LS as he reaches for the clock, then cut to the MCU on the second half of that motion when he actually taps the button.

Action Overlapping

The ultimate decision for where to cut depends on the dramatic emphasis of the scene, meaning that we need to think about why we are drawing the audience closer to the character at this precise moment, but technically speaking it should be obvious that in order to cut any of these actions we need to overlap or duplicate these action points when

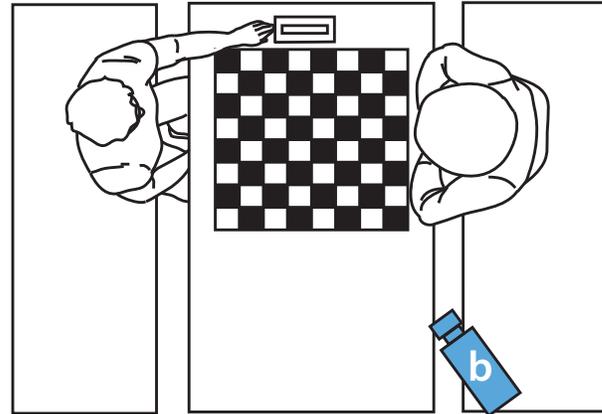


Figure 4-5 The 20mm/30° rule. Two shots of obviously different sizes and angles such as shot (a) (LS profile) and shot (b) (CU three-quarters) cut together smoothly, but two shots that are nearly identical, such as shot (a) (LS profile) and shot (c) (LS shifted slightly to the right), will cause a jump cut.



a



b



c

Figure 4-6 The images taken from the overhead positions in Fig. 4-5. Shot (b) will cut seamlessly with shot (a), but shot (c) creates a jump cut.

we shoot each shot. If we decide to cut to the CU of the clock when the man with the white pieces hits it (as in **Figure 4-6 A and B**), then we shoot that entire action in the LS and duplicate the action again in the CU. Doing this allows us to edit anywhere along that action. We can cut on white reaching for the clock, or when he hits the clock, or when he pulls his hand back. Going into production, directors should have a sense for where they might want to cut, and shoot ample footage of shared actions so that, in the edit, there is a range of cutting possibilities.

In our chess player example, however, the possible edit points (1 through 4) are so close that I would probably choose to shoot the entire thing in the LS (walking in, sitting, acknowledging, moving, tapping clock) and then repeat the actions, from sitting to clock, in the MCU. That would allow me even more flexibility in the editing room. Technically speaking, wherever we edit, we must be careful to make the cut such that the action is matched precisely. Be careful not to accidentally duplicate some part of the movement in both shots, thereby creating double motion or eliminating a chunk of the motion, even just a few frames. Both cases will lead to an awkward edit that calls attention to itself.

■ INVISIBLE EDITS BY CUTTING ON ACTION

A strong, tight cut on action creates such a smooth transition that it can effectively hide small continuity errors. In a scene from one of my own films (**Figure 4-7**), I shot an extensive MLS master shot of an architect at work, and then later shot the CU of her hand reaching for the telephone. When I framed the CU, I didn't like the composition—there was just a bare white wall in the background and it seemed

bland—so I repositioned the colorful pencil can on the drawing table to be behind the phone. Everyone on the set cried “Continuity! Continuity!” but I shot it anyway. I knew that by cutting on the strong action of her grabbing the phone and the relative brevity of the CU, no one would notice the pencil can jump from one side of the desk to the other. I've screened this film all over the country and dozens of times in class, and not one person has called me on this shot. That's how smooth and seamless cutting on action is.



■ **Figure 4-7** A tight cut on action can cause viewers to overlook small continuity errors, like the moving pencil can in this edit from Hurbis-Cherrier's *River of Things*: “*Ode to Things*” (1998).

Cutting on action can also smooth out transitions between shots in which the subject is entirely different. For example, what if your next shot (shot B) is not a match action edit, meaning that there are no shared actions between the two shots? What if we were to cut from the second shot (MCU shot B) to a woman at a park bench (MS) who has noticed that a game has begun? Cutting on an action—or perhaps more accurately, *cutting on movement*—in the first shot (i.e., moving the pawn) to the woman turning her head and noticing the game makes for a smoother edit than cutting together two perfectly static images.

■ SIX BASIC PRINCIPLES OF CONTINUITY

1. Continuity of mise-en-scène (shared shot content)
2. Continuity of sound
3. Continuity of performance
4. Continuity of spatial orientation (axis of action)
5. 20mm/30° rule
6. Cutting on action (match action edits)

■ SCENE STRATEGIES: PUTTING CONTINUITY TO USE

In this section we explore a range of scene and sequence constructions that work with the preceding continuity principles and that make up the fundamental visual approaches to dramatic visualization and scene structure. This is essential information for any filmmaker. One can certainly move beyond or add to these traditional methods, but these approaches are central to the expectations an audience brings to the experience of watching a film, and with these approaches one can find enormous communicative power. In fact, many great films have been made with not much more than the techniques I discuss for the remainder of the chapter.

Every concept in the following section involves the interrelationship between shooting technique (a production process) and editing technique (a postproduction process)—it is impossible to detach the two. In addition, these concepts inform both the creative approach and the production plan for your film, so they are vital preproduction concerns as well. Film is an interrelated art form; each stage of the process is intimately connected to the others.

Two-Person and Person/Object Interactions

One of the most fundamental relationships we construct within a scene is between two people, or between a person and an object, in the same space. We have, in fact, already done that with our two-shot sequence of the chess players. But let's make it a little more complicated than just one edit—let's look at a scene in which two people interact over the course of many cuts. The traditional and still most common way of approaching a two-person (or person and object) interaction is called **the master scene** or **shot/reverse shot technique**. **The master scene** consists of three basic shots that are later edited together—that is, the master shot and reverse shots of each person (or the person and the object). In addition, there is often a fourth type of shot in a master scene called a **cutaway**.

The Master Shot

The **master shot** clearly shows both subjects in the scene and defines the spatial relationship of the two to each other and to the space around them (**Figure 4-8 a**). For this reason, the size of a master shot is usually on the wide side. Often master shots are used to cover the entire scene from beginning to end and can be used as a safety shot, one that you can always stay on or cut back to if the other shots do not edit in smoothly. The side of the 180° line of action from which you choose to shoot the master shot determines on which side you must remain for your reverse shots.

Reverse Shots and Reaction Shots

Reverse shots (also called **singles**) are closer shots of the subjects in the scene, often a MCU or CU. Each time we move our camera to frame up a reverse shot, we observe the six basic principles of continuity so that the reverse shot will cut seamlessly into the master shot at dramatically motivated moments. Keep in mind that you have many possibilities concerning the size of your frame and the camera angle for the reverse shots, and these must be chosen carefully because they are central to the dramatic emphasis and style of your scene. You can shoot a reverse shot from anything between an extreme close-up (ECU) to a MS and from a frontal shot to a three-quarter back angle. A reverse shot that is

from an angle that includes a portion of the other person's shoulder or head is called an **over-the-shoulder shot** (OTS) or **dirty single** (Figure 4-8 b and c).

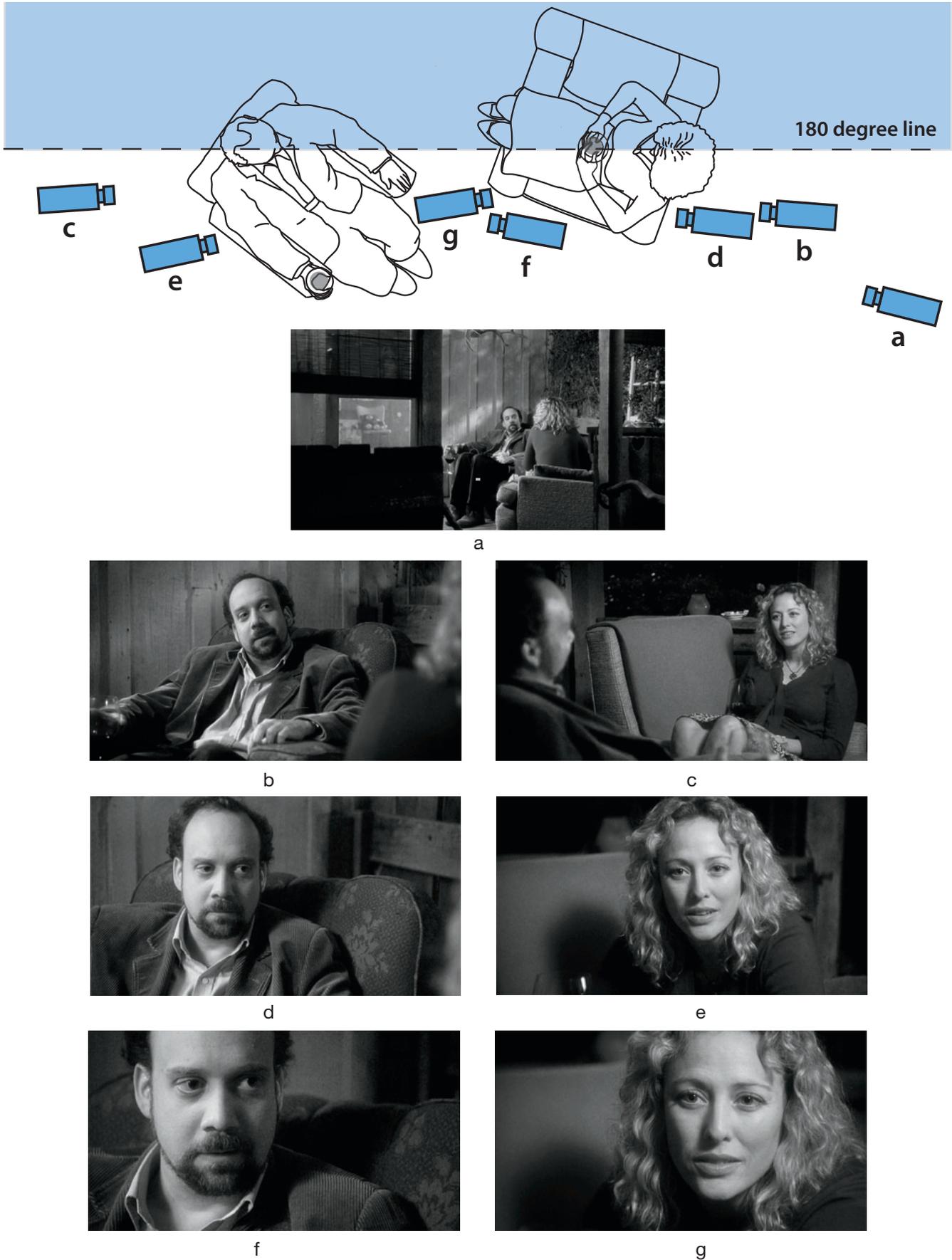
We can use the reverse of only one character in the scene or we can alternate between the reverse shots of both characters. Alternating between the two reverse shot angles is called **shot/reverse shot technique**. Reverse shots are not just about showing a person when they speak their dialogue; there are often times when we wish to see a character who is purely reacting to the moment. This type of reverse shot is called a **reaction shot** (Figure 4-8 d).

As I mentioned before, reverse shots are edited into the master shot at dramatically motivated moments—for example, when you want to draw the audience into a closer identification with one character at a particularly pivotal moment. These pivotal moments depend on your script and how the director interprets the scene. It's also important to note that you can shoot more than one reverse shot of a single character, adjusting the framing and shot size in order to change the tone of the scene or the audience's engagement with that character as the scene evolves.

The famous wine monolog scene in Alexander Payne's *Sideways* (2004) demonstrates how simple master shot technique can be used to shape the dramatic impact of a scene (Figure 4-8). The scene involves the protagonist Miles, a wine aficionado still recovering from a two-year-old divorce, who finds himself alone with Maya, a woman he is attracted to but afraid to approach. The master shot that opens the scene is very wide and reveals that they are on a porch and quite alone. Even though the master shot is close to the 180° line, it is nonetheless clearly on one side and defines the space such that Miles is looking left to right and Maya is looking right to left (frame a). This is an intimate scene, so the director chose not to stay on the master shot for more than ten seconds before bringing the audience into Miles and Maya's personal space by cutting to the reverse shots. The camera setups for all the reverse shots are also near the line of action, which means that they are frontal shots, an intimate perspective as the audience can look directly into a subject's eyes and see facial expressions clearly. The reverse shots begin as medium OTS shots (frames b and c) as Miles delivers his monologue, which ostensibly is about pinot noir but which actually reveals his soul (see page 38). Maya's response to him, however, ups the ante significantly as she subtly reveals, through her own monologue (about why she likes wine), that she is a perfect fit for Miles and is interested in him. Here, as the scene becomes increasingly personal and intense, Maya's reverse shots and Miles' reaction shots move closer with each edit until they are very tight CUs (shots d through g). Although both characters are supposedly speaking about wine, the progressively tighter framing effectively ramps up the dramatic tension and reveals the emotions that are embedded in the subtext of the dialogue.

Eyeline Matching

An additional and important principle that applies to the camera placement for reverse shots is called the **eyeline match**. More exact than the general looking direction established by the 180° line (i.e., left to right or right to left), eyeline matching means being precise with camera placement and the focus of a character's gaze so that you accurately follow that person's sightlines from shot to shot, especially in an interaction. The sightlines established in the master shot are not only traced horizontally but they are also defined vertically, especially if there is a height discrepancy between the subjects (i.e., one looking down and the other looking up). Eyeline matching involves two critical details to keep in mind when setting up for reverse shots (two characters or a character and object). The first is simple and has to do with the eyes. If you intend for there to be eye contact, the looking direction of a subject in a reverse shot must be focused *precisely* where the audience understands the other person (or object) to be. For example, if we know from the master shot that character A is standing slightly to the right of character B who is sitting, then when we cut to character B's reverse shot (especially important if it's a CU single), they should be looking up and slightly to their right. If character B is looking straight ahead or



■ **Figure 4-8** This scene from Payne’s *Sideways* cuts from a master shot, to medium close-ups (OTS), to increasingly tighter shots as the conversation between Miles (Paul Giamatti) and Maya (Virginia Madsen) becomes more intimate.



■ **Figure 4-9** Perfect eyeline matching between Wendy (Laura Linney) and a sympathetic observer in Jenkins' *The Savages*.

if there is a horizontal stray to their visual focus, then it will not appear as if B is looking at A and the shot will feel very awkward. It is remarkable how just a little discrepancy can throw off the connection and prompt the audience to feel like the eye contact is askew. This discrepancy can occur especially when you shoot singles without the other actor sitting in (i.e., shooting reverse shots after one actor has gone home or at a later date). In these cases you should have a stand-in to give the on-camera subject the correct **focus point**. In this sequence from Tamara Jenkins' 2007 film *The Savages* (**Figure 4-9**), Wendy Savage (Laura Linney) is clearly less than involved in the "two-person interaction" she is having with a married man; instead her attention wanders and eventually her gaze fixes on something off-screen where she makes a more meaningful connection—with the man's dog, Molly. Notice how clear the eyeline match is. She looks at the dog and the dog looks back at her, though they are not in the same frame. It is very likely that both Wendy and her lover were not there for the dog's reverse shot, and that Molly was not off-screen for Wendy's reverse shot. It doesn't matter as long as their visual focus is precise enough to create the connection.

The second eyeline consideration has to do with the height of the camera. It's very common when shooting reverse shots to adjust the camera angle in order to approximate the vertical sightlines established in the master shot if there is a height differential between characters addressing each other, as in (**Figure 4-10**). This scene from Jason Reitman's *Up in the Air* (2009) shows a classic example of seamless master shot/reverse shot matching. Ryan (George Clooney) stands as he explains to the seated Natalie (Anna Kendrick) that the employee she has just fired will probably not commit suicide as she announced. The master shot clearly establishes their horizontal and vertical sightlines. Ryan's reverse shots are then shot from a slightly low angle (approximately as Natalie sees him) and Natalie's reverse shots are from a high angle (almost as Ryan would see her). Even when the camera pushes in closer (to clean singles), the angles remain consistent with their horizontal and vertical looking directions. You can see clearly in this example that the reverse shot camera angles are not directly from the visual perspective of each character, but the sightlines of each character—where they are looking—are precise.

Cutaways

Finally, one additional shot commonly found in a simple two-person interaction scene is the **cutaway shot**. The cutaway is a shot of a detail within your scene other than the characters. For example, in our scene of the chess players, one cutaway might be an ECU of the clock counting down the seconds, and another could be a shot of a bystander watching their game. Generally, cutaways can have few continuity connections to the main action of your scene. The fewer details a cutaway shares with the other shots in the scene, the easier it is to cut it in. Cutaways are very useful in editing. They can be used for adding additional details and information to the scene, or for patching together shots where continuity is problematic, or as a way to hide postproduction alterations (like cutting out blocks of dialogue), or as a way to control the dramatic pace within a scene. **Figure 4-11** shows a sequence from the "Leon Test" scene in Ridley Scott's *Blade Runner* (1982). Several times, this scene cuts to CU details of the Voight-Kampff replicant detection device as an effective cutaway to add visual information, suture shots together seamlessly, add tension to the encounter, and regulate the pace of the scene. Finally, cutaways can also be used to create an elliptical time bridge between interactions in the same location. With our two chess players, for example, cutting away from them playing to a shot of the sun setting,



a



b



c

■ **Figure 4-10** The eyeline matching in this exchange from Reitman's *Up in the Air* maintains both the horizontal and the vertical looking angles established in the master shot (a) in each respective medium close-up: (b) lower angle and (c) higher angle.

and then back to the players again can imply with a simple edit that they've been playing all day long.

Coverage

Practically speaking, typical master scene shooting technique involves shooting the entire scene in a master shot, then changing the placement of the camera to reshoot sections of the scene for all of the reverse shots of one character, and then changing again to shoot all of the reverse shots of the other character. It's very common to shoot the same moment in a scene from two or three different angles and shot sizes or even more. Shooting a scene from various angles, and duplicating actions in more than one angle, is called **coverage**. The amount of coverage you can accomplish for any given scene is determined first by your visual conception of the scene and then, to a large degree, by your time and financial resources. Coverage from multiple angles takes time and continuity coordination, but being able to choose between several angles of the same moment also gives you great flexibility in shaping the dramatic arc and emphasis of the scene later in the editing. Shaping the master scene is a central skill in a filmmaker's dramatic vocabulary. The motivation for cutting back and forth between the reverse shots, for deciding where and when to utilize the master shot and when to use a cutaway, is largely determined by the dramatic rhythms of action, dialogue, and emotions in the screenplay. These decisions are initially made in preproduction, but with standard continuity coverage,



a



b



c

■ **Figure 4-11** The Voight-Kampff device (b) is used as a neutral cutaway in this scene from Scott's *Blade Runner*.



■ **Figure 4-12** With no dramatic reason to cut to a closer angle, this scene from Payne's *Sideways* plays out in a single, unbroken long shot.

a modular, and highly flexible shooting system, these choices can change according to the dynamics of performance and discoveries made during rehearsals and shooting and they can change yet again during the editing process as you work with the reality of your actual footage. We will look at how to give dramatic shape to a master scene throughout this book, but especially in Chapters 5 and 21.

The story and directorial style of some films require extensive coverage, while others, like Jim Jarmusch's *Down by Law* (1986; see **Fig. 3-4**), don't use coverage at all, opting instead for one single long take to cover an entire scene. It is important to understand that not

every scene requires the same amount of coverage; some scenes are shot from multiple camera angles, while others are presented from only one angle. For example, the wine monologue scene from *Sideways* (see **Fig. 4-8**) involved numerous camera setups to cover, which requires extra time. In this case the time was clearly well spent, because this is one of the central moments in the film and each tightening of the reverse shots intensifies the moment. However, in an earlier scene, where Jack warns Miles not to "sabotage" him on their date with Maya and Stephanie, the exchange is presented only in a long, uncut master shot (**Figure 4-12**). Clearly the director felt that there was no dramatic reason to cut to a tighter shot for this relatively simple moment.

■ COVERAGE AND DIRECTORIAL STYLE

Coverage is often a matter of a director's style: their particular approach to a scene, to the film, and to filmmaking in general. So in the final analysis, there is no absolute right or wrong way to shoot a scene. As Ethan Coen states in his quote at the beginning of Chapter 3, "That would be too easy." Here are some directors discussing their approaches (all quotes from *Moviemakers' Master Class*, by L. Tirard, 2002):

I don't do any coverage, and I try to shoot every scene in a single shot, or as close to that as I can. I don't cut as long as I don't have to, and I never shoot the same scene from a different angle ... I never cover anything partly because I'm too lazy, and partly because I don't like the actors to do the same thing over and over.

Woody Allen

I tend to cover each scene a lot, mostly if they're dialogue scenes, because of matching

problems. Sometimes I get a very straightforward scene, where I know there is only one way to shoot it and I stick to that. But that's pretty rare.

Sydney Pollack

As a rule, I don't cover much. It depends on the scene, of course. Very often there is only one way to shoot it. But in some scenes, and especially if the scene is something of a transition, where the story can shift from one point of view to another, then I will do a lot of coverage because it is only in the editing that I will be able to know whether the story should follow this person or that person.

Wong Kar-Wai

When I shoot a scene I cover everything, from wide shots to close-ups, and then I choose in the editing, because that's the moment when I really know how I feel about a scene.

John Woo

Changing the Line of Action

How do we organize space for a slightly more complex scene in which one of our characters moves around, disrupting the original line of action? What happens if a third person comes into the scene, causing our characters to shift their sightlines? The truth is, we are not once-and-for-all stuck with only one axis of action in every single scene. It's very common for there to be shifts in the line of action, even several times, within a single scene.



■ **Figure 4-13** This scene from Baumbach's *The Squid and the Whale* (2005) illustrates a common shift in the line of action. Shots (a) and (b) maintain consistent sightlines: screen right for Joan (Laura Linney) and screen left for Walt (Jesse Eisenberg). However, when Walt passes in front of the camera (c) on his way down the steps, the sightlines are reversed and a new line of action is created (d).

Each time there is a shift in sightlines within a scene, we simply need to be clear in showing how and when the axis shifted and then we redraw our line of action and shoot any reverse shots accordingly.

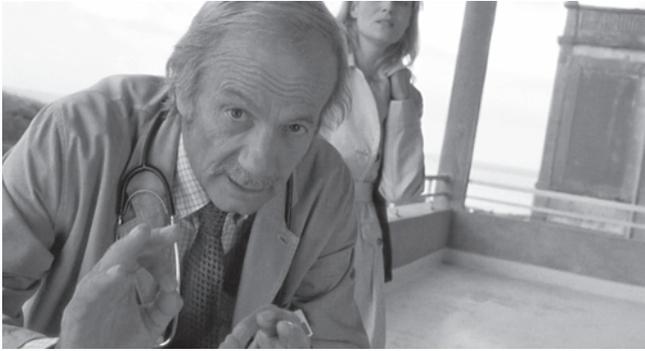
For example, you will often see a moving character cross the established line of action causing a complete shift in looking direction. In this case, it's important to show, in a single shot, the character move and cross the line while the other person follows them with their gaze. Very often this will involve the moving subject to pass in front of the camera. Once a character has crossed the axis and settled, a new axis of action is established from that point onward. Usually the movement that establishes the new line of action is shown in a master shot, although it is also possible for us to see a character cross in front of the camera in the reverse shot of the stationary character, where we can also see the sightlines shifting (**Figure 4-13**).

Another way we can change the line of action in a scene is to move the camera itself from one side of the action to the other, during a single, unbroken shot. For example, arcing the camera around and behind one of our chess players to shoot over the other shoulder as they contemplate a move would shift the line of action for subsequent reverse shots.

It's essential to understand that the line of action is not a fixed axis—rather, it shifts when characters and sightlines shift. Very active scenes, like a judo match or a swordfight in which characters circle each other, might involve reestablishing the line of action many times, as would a very active and mobile camera.

Creating Visual Point of View

Establishing a character's **visual point of view** (POV) means representing the visual perspective of that character, what the character sees. By creating a POV, the audience is not just looking *at* your character but *with* them. There are two ways to create shots that



■ **Figure 4-14** Large sections of Schnabel's *The Diving Bell and the Butterfly* (D.P. Janusz Kaminski, 2007) are presented through the subjective perspective of the stroke victim Jean-Do.

replicate a character's POV: using a **subjective camera** or constructing a **POV sequence**. Using a subjective camera implies that we are literally looking through the eyes of our character. To produce this effect, the camera is usually operated so that its motions are somewhat human (i.e., a handheld camera), and we do not see the character who is looking, just as we never really see our own faces. Because of the overt artificiality of the device, the subjective camera is not frequently used (**Figure 4-14**).

A much more common approach to creating POV involves a three-shot POV sequence, which, visually speaking, only approximates the true perspective of our character but which, in many ways, allows us even more intimate access to the character's perception. The

three shots in the POV sequence are: the looking shot, the POV shot, and the reaction shot. The **looking shot** shows your subject turning their gaze toward a person or object. At the precise moment their eyes rest on the target, we cut to the **POV shot**, which shows what they are looking at. The POV shot is taken from approximately the looker's perspective, including sightline matching, but it is not a true subjective shot. After the POV shot, we return to the character to see their response to what they've just seen (the **reaction shot**). If this sequence is done correctly, the reaction of our character can be quite subtle because the POV shot puts us inside their perspective and the additional juxtaposition with the reaction shot creates all the necessary context.

A textbook example can be seen in Phil & Olly's short film, *The Black Hole* (streaming on the *Voice & Vision* companion website). After the office clerk (Napoleon Ryan) tests the special powers of his photocopied "black hole" by getting himself a candy bar, he scans the office for other, bigger, uses. When he sees the locked door marked "Keep Out," his reaction shot tells us (without any need for dialogue) that greed is overtaking him and that he fully intends to get into that room (**Figure 4-15**).

POV sequences follow the same continuity principles as shot/reverse shots, with camera angle positions, to approximate the sightlines of the looker, being especially critical. Practically speaking, although the POV sequence includes three edited shots, we really only shoot *two shots* during production. The looking shot and reaction shots (**Figure 4-15 left and right**) are in fact just one take that we have divided by inserting the POV shot (**Figure 4-15 middle**).

A very effective and common variation of the three-shot POV sequence is accomplished by using only two shots: (1) an angle on the subject from a three-quarters back view essentially merging the looking and POV shots into one shot. This gives us the sense that we are looking *over a character's shoulder* and seeing what they see. (2) Then a reaction shot from a different angle (**Figure 4-16**).



■ **Figure 4-15** The three-shot POV sequence (looking/POV/reaction) is very common to create the sense that we are seeing and understanding events from a character's perspective. A perfect example can be seen in the example film *The Black Hole*. The office clerk searches for something to do with his newly discovered powers and sees (*left*), the locked door to the office (*center*), which gives him a very wicked idea (*right*).



■ **Figure 4-16** A two-shot POV sequence (OTS looking/POV) from Jeunet's *Amélie* (shot by Bruno Delbonnel, 2001).

Dramatically speaking, creating a specific POV—that is to say, linking POV to a specific character—is a strong device. It's powerful to have a character's look send the camera and the entire audience to see what they see! This is not an ability to be taken lightly. Establishing POV signals to the audience who your main character is and from whose perspective the audience is supposed to experience the scene. It can also establish with whom an audience is supposed to identify. Giving the power of POV to one character or another can radically alter the meaning of a scene or even the entire film. Do not squander the intimate connection created through POV on just any character.

Group Interactions

There are many different approaches to shooting groups of people, and each approach is more or less complicated and time consuming. It's advisable for beginning filmmakers, with small crews, to approach these scenes as simply as possible. In general, it's simplest if you can divide your group into two smaller groups (i.e., single versus group, or half and half); then you can conceptualize the camera placement for the scene exactly like a two-person interaction. For example, take a scene involving a teacher interacting with a class of 20 students. If we conceptualize the teacher as character 1 and all the students as character 2, then we simply draw our axis of action and follow the basic rules of the continuity system. Even if we cut to different CU reverse shots of various students, they will all follow the same sightline principles (**Figure 4-17**).

Moving a Person through Space

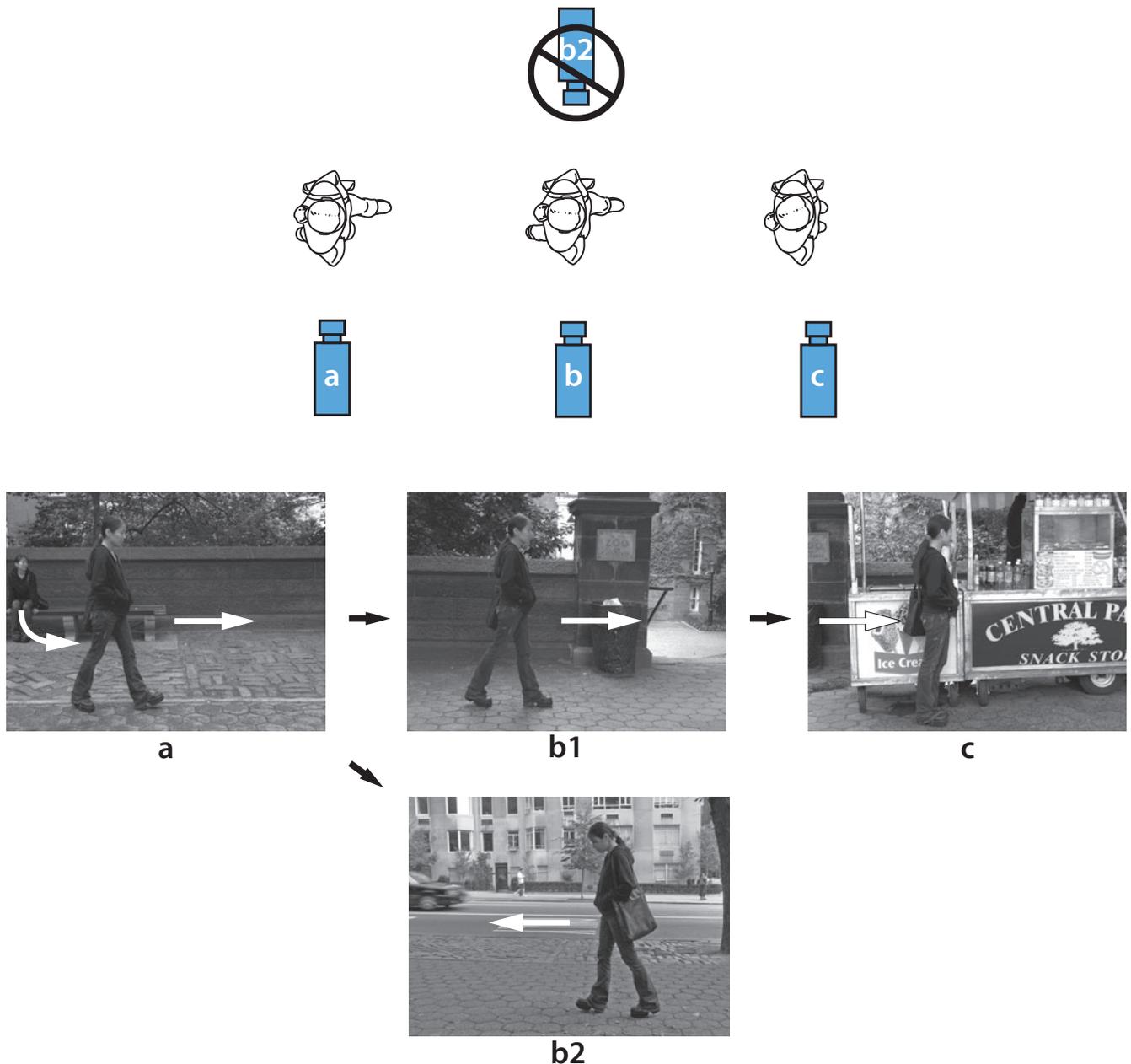
Movement and the 180° Line of Action

In the continuity system, the 180° line of action also applies to moving a character through space—that is, moving someone from one place to another in an edited sequence. The movement of a character (or a car, or animal, etc.) through the frame establishes their screen direction and the axis of action. For us to maintain a strict sense of continuity and progress toward a destination, we must maintain this screen direction from shot to shot by staying on the same side of the 180° line.



■ **Figure 4-17** Breaking up a group of people into two groups makes it easy to cover the dialogue of both, since each can be treated as simple shot/reverse shot instances. In this example from Antonioni's *L'Avventura* (1960), the group was divided up as one versus the rest.

Let's create a simple, three-shot sequence. Jessica is sitting on a bench and decides to walk to a food cart, which is down the sidewalk, to get a soda (Figure 4-18). We decide that our three shots will be (a) getting up from the bench and heading toward the food cart, (b1) walking down the sidewalk, and (c) arriving at the food cart. When Jessica gets up in shot a and moves in one direction, say screen right, in order to get to the cart, the audience understands that the cart is off in that direction. When we cut to the shot of her walking down the sidewalk, we must remain on the side of the action that will maintain her progress, toward screen right, and continue the same screen-right progression when she gets to the food cart. Notice that if we were to place the camera on the other side of the 180° line of action (B2), it would reverse Jessica's screen direction. This gives the viewer the feeling that she is returning to the bench or heading in the wrong direction rather than making her way to the cart.



■ **Figure 4-18** The movement of a subject through the frame establishes their screen direction and the axis of action. Crossing the line of action (camera position b2) reverses the subject's movement through the frame creating the impression that the subject is suddenly moving away from the original destination.

Entering and Exiting the Frame

Allowing moving subjects to enter and exit the frame in each shot is especially useful when it comes time to edit a moving-through-space sequence. Cutting from the moment a subject exits the frame to the moment they enter the frame is a very smooth edit, although it is not necessarily the one you need make. By allowing a moving character to enter and exit the frame, you give the editor a range of possible places in which to cut into the action.

Movement and Elliptical Edits

Look at the three-shot sequence in **Figure 4-18** and take out the middle shot. It still works. We can show this character going from bench to food cart in two shots, leaving and then arriving. In fact, we could show a person walking from New York City to Dallas, Texas, in the same two shots! However, we could show Jessica going from park bench to the cart in four shots or ten shots or even more! One important question for a director is, how much of a journey, from one place to another, do we want to show? The usual answer is, we show as much of the journey as is necessary to get our dramatic point across. If our character's progress to the food cart is not important, then two or three shots will do. If we need to show that Jessica is on a very rough street, then we might need many shots to show her walking past a snarling pit bull, two men fist fighting, and a police officer arresting a drug dealer, until she finally reaches the cart to buy a drink. In this case, the details of the journey and the additional shots have narrative importance.

For the most part, however, getting someone from one place to another usually means cutting out the nonessential time and terrain. If our point is simply that Jessica gets up to get a drink, then we need not belabor the journey and we can simply show two shots: Jessica getting up from the bench and Jessica arriving at the food cart. This sort of time compression is an extremely common cinematic technique. Removing extraneous time and territory in the edit is called **elliptical editing**. Some ellipses are designed to be extreme and obvious (e.g., the guy who walks from New York City to Dallas in two shots), but others, like Jessica walking to the vendor in two or three quick shots, are practically invisible. The remarkable thing about elliptical editing is that you can maintain the feel and seamlessness of strict continuity, even though you have lopped off a good portion of time (**Figure 4-19**).

 To see the basic principles for moving a person through space in action, see the brief example student film excerpt *Kiarra's Escape* on the *Voice & Vision* companion website.

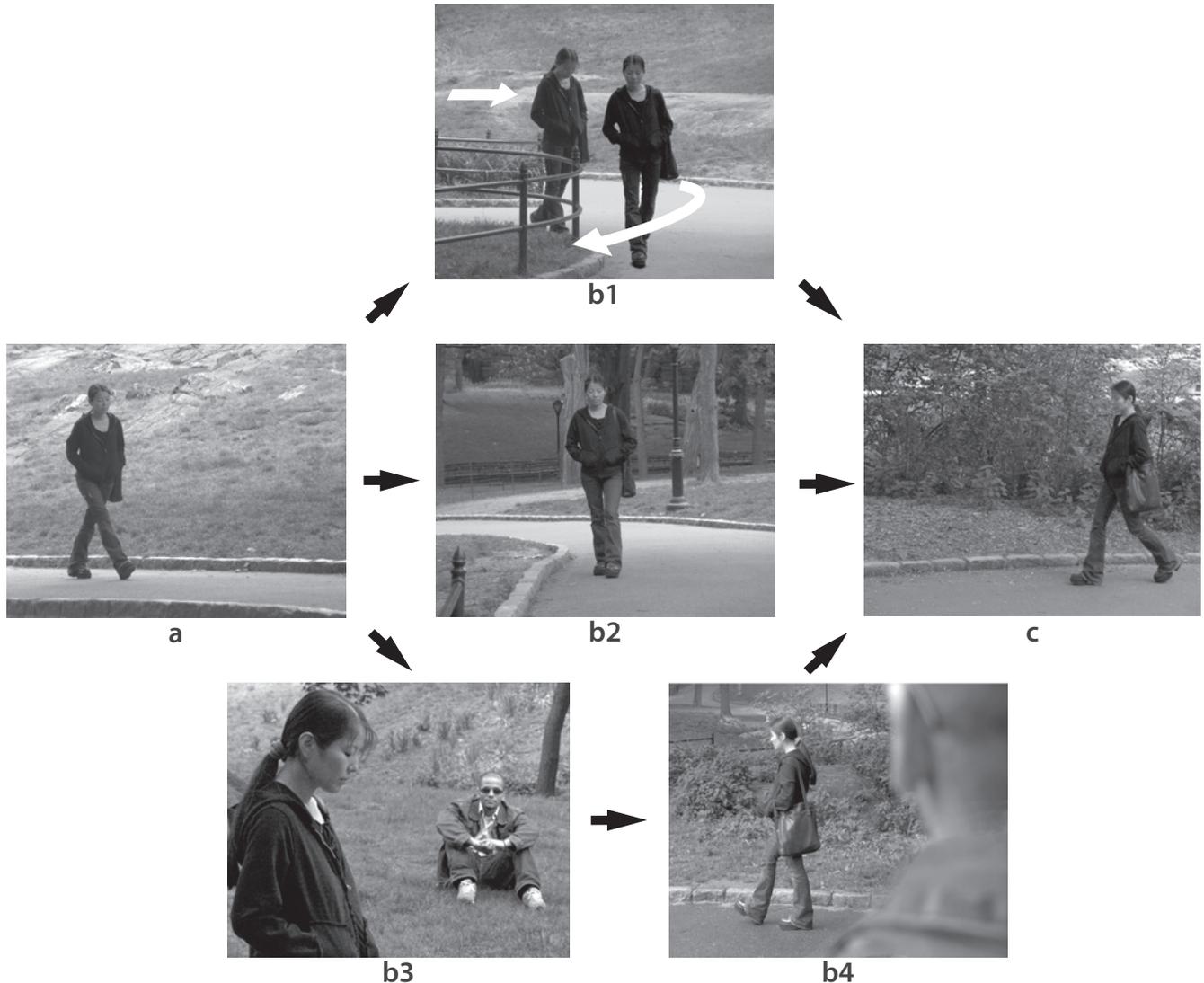
Changing Screen Direction

Maintaining only one screen direction over the course of a longer traveling sequence can get somewhat monotonous for a viewer. It's easily possible to change screen direction (i.e., the axis of action) and still maintain the feel of a character's progress toward the destination. **Figure 4-20** shows three simple ways we can change screen direction for Jessica, who is walking across the park to her destination:

1. *Show the character change direction within a shot.* Given that our character leaves the first shot



■ **Figure 4-19** In this elliptical edit from the Coen Brothers' *Raising Arizona* (1987), the bounty hunter Leonard Smalls (Randall "Tex" Cobb) rides his motorcycle in the middle of a vast desert. When he crests a hill his motorcycle takes flight and in one edit lands in the center of town. The edit maintains continuity while leaping forward in time and location. The energy contained in this flamboyant edit also adds to the superhuman quality of this fierce character.



■ **Figure 4-20** Three ways to reverse the screen direction of a subject while maintaining the feeling of forward progress. From shot (a) (moving screen right); changing direction within a shot (b1); cutting to a neutral shot (b2); or using another character's POV shot (b3 and b4) will allow us to continue the journey toward screen left (c).

(a) moving screen right, we match screen direction and start the next shot with Jessica following a footpath screen right. But if that path curves around so that she ultimately crosses the front of the camera and exits screen left, she has now reestablished her screen direction (b1). Her journey from this point on can progress screen left (c).

2. *Use a neutral shot.* A neutral shot is a shot that has no specific horizontal screen direction, meaning the character is moving either directly toward or away from the viewer. We have not crossed the axis in this shot; rather we are shooting right on the 180° line (b2). Since there is no (left/right) screen direction in this shot to match, the following shot can be taken from either side of the axis of action, showing the character moving screen left or right, and it will cut in seamlessly.
3. *Use a POV shot.* Using a POV shot reestablishes the axis of action via a third character and can reverse your character's direction. For example, in shot a Jessica is crossing the field moving screen right. In the background is a mysterious man, sitting under a tree, watching her. We can redraw our line of action between Jessica and the man (b3). Now, if we cut to an over-the-shoulder POV shot (b4), Jessica's direction is reversed and her journey can proceed toward screen left (c).

There are, of course, other ways to strategize changing screen direction and to maintain coherent directional orientation. Although these things can be puzzling and even frustrating, at times it's often actually a fun conceptual challenge to devise elegant or even acrobatic approaches to keeping a character's journey as interesting as possible.

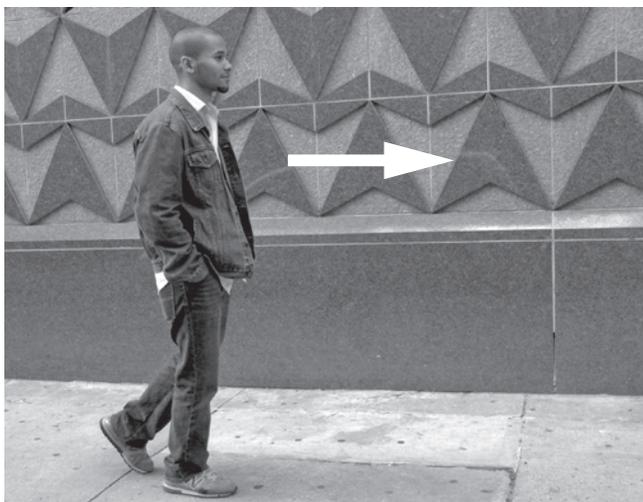
Moving People through Space: Following or Converging

Screen direction is a crucial concern when we create a sequence in which we move multiple people through space, principally in meeting (or converging) scenes and chase (or follow) scenes.

A **meeting scene** is one in which we intercut between two (or more) people (or other moving subjects) who are in different locations but appear to be moving toward each other. To create the impression that two people will meet, we must make sure that their screen direction is oppositional—meaning that one character is moving screen right and the other is moving screen left. Simply by presenting the movement of two people in oppositional (or converging) directions, you can create a very strong anticipation that these people will ultimately meet—long before they do or even if they never do! In shot a (Figure 4-21) we present a young man moving screen right, and we cut to a shot of a young woman (shot b) walking screen left, so the viewer will get the *sense* that these two might bump into each other at some point. With two shots, you have the audience imagining what might happen—in fact they are imagining the story. The more you intercut the characters' converging paths, the stronger this feeling becomes, and after a few cross-cuts the audience will *assume* that their meeting is inevitable.

The **chase (or follow) scene** involves cross-cutting the paths of two (or more) characters who are traveling in the same direction. Simply switch the direction of the young man in the preceding example, so that he is moving screen left, like the young woman, and it will now feel like she is following in his path (Figure 4-22).

This feeling becomes even stronger if there are **shared landmarks** from shot to shot. For example, the young man passes by a bed of flowers and then we cut to a shot of the young woman, walking in the same direction, and she eventually passes the same flowerbed. Now it's clear she is following along the same path. If you add a POV shot from her perspective, in which she watches the young man and then moves in the same direction, you will have created a sense that she is *intentionally* following him. Further, if you give him a POV shot, looking over his shoulder at her, before he flees screen left, you will create a sense that he *knows* he's being followed and he's trying to elude his



a



b

■ **Figure 4-21** Meeting sequence. Maintaining a consistent and oppositional screen direction creates the expectation that two characters might eventually meet.



■ **Figure 4-22** To create a sense of one character following (or chasing) another, we shoot them moving in same screen direction. This can be emphasized further by shooting the characters against a shared landmark, in this case a flowerbed.

pursuer. Now we have a genuine chase scene—someone is fleeing from another person who is in pursuit. The screen direction of pursuer and pursued must be the same in order to preserve the feeling of a chase, while passing common landmarks offers clear points of reference for the proximity of the two. The expectation of a viewer concerning chase scenes is that they are very dynamic sequences. For this reason, chase scenes, especially long ones, often use many neutral shots (and other axis-switching techniques) so that they can change screen direction at any time. Controlling screen direction can allow us to alternate between a close chase (same direction and landmarks) to one in which the pursuer is losing the trail (screen directions become scrambled and landmarks are no longer shared).

Parallel Action Sequence

Parallel action is a narrative technique that involves intercutting between two or more separate areas of action (or scenes) in such a way that the viewer assumes the scenes are occurring simultaneously. Parallel action involves **cross-cutting**, which is an editorial term meaning to alternate between two or more scenes. Parallel action is a powerful technique because it invites the viewer to draw thematic connections or make other kinds of comparisons between the areas of action. Just as we discussed earlier with juxtaposing shots in a sequence (page 46), by juxtaposing the events of two or more scenes a film suggests more than the meaning of each scene individually, because the actions of one area inflect the actions of another area. In order to maximize the substantial potential of parallel action, it must be anticipated *before* shooting, and certainly long before editing, when and where the intercutting will occur. An effective parallel action sequence is devised in preproduction, followed through in the shooting stage, and constructed in editing.

The power of parallel action is not realized simply by intercutting areas of action willy-nilly, but by carefully selecting the specific moments, action, and objects, which are linked through the editing. This is what gives an audience the sense that these separate actions are happening simultaneously *and* that encourages intellectual or thematic comparisons as well. Here are five common ways to create provocative links in your parallel action sequences:

1. *Dramatic structure matches.* Intercutting on dramatic narrative beats, meaning that we alternate between the beginnings (intro), middles (development), and ends (result) of each area of action in the sequence. This provides a strong sense of simultaneous actions.

■ A CLASSIC MEETING SEQUENCE

In the magnificent opening to Hitchcock's *Strangers on a Train* (1951), screen direction establishes the eventual meeting between Guy (Farley Granger) and Bruno (Robert Walker) by showing shots of their feet as the men make their way to a train (Figure 4-23). Guy consistently moves screen right while Bruno moves steadily screen left. In a display of typical Hitchcockian formalism, a shot of converging train tracks (frame e) foreshadows the course their lives are about to take.

■ A CLASSIC CHASE SEQUENCE

The famous “man versus moped in the subway” (Figure 4-24) chase scene from Jean-Jacques Beineix's

Diva (1981) uses many of the principles we've discussed, including:

1. Maintaining screen direction and shared landmarks between the shots of the chaser, a Parisian cop, and the chasee, Jules (note the poster on the subway wall).
2. A neutral shot, (b, left) to switch screen direction.
3. Changing screen direction within a single shot.
4. Toward the end of the chase the two characters are placed within the same frame to give us the sense that the cop is closing in on Jules and will catch him.



a



b



c



d



e



f



g

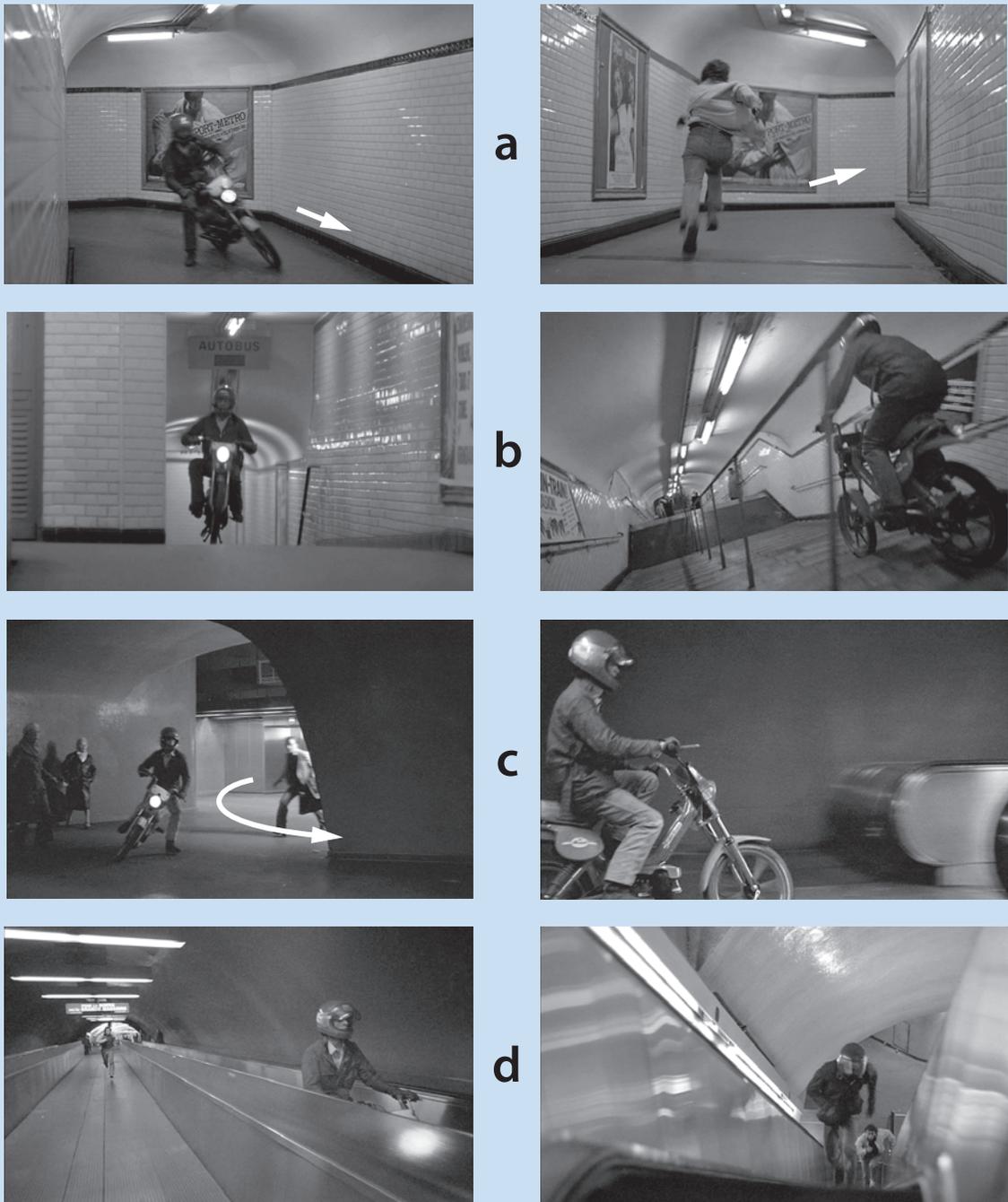


h



i

■ **Figure 4-23** A classic “meeting sequence” opens Hitchcock's *Strangers on a Train*. Guy consistently moves toward screen right (frames a, c, f, and h) while Bruno moves toward screen left (frames b, d, and g).



■ **Figure 4-24** These frames represent only one small segment of the extensive “man versus moped” chase sequence from Beineix’s *Diva*.

2. *Content and activity matches.* Cutting on similar activities or details that have different particulars encourages the audience to make direct comparisons between each scene.
3. *Matched action cuts.* We can make very strong associations, along with smooth editing transitions, between the different areas of action by using the matched action cutting technique. As discussed earlier, this would involve an edit that matches the gesture in one area of action to the same action, but performed by a different person, in another location. The second shot is the completion of a gesture from the first shot.

4. *Graphic matches.* We can create strong aesthetic associations from area to area through formal visual links, like matching color, shape, objects, frame compositions, camera or subject movement, and so on. Graphic matches also make for smooth editing.
5. *Sound bridges.* Finally, audio can create a bridge between various areas of action. The obvious example would be score music that continues under all of the intercut scenes, but shared sounds within each scene, or dialogue, can also be used as edit points and/or points of comparison and contrast.

Let's look at each juxtaposition technique one by one as they are used in two very different films: *Mama, There's a Man in Your Bed*, by Coline Serreau (1989), and *The Godfather*, by Francis Ford Coppola (1972).

The French film *Mama, There's a Man in Your Bed* opens with a parallel action sequence that cross-cuts between the morning routines of two Parisian families: the wealthy white family of executive Romuald Blindet and the struggling, African immigrant family of cleaning woman Juliette Bonaventure (Figure 4-25). By using both dramatic structure matches and content/activity matches to move back and forth between the same morning activities of each family (e.g., waking, cleaning, eating, leaving), Serreau is able to quickly and vividly



■ **Figure 4-25** Efficiently illustrative and thematic juxtapositions through parallel action open Serreau's film *Mama, There's a Man in Your Bed*.

reveal the stark contrast in economic status between these two families and instantly raises the issue as a central theme in the movie. In addition, by using parallel action, the filmmaker is able to anticipate the improbable but inevitable entanglement between these two families, who appear to have very little in common.

Dramatic Structure Matches

The narrative events of the sequence in [Figure 4-25](#) are duplicated within each area of action, Romuald and Juliette's apartments. Each sequence begins with one of the mothers getting out of bed and waking up their children, who then get ready for the day in their respective bathrooms. Next, each of the women prepares breakfast. They then each see their families off to school, and work, and finally they both return to bed. Each of these specific narrative beats is deliberately and carefully paired. This approach not only maintains the sense of linear progression in each of the narrative lines, but it also strongly implies the simultaneity of actions. It feels like the activity of each household is happening on the very same morning and at the very same hour.

Content and Activity Matches

Because the morning rituals of each family are essentially the same, their juxtaposition encourages us to see the telling differences in their details. At Romuald's apartment, the mother must walk down long corridors to get to each of her children's separate rooms. In addition, each child has their own bathroom and brushes their teeth at their own private sink. This is juxtaposed with Juliette's apartment, where she enters her children's one single bedroom, just off her own, and simply claps her hands to wake up all six kids. Teeth brushing time at Juliette's apartment means five children crowded around one tiny sink to brush their teeth while the sixth is showering just behind them in the same bathroom. Simply witnessing the specific conditions of their respective morning routines back to back provides all of the evidence necessary to drive home the point that there is enormous economic disparity here. Add to this that Romuald and his children step into a waiting limousine while Juliette's children wait for the bus. By the end of the sequence, when the two mothers return to bed, we understand that Romuald's wife does so because she can afford the luxury (she has a maid who cleans the kitchen), while Juliette does so out of necessity—she is a cleaning woman who works the graveyard shift.

The justly celebrated “baptism sequence” from *The Godfather* is a masterpiece of parallel action technique ([Figure 4-26](#)). The overall idea behind the parallel action is the harsh juxtaposition of the brutality of cold-blooded murder with the indoctrination of an innocent new life into the spiritual tradition of the church. These are the worlds that the lead character, Michael Corleone, straddles. He is literally both the godfather to his sister's baby and the godfather of his “family business.” The sequence follows more than six (!) lines of action and utilizes every one of the techniques mentioned, both to maintain a sense of coherence and simultaneity and to create a strongly ironic context that reveals the hypocrisy and true brutal identity of Michael Corleone. One can write an entire chapter on this scene alone, but here I'll just isolate the final three juxtaposition techniques mentioned on pages 94–95.

Matched Action Cuts and Graphic Matches

Throughout the baptism sequence Coppola sutures together areas of action through matching gestures, shot sizes, movements, and camera moves. Some of these are perfect continuity matched actions, like the cut on two different hit men wiping their sweaty faces (b frames). One man starts the gesture in a MCU and the other completes the gesture in an LS. This creates a seamless edit and provides a strong sense of the simultaneity of action. Other action juxtapositions have more thematic overtones to them, like the duplication of gestures and camera moves when the barber's hand brings shaving cream to the face of a mafia assassin (the face of evil), juxtaposed directly with the hand of the priest bringing the holy water to the face of the baby (the face of innocence) (a frames). These are not continuity matched action edits but are formal, graphic matches on camera and subject movement and shot size.



a



b



c



■ **Figure 4-26** The famous baptism sequence from Coppola's *The Godfather* develops more than six lines of action simultaneously through exemplary parallel action technique.

Sound Bridges

Perhaps the most overt thematic bridges in this parallel action sequence occur through Coppola's use of sound to connect the holy baptism to the unholy murders. Michael Corleone's rejection of Satan during the baptism is directly juxtaposed with the savage killings of all his enemies (c frames). Additionally, the somber ecclesiastical organ music from the church is heard throughout the entire sequence, adding an ironic context to the revelation that Michael's allegiance to a life of virtue is, in fact, a lie.

Cheating on Film

To be able to cheat properly is one of the most useful bits of technical knowledge in a Director's bag.

Edward Dmytryk (From *It's a Hell of a Life, But Not a Bad Living*, by E. Dmytryk, 1978)



■ **Figure 4-27** Simple “cheating” from Reitman’s *Up in the Air*.

The techniques for establishing spatial relationships with the continuity system are so powerful that they allow us to create relationships and spaces that don’t exist in the “real” world. This is called **cheating**. What does it mean when we cheat a shot or cheat a location? First, it’s important to remember that how a shot appears on the screen is more important than the true physical circumstances and layout of the real location. Understanding this concept is fundamental to shooting beyond the limitations of your situation and capitalizing on the small tricks filmmakers play all the time.

There are many types of cheating, but the most common one involves moving people, furniture, or objects around to accommodate a certain camera position or shift in the angle of the sun. **Figure 4-27** shows a simple example of cheating from Reitman’s *Up in the Air*. As Ryan (George Clooney) packs to travel he comes across a cardboard cutout of his sister and her fiancé, which he is supposed to take with him to photograph at various locations. His reverse shot, which is shot from behind the cutout (like an OTS), reveals that he is not pleased with this thing that does not fit into his perfectly organized suitcase. But how is this angle possible given the fact that the cutout

is laying on the pillows? Although no viewer would ever notice, this shot was cheated. The bed was moved, the camera placed where the bed was, and the cutout held above the camera to position it in the foreground of the shot. Cheating like this works because its mechanics are hidden behind perfect continuity technique. In the case of this scene from *Up in the Air*, the shot/reverse shot pattern has also followed the principle of eyeline matching perfectly (note the shot angles), and this disguises the obvious fact of the disappearing bed.

Cheating locations is a common tactic for filmmakers at any budget level. Let’s say that your film involves a character who lives in a swanky townhouse on the upper west side of Manhattan, but you couldn’t find anyone who would let you shoot in their Manhattan townhouse—instead the location you have available for the interiors is your uncle’s house in New Jersey. It’s very simple to cheat this location by using the principles of continuity. First, you’ll need to art direct a room of the uncle’s house to look sufficiently swanky. Then, if you start with an interior shot of your character putting on his coat and leaving the (New Jersey) house, and juxtapose this shot with an exterior shot of the character (same coat of course) exiting an upper west side townhouse and walking down the street, the connection between the interior and exterior will be totally convincing and indelible for the rest of the film—even if you took those shots days apart! This method of cheating “hard to secure” locations is very common. You don’t need to rent a Manhattan townhouse to shoot in, all you need to do is find someone who’ll let your one character exit their front door.

Another great example of this sort of money saving cheating technique can be seen in Didier Rouget’s short film *Vive le 14 Juillet*, described in the “In Practice” box that follows.

■ ONLINE FILMS AND THE BASIC TECHNIQUES OF FILMMAKING

In this chapter I have explored the basic techniques of continuity filmmaking. As I mentioned, many successful and wonderful films have been made with not much more than these simple techniques. On the companion website for this book, you will find a collection of short films that provide a great opportunity to see and analyze many of these principles. Be sure to watch these films on the *Voice & Vision* companion website and then read the following analysis.

Two-Person Interactions

Waking Dreams by John Daschbach develops the strange relationship between the executive Mr. Saroyan (Ben Shenkman) and Becky (Tina Holmes), a temp worker who may be able to predict the executive's death. Highly dialogue driven, this film revolves around five conversations Mr. Saroyan has with Becky and serves as a great example of shot/reverse shot technique. The two-person interactions in the office do not use any master shots per se, but the OTS shots establish the physical proximity of the executive and the temp. Interestingly, Daschbach decided not to cut into the conversation that takes place in front of the elevator; rather he maintained the extreme awkwardness of this encounter by keeping it in an unbroken two-shot. In their fourth office encounter you'll see a great example of shifting the 180° line when Becky crosses the line of action (passes in front of the camera) and changes their looking direction just before she delivers her significant line "There's no such thing as fate. What people call fate is just time plus free will." Also, the hospital encounter shows a classic example of cutting on action (sitting and standing) to move from the master shot into the reverse shots and back out to the master shot again. Finally, the rhythm of Daschbach's editing

and how reaction shots are used to invite the audience to imagine what a character must be thinking is especially important to observe in all these scenes (**Figure 4-28 left**).

Cutaways as Time Transition

Gemma Lee's *The Wake* tells a gently humorous story of an awkward, hapless family friend who unexpectedly provides comfort to three siblings during their father's wake. The bulk of the film includes five continuity style conversations that take place outside the house where the wake is being held. Between each encounter Lee inserts cutaway shots—details of the garden (flowers and leaves) or shots of the mourners at the wake—that imply the passage of time between each conversation (**Figure 4-28 right**). These elliptical time transition cutaway shots allow the narrative to breathe and unfold organically, rather than seeming like an unbroken series of conveniently organized conversations, and they also contribute to the feeling that the family friend has been at the house for quite some time (certainly longer than the seven minutes of the film's running time), even though he never leaves the front lawn.

Moving through Space

Plastic Bag by Ramin Bahrani is the story of one bag's eternal journey across land and sea to find purpose and meaning in life. Visually, we follow a plastic bag as it travels across great distances. The screen direction and cutting (continuity and elliptical) is impeccable in this film. What's especially interesting is that for the most part the bag is not traveling to a specific destination (from point A to point B), but instead the journey is peripatetic; it floats this way and that, wanders here and there, and is often lost and blown about by the winds. To give us this feeling the screen direction is intentionally not consistent. The bag roams left to right in one shot and right to



■ **Figure 4-28** Daschbach's *Waking Dreams* (*left*) displays textbook shot/reverse shot technique, while Lee's *The Wake* (*right*) skillfully uses insert shots of nature to move us forward in time and to punctuate moments of dialogue.

left in the next, and very often, Bahrani will use a succession of perfectly neutral moving shots. Given this, what becomes critical to the sense that this bag is, in fact, crossing great distances are the different landscapes from shot to shot and indications of the passage of time (night to day, summer to winter) (Figure 4-29 left).

Visual POV Sequence

In the short films online you'll also find many examples of the looking shot/POV/reaction shot sequence, but the sharpest and most revealing can be found in Phil and Olly's *The Black Hole* which we already looked at (see Fig. 4-15) and Huixia Lu's *When I Was Young* which uses looking and POV shots quite complexly (Figure 4-29 right). Lu's film, which is a subtle portrait of a Chinese immigrant's life in Philadelphia, pivots on the moment the central character (Vicki Wang) enters a restaurant where her husband works as a prep cook. There is an intricately conceived sequence of shots between them through a tiny window in the kitchen door. This shared moment is a relay of looks, POVs, and reactions, which begins with him in the kitchen and ends with her in the restaurant. No words are spoken, but the sequence reveals their very different reactions to seeing one another; he is happy to see her, she, on the other hand, is having an epiphany about her husband's part in their struggles and has mixed feelings.

Cheating

Didier Rouget's *Vive le 14 Juillet* is about a sweet, civilian guy who loses his girlfriend (a woman with an eye for men in uniform) during the Bastille Day military parade. In the film the guy joins a tank crew,

cruises down the street in the turret gunner's position, and finds his girl.

When he finds her he stops the tank, lowers the tank's long barrel so that she can sit on it, and, as he raises the barrel, she slides into his arms. Without getting into the audacious and hilarious sexual references here, this sequence was not even remotely possible to accomplish with a real tank. Didier had neither that much access to a tank nor would it have worked anyway. It had to be cheated—a lot! The reality was this: Didier's actor and camera operator were allowed to ride the real tank only twice—for a total of a few minutes. Once very briefly, during the parade rehearsal and another time as the tank was driven into position (Figure 4-30). Didier quickly got shots of the hero in the tank, the hero's POV of the tank commander, and down the barrel of the tank. The left frame is Didier's champion image, and he knew that he could work cheated shots around it. Understanding that the audience had *seen* the guy in a tank (even briefly) he could now create the *illusion* of a longer tank journey through careful cropping and continuity editing. So next to the real tank shot he juxtaposed low-angle CU shots of the guy who was now riding in a car with his head poking out of a sunroof (right frame), which created the illusion that the guy rode around in that tank for much longer than was true. Later, the scene where the guy lowers the tank barrel to “pick up” his girlfriend (!) was accomplished by using a camo-painted cardboard carpet roll and a teeter-totter-like device (Figure 4-31). With careful cropping and perfect matching of action and angles from the real tank, he created a seamless illusion. It's remarkable to think that this film was shot in only six hours total and with practically no budget.



■ **Figure 4-29** Bahrani's *Plastic Bag* (left) uses numerous techniques to make a bag very far through space, and occasionally to make us feel it's hopelessly lost. Simple and intricate POV sequences can be seen in Lu's *When I Was Young* (right).



■ **Figure 4-30** The real tank shot (*left*) and the “cheated” tank shot (*right*) from Rouget’s short film *Vive le 14 Juillet* (1995).



■ **Figure 4-31** Cheating the tank barrel sequence in Rouget’s *Vive le 14 Juillet* with a painted cardboard carpet roll. The camera perspective (*left*) and what was really going on (*right*).

■ STYLE OUTSIDE THE CONTINUITY SYSTEM

At this point in the history of filmmaking, many films do not adhere strictly to the established principles of temporal and spatial continuity from beginning to end. It’s common for a filmmaker to deviate from the conventions from time to time to make an especially strong narrative point or to elevate one dramatic moment, like a film’s climax, over other moments. In these heightened dramatic scenes the conventional rules might go out the window in order to jolt the audience visually to make a more direct and visceral emotional connection. For example, Martin Scorsese’s fight sequences in *Raging Bull*, especially the “Sugar Ray Robinson: Round 13” sequence, are significant stylistic departures from the rest of the film (see page 496).

In the case of Fernando Meirelles’ *The Constant Gardener* (2005), the moments that *do not* contain essential story information are shot and edited with a very loose, disjunctive, noncontinuity style, whereas the moments that include important verbal information (exposition) calm down considerably and adhere fairly closely to basic continuity principles (**Figure 4-32**).

It’s important not to mistake fast editing or handheld camera work with jump cuts or disjunctive editing. As you have seen, the continuity system is founded on two central precepts. The first is the invisibility of the edit, which is accomplished by maintaining a



■ **Figure 4-32** Meirelles' *The Constant Gardener* freely mixes standard continuity technique with scenes shot in a loose, discontinuous, jump-cut style. The scene in which Justin (Ralph Fiennes) meets Tessa (Rachel Weisz) (*left*) maintains spatial and temporal continuity, whereas the scene in which the couple make love for the first time (*right*) eschews these conventions.

coherent sense of space, motion, and movement through principles like the 180° line of action, the 20mm/30° rule, and cutting on action. The second is the expectation to eliminate extraneous time, action, and terrain through seamless elliptical edits. There are a number of techniques and aesthetic approaches to shooting and editing that challenge

both of these assumptions; the two most common are the use of intentional jump cuts and the long take technique.



■ **Figure 4-33** Lars von Trier uses jump cuts throughout *Dancer in the Dark* (2000), adding directness and immediacy to his film. The three frames shown here were taken from three consecutive shots.

Jump Cut Technique

The use of **intentional jump cuts** directly challenges the precept of invisible edits by tossing out concerns like the 180° line of action, the 20mm/30° rule, and matched action edits. The point of the jump cut style is, in fact, to expose edit points, to create obvious skips in time, and to use this edit abruptness to infuse a moment, a scene, or even an entire film with edgy energy.

The legendary French film director Jean-Luc Godard has often been credited as the innovator of this technique, and his film *À Bout de Souffle* (1960) is generally regarded as the first film to make extensive and aesthetic use of the intentional jump cut. Today the intentional jump cut is a fairly common formal technique in narrative films and is used freely by many filmmakers, including Wong Kar-Wai, Lars von Trier, Danny Boyle, and Steven Soderbergh (especially in *The Limey*).

Often, when jump cuts are used as a stylistic choice for an entire film, as in Lars von Trier's *Dancer in the Dark* (**Figure 4-33**), the technique (usually paired with handheld camera shooting) is intentionally evoking the looser editing style of observational documentaries to establish the film's realistic tone and generate a sense of real-world immediacy.²

Another common application of jump cuts is to use the restless, in-your-face energy of the technique to create

² Interestingly, the musical numbers in *Dancer in the Dark* are edited in a much tighter continuity style to provide a stark contrast between Selma's "real-life" and her Hollywood musical type fantasies.

a tone of unease, disquiet, or agitation, as is the case with Wong Kar-Wai's *Happy Together* (1997) in which two Chinese immigrants in Argentina endure the on-again/off-again emotional spasms of an intense yet fractured relationship in an environment of near total cultural displacement (Figures 4-34).

However you apply them, the important thing to remember with jump cuts is to utilize them as an *intentional technique*, a stylistic choice around which you plan, organize, and choreograph your shooting and which is fully integrated into the overall aesthetic and conceptual approach of your story. Too often, students will go into a production intending to produce a standard continuity film and when they discover in post that they do not have all the shots they expected (and require) they decide to try jump cuts as a last ditch effort to save the film. But, there's a big difference between the intentional use of jump cuts and the accidental occurrence of jump cuts—one works and the other doesn't.

Long Take Technique

Another technique that challenges the traditional continuity system is the **long take**. Long take technique eschews editing altogether and allows the actions and relationships of an entire dramatic moment to develop within a single shot, in real time. These shots are often five, eight, or even ten minutes long! Considering that the average shot length in a conventional motion picture runs around two to six seconds, you'll have a sense of what a radical aesthetic departure the long take is. The irony of calling long take technique an alternative to the continuity system is that the long take is actually the only approach that gives us true continuity of action, time, and space. Because one essentially never cuts into a master shot, there is no question about matching shot content or actions or spatial orientation. However, for that same reason we are not able to cut out extraneous actions, terrain, or time. There are two stylistic poles of the long take techniques: **long takes with a moving camera**, and **long takes with a stationary camera**.

The moving camera long take pulls us through real space and real time simultaneously and can fluidly change the *mise-en-scène*, subject, and location along the way. It's not unusual to find the moving camera long take replicating shot/reverse shot sequences by shifting the frame from one character to another, pulling back for wider "master shots" and pushing in closer to frame tighter "reaction"—without cutting between these different framings. Likewise, POV sequences are also often duplicated in the same way; showing a character looking, spinning the camera around to see what they're looking at, and returning to show their reaction in one fluid camera movement. The moving camera LS places the viewer directly into the dramatic dynamics of the scene as a witness to action that unfolds without the external manipulation of edits. This type of shooting requires enormous amounts of planning, rehearsals, and choreography of camera and subject movements to ensure that the camera captures what it needs to capture and that the image conveys the dramatic content of the scene effectively.

Alejandro González Iñárritu's 2014 film *Birdman* comprises a string of long takes (most around ten minutes long) strung together to give the illusion of a single long take (Figure 4-35). Although there are a couple of elliptical visual time transitions, it feels as if we're watching the unbroken emotional thread of a man who is risking



■ **Figure 4-34** In Wong Kar-Wai's film *Happy Together*, the consistent use of jump cuts throughout the film conveys the feeling of disquiet, displacement, and a pervasive loneliness that denies our protagonist, Lai Yiu-Fai (Tony Leung Ka Fai), any emotional equilibrium.



■ **Figure 4-35** A string of long takes cleverly edited to hide the cuts gives the illusion that Iñárritu's *Birdman* was shot in a single, unbroken take with a moving camera.



■ **Figure 4-36** The heavily emotional, six-minute long take from Tsai's *Vive L'Amour*.

everything on a Broadway play that may or may not revive his self-esteem and reputation as an actor. This highly formalistic approach is appropriate for the subject because the film drama unfolds in much the same way that live theater drama unfolds on stage, in long, real-time scenes.

Some films elevate the formalistic qualities of the long take even further by allowing extended moments to play out in front of a stationary camera with a fixed mise-en-scène. This approach is quite powerful because it gives the viewer a long time to ponder the image. Viewers are asked to look, think, and then consider again what it is they are seeing, as the film flows on in the real time of everyday life. They are also given the opportunity to

choose for themselves what part of the scene to give their attention, rather than have the edit (or the moving camera) dictate what they should see and when. In the appropriate story, this immersion into a single perspective for a long unbroken period can communicate the feeling of truly being “in the moment” instead of witnessing an abbreviated construction of it, and this can be profound. A good example is the last scene from Tsai Ming-Liang's *Vive L'Amour* (1994) (Figure 4-36). One of the film's leads, May (Yang Kuei-Mei), tries hard to contain her tears, then breaks down and cries inconsolably. Afterward, she gathers herself and lights up a cigarette, but after a few moments she weeps once again. This unbroken shot lasts six minutes, and watching May's emotional struggle unfold in real time is utterly unforgettable. Many filmmakers make extensive use of this technique, including Tsai Ming-Liang, Jim Jarmusch, Cristi Puiu, Hirokazu Kore-eda (especially in *Mabaroshi*), and Pawel Pawlikowski (especially in *Ida*).

In the case of both the intentional jump cut and the long take, the filmmaker understands that the technique will call attention to the artifice of the filmmaking process. Making the process visible rather than invisible makes the audience aware that they are watching a movie, a fiction made by people and machines, and this can encourage active viewing, rather than passive reception. Both techniques, among many other alternative approaches to filmmaking, encourage a viewer not only to *feel* but also to *think*.

in practice

■ **THE ENERGY OF NON-CONTINUITY EDITING**

✎ Alexander Engel's short film *This is It* (streaming on *Voice & Vision's* companion website) is an example of an unorthodox editing style that, for the most part, eschews the standard continuity approach to shooting and editing. The surprisingly complex story of two ill-suited college roommates in their first apartment is built almost exclusively around a series of questions: some sincere, some rhetorical, and some passive aggressive. In a little over two minutes, the film races through 50 “scenes” depicting several months of roommate discontent, with each “scene” usually defined by one quick shot (one–two seconds) and a single question, “Did you

pay the rent?” “Did you take out the garbage?” “Who drank my soda?” and so on. The pace of the film is very quick and much of the humor derives from the energy of the fast, staccato, elliptical cutting that leaps from moment to moment. With comedy, timing is everything and dwelling on any of these mundane events long enough for a master shot, shot/reverse shot sequence would have bled the humor out of the film entirely. However, for a few narratively critical moments, Engel mixes the pace up with scenes containing several shots and questions, e.g. “Are you reading my email?” “Are you cheating on Marla?” (*reaction shot*). These multi-angle moments adhere to basic continuity principles, yet they are quickly edited to keep from dragging the pace down.

However, despite the fact that the film races forward in dis-continuous, elliptical time, Engel does cunningly employ one continuity editing principle to make this avalanche of questions, delivered over months of story time, *feel* like a single extended conversation—the 180° principle. For most of the film, Kip’s looking direction (even in two shots) is toward screen right, while Jules’ looking direction is toward screen left (Figure 4-37). This strategy

establishes the sense of two people in an unbroken dialogue despite vast leaps in time and place. The one jarring exception to this pattern is the central dramatic moment in the film when Kip discovers that Jules started seeing Marla while he was away (“Did you and Marla . . .?” “Didn’t I tell you?”). Suddenly, their looking directions are abruptly reversed, which elevates this moment of betrayal and discovery.



■ **Figure 4-37** In his short film *This is It*, Engel maintains consistent looking direction between the two central characters making it seem like they are talking to one another, even though nearly every edit leaps forward to a completely different time.



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From Screenplay to Visual Plan

*Tell me and I will forget.
Show me and I will remember.
Involve me and I will understand.*

Chinese Proverb

Once you're acquainted with the fundamental aesthetic and conceptual principles of the cinematic language, you're ready to transform a written screenplay into a story, told in images and sound, which plays out across a screen. This transformation is the heart and soul of filmmaking, and the visualization process is where directors do the lion's share of their creative work. However, this is also the beginning of the nitty-gritty logistical work necessary for you to have a successful production period, so a filmmaker needs to wear two hats at this stage: the creative, visual storyteller and the foreman of a production team who has a movie to construct.

Novice filmmakers tend to rush or overlook previsualization, but this is precisely the stage that, if done thoroughly and correctly, can ensure a successful production. When it is done right, a filmmaker, and the entire creative team, arrive on the film set knowing what to shoot, what it should look like, and what everyone must do in order to achieve the unified vision of the film. Knowing your visual approach beforehand allows for two things. First, it makes the production process, the most expensive and stressful stage of making a film, much more efficient and calm. Second, because you are clear about what you are striving for aesthetically, you can more easily respond to the unexpected and improvise on the set. In other words, thorough preparation actually facilitates creative spontaneity during production.

[W]e basically make the movie before we even walk on the set. I mean she and I know so well what we want to accomplish and what we want to do that we know what the shots are. We know what we're going to do before we even get there. This kind of collaborative planning, instead of a one-sided approach, is what enables the flexibility on the set, the opportunity to make changes as the need arises. . . . People who don't plan get themselves so worked up when they actually get to the location that they're so frantic to get something in the can that they're out of their minds.

Ellen Kuras (cinematographer) on preproduction with director Rebecca Miller
(From *Taking the Digital Medium into Their Own Hands*, by P. Bourke, 2002)

■ THREE TOOLS FOR PREVISUALIZATION

There are three essential tools used to previsualize a film: *the shooting script*, *overhead diagrams*, and *storyboards*. We often use these tools simultaneously to help us devise a visual strategy to tell our story effectively and to essentially “see” our film before stepping onto the set. These tools are also critical for communicating the film's visual style and shot selection to the entire crew.

The Shooting Script

The ultimate goal of the visualization process is the realization of a shooting script. The **shooting script** expresses the director's visual strategy for every scene in the film. It shows

you what shots will be used to cover each scene and how they might connect together as edited sequences. You may have scenes that are accomplished in only one long static shot requiring no editing, while other scenes may require multiple shots that duplicate (cover) the action from multiple angles allowing for interpretation in the editing room—it all depends on what best facilitates the telling of the story. The strategy of covering scenes from multiple angles (e.g., wide shot, close-ups, cutaways, etc.) for creative elasticity in editing is called **coverage**, and this is very common in filmmaking (see “Coverage” section beginning on page 83). In any case, the process of deciding the general visual strategy and specific scene coverage is usually done collaboratively between the director and cinematographer, and the shooting script that emerges from this process should show, at a glance, the coverage required for each scene.

It’s important to remember that all major screenplay revisions should be completed before coverage is determined because the shooting script is the version that goes into production, and the core creative team (cinematographer, art director, sound mixer, etc.) each get a copy to work from. In addition, from the details in the shooting script, the director and production manager will devise the logistical strategy for the shoot—the scheduling of the order in which scenes will be shot. Considerable time, effort, collaboration, and creative attention are required at this stage, because the shooting script functions as both the creative, technical, and logistical blueprint for the entire shoot.

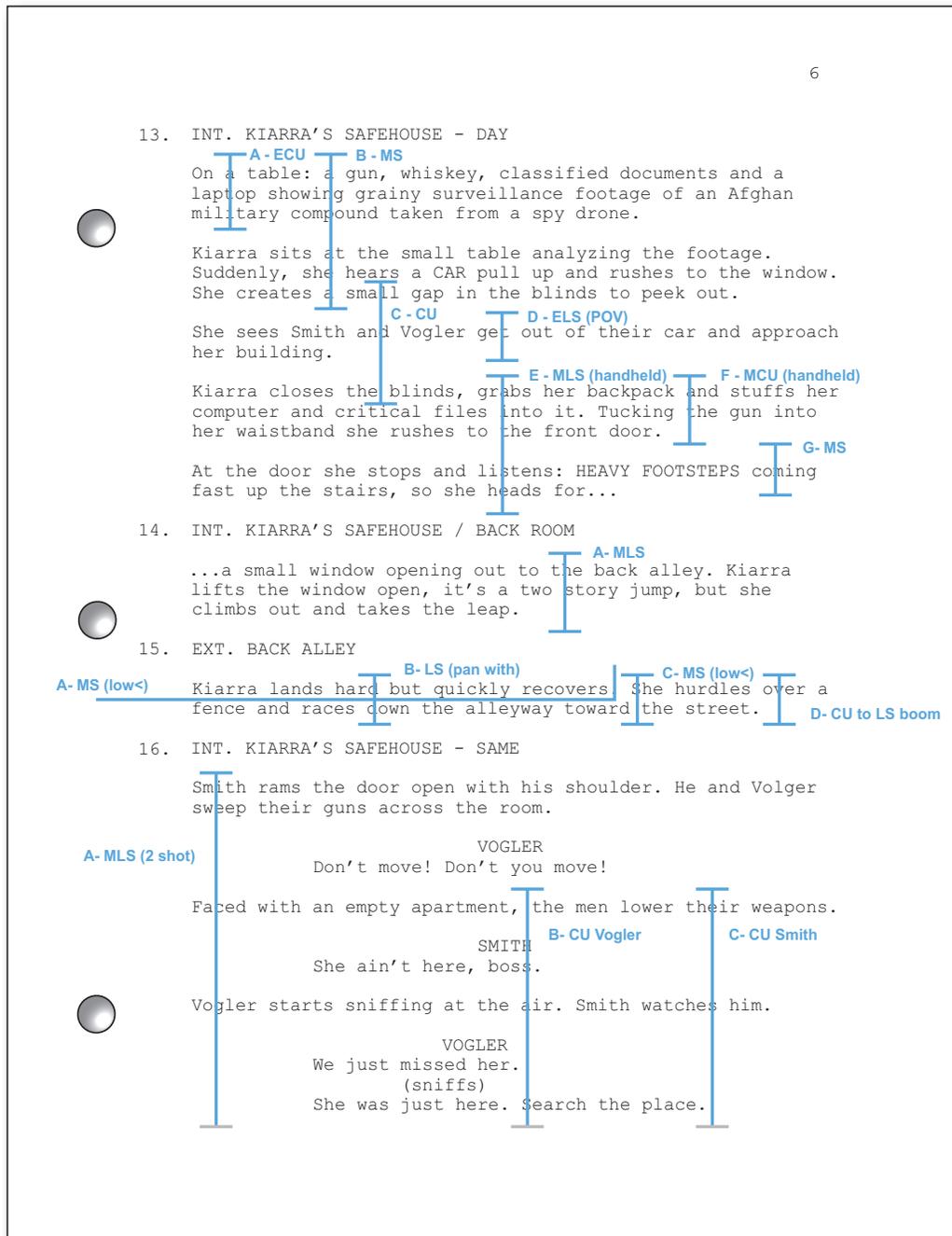
Creating the Marked/Shooting Script

1. The first step in creating a shooting script is to number each scene in the script sequentially by placing the scene number in the left margin next to each scene heading.
2. Next, indicate how every action and line of dialogue will be covered by **marking the script** (also called **lineup**), which means drawing a vertical line through the action and dialogue covered by a specific shot. The line represents the anticipated duration of the shot—where the camera starts rolling and stops (which is always longer than the anticipated edited shot). Each line is labeled with the type of shot desired (i.e., CU or MS PAN WITH or MLS, etc.). When you have finished marking a script, you should be able to see at a glance the anticipated coverage for each scene; you’ll also easily see if you’ve inadvertently left any actions or dialogue uncovered by a shot. Keep in mind that some actions may be covered more than one time (drawn through with multiple vertical lines), allowing for options in the editing room. Also, keep in mind that actions on which you anticipate editing should be duplicated in each of the connected shots to allow for a matched action edit (see **action overlapping** pages 77–78). The concept of starting a shot well before the anticipated edit point is known as **shooting with handles**.
3. Finally, give every shot a letter identifier. Shots are labeled with capital letters and in alphabetical order beginning with (A) in every scene. Each new scene begins with (A) again. For example, scene #1 will have shots 1A, 1B, 1C, etc., and scene #2 will have 2A, 2B, 2C, etc. One caveat is that we usually skip over the letters I and O because they can look like a one and a zero, especially written on a slate (e.g., is scene #5O scene five-O or scene fifty?). When you are done, every shot in every scene has a unique identification number and a basic shot description. This information will become very important when it comes time to organize your shot list and shooting schedule (see later, “Creating a Shot List”).

The **marked shooting script** (Figure 5-1) for several sample scenes from the student film *Kiarra’s Escape* will serve to illustrate how we visualize and indicate some of the cinematic concepts discussed in previous chapters: especially 180° line of action, POV sequences, and moving characters through space. *Kiarra’s Escape* is about Kiarra (Jessica Krueger), a skilled freelance undercover agent who discovers sensitive military surveillance footage she wasn’t supposed to see. As a result, she is being hunted by the CIA and the corporation who hired her. Her principle nemesis is the capable, but sleazy,

Vogler (Robert Youngren) who, along with his sidekick Smith (Rick Varela), is always just one step behind her.

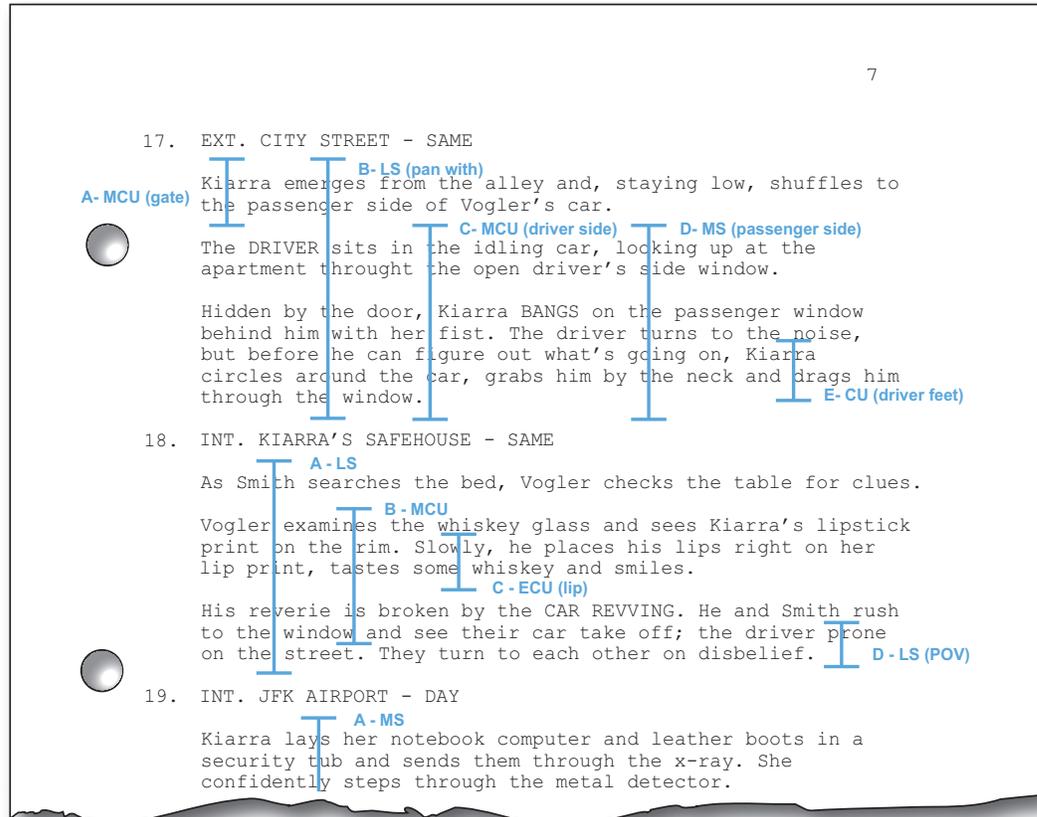
In these six excerpted example scenes (scene #13 through #18), every action and line of dialogue has been marked through and is covered by at least one shot, and every shot is now identified with a scene number and letter. Notice also that for the POV sequence in scene #13 that shot 13C continues right through shot 13D, even though there will obviously be an edit from the looking shot to the POV shot. It doesn't make practical sense to separate the looking and reaction shots into two different shots when you can easily shoot the looking and reaction in one shot and then insert the POV shot later (see Fig. 4-15). Also notice how scene #16 is covered first by a master shot (16A) and then again by the CU reverse shots of each character in the scene (16B and 16C); this is a typical coverage



■ **Figure 5-1** Marked shooting script. By drawing vertical lines across dialogue and action on a script to indicate shot coverage, the director can visualize how they will shoot the film. Scenes must be numbered and individual shots identified with letters.

■ Figure 5-1, cont'd

Marked shooting script. By drawing vertical lines across dialogue and action on a script to indicate shot coverage, the director can visualize how they will shoot the film. Scenes must be numbered and individual shots identified with letters.

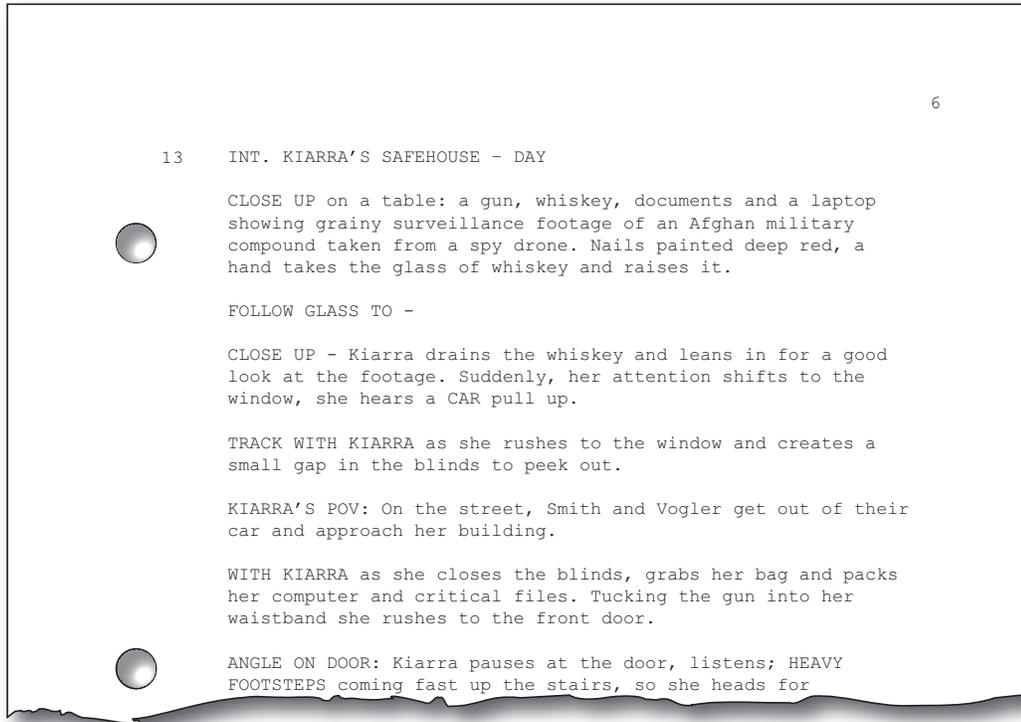


strategy for simple dialogue exchanges and gives you great flexibility in postproduction to determine the pace of the exchange or cut around less than perfect acting. There is similarly duplicated coverage for the action sequence in scene #17 when Kiarra sneaks up on the driver and drags him out of the car. Large chunks of this scene are covered by different angles so that the rhythm and energy of the attack can be precisely modulated through editing. Finally, look at scenes #14 and #15. Both are very short moments, but #14 is covered with one fairly neutral shot while #15 is covered by *five* very different and dynamic shots. This gives you a sense for which scene the director felt was more important or was doing more for developing the character, narrative, or tone (see these scenes from *Kiarra's Escape* on the book's companion website).

For short films, the marked shooting script is certainly all you need to take your film into production. The marked script suffices as your shooting script. Feature films, however, often go through an additional process of rewriting the script to incorporate the shot information into the body of the screenplay itself (Figure 5-2). On short films, this is an unnecessary, non-creative step. It's best to simply work from your marked screenplay, as it also gives you a more immediate picture of scene coverage.

Overhead Diagrams

Overhead diagrams are essential previsualization tools worked out and used simultaneously with the development of the shooting script (Figure 5-3). **Overheads** are basically drawings of each scene from a bird's-eye perspective; they help the filmmaker figure out important details like the axis of action, camera placement, and character **blocking** (the movement of your characters in the space). Overheads are one of the most efficient methods for figuring out where the camera goes for each shot and for communicating the visual breakdown of a scene to your crew. You may sketch and throw away many preliminary overheads as you work and rework a scene during previsualization and rehearsals, but in

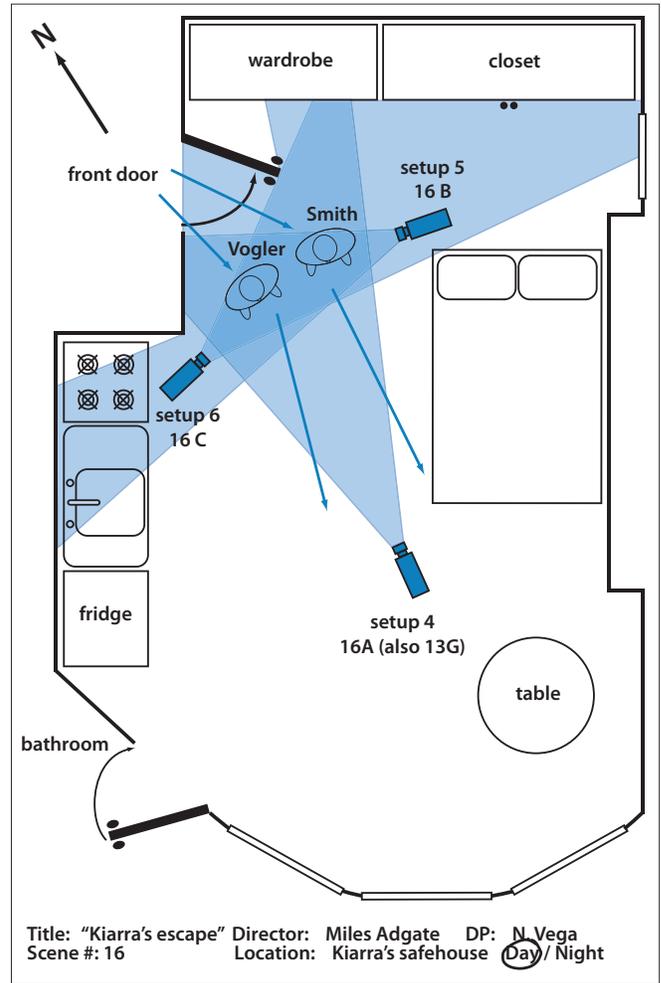
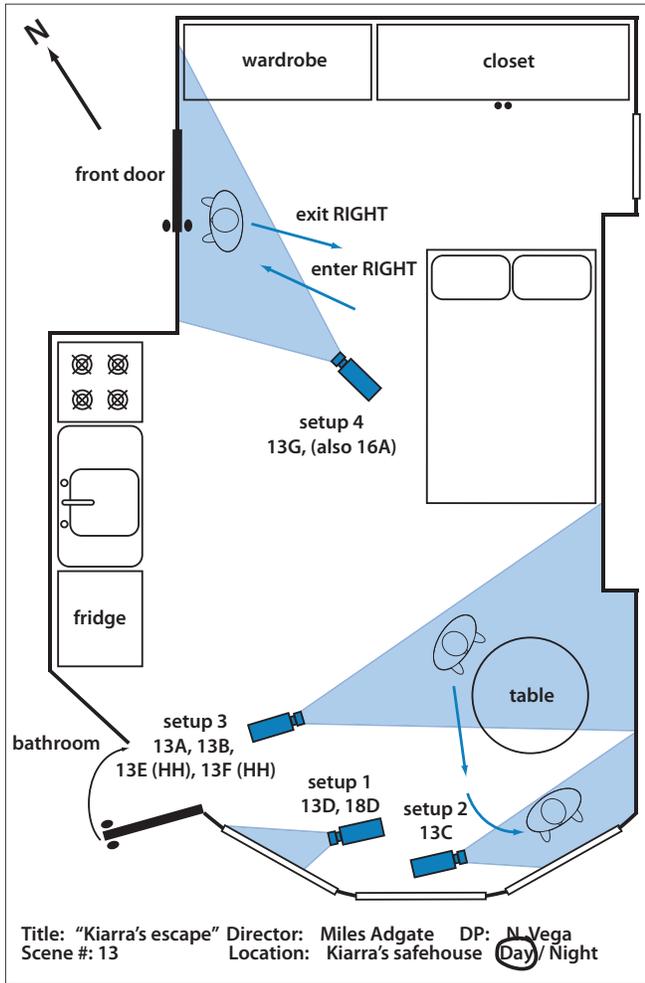


■ **Figure 5-2** Shooting scripts for feature films often involve rewrites that incorporate shot angles. This is usually an unnecessary step for short films that can easily use a marked script as the shooting script.

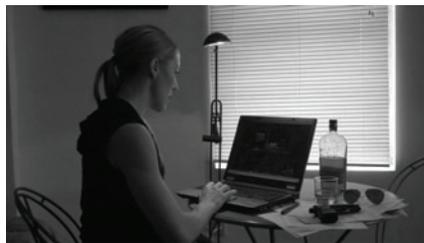
the end you should always generate polished overheads of your final scene strategy to accompany the shooting script on the set of your film.

Each camera symbol represents a **camera setup**, which is the basic location and angle (e.g., angle on table) of the camera from which we shoot one or a number of similar shots from the shooting script. Camera setups communicate to the entire crew where equipment needs to be roughed in from shot to shot and which areas will be in the frame and therefore must be lit and prepped. Notice in **Figure 5-3** (*left*) that four different shots are being taken from setup 3 (angle on the table: 13A, 13B, 13E, and 13F). By referencing those shots with the lined script, you'll see that the shots are of different sizes, but they all share the same basic angle and therefore the same lighting setup and mise-en-scène details. Camera setup 2, on the other hand, is used for only one shot, 13C. So in the end we are covering scene #13 (*left overhead*) with seven shots, but we have only four setups. One additional detail to note is that there are, in fact, *nine* shots on the overhead. This is because two shots from other scenes (16A and 18D) share these camera setups, so we'll also grab those shots while we're already lit and ready to go with those angles (see setup 1 and setup 4 in *left overhead*). Remember, a film shoot is usually organized for maximum efficiency. This idea of multiple shots taken from the same camera setup will be an important consideration in organizing your shoot (see later, "Creating a Shot List"). You'll also notice the indication of character movement in both overheads. This ensures that continuity of action is consistent and that, even though we're shooting out of sequence, it'll all cut together smoothly in the edit.

I should note here that some people do not number their camera setups as I have here (i.e., camera setup 1, camera setup 2, etc.); instead they refer to them by angle (i.e., angle door, angle table, angle window, etc.). Either way works as long as your system remains consistent.



13A



13B



13G



16A



16B



16C

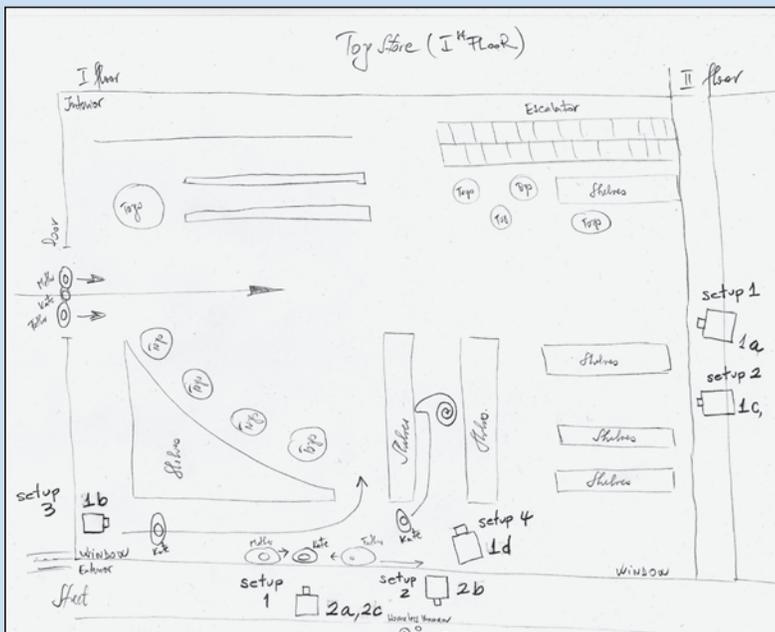
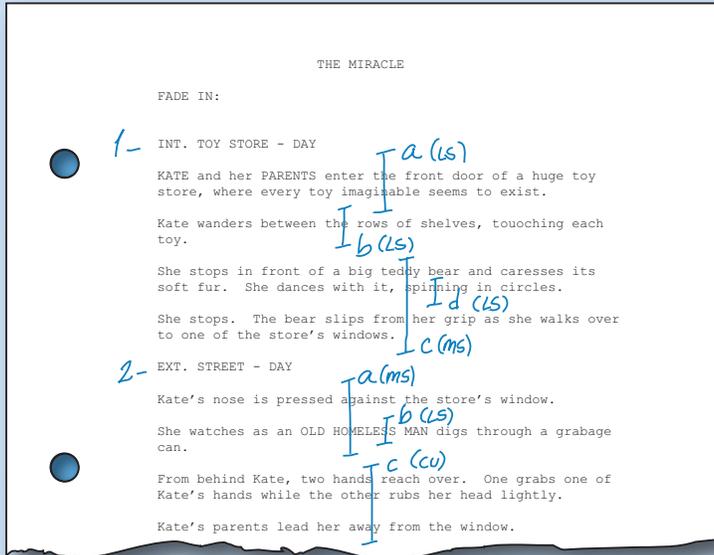
■ **Figure 5-3** Overhead diagrams are simple bird's-eye views of locations with camera positions and actor movement sketched in to allow everyone on the crew to know the basics of each setup.

in practice

For his film *The Miracle* (read the script in Chapter 2), George Racz managed to obtain permission to shoot in a famous toy store in New York City (scenes #1 and #2). But he was allowed only one hour (from 9 to 10 a.m.) to get all of the shots he needed. To save

time, George scouted the location ten times before shooting day! He went alone and with his director of photography (D.P.). He imagined shots, actions, and character movements. He took copious notes and digital photos. He was aware of where all of the toys were and how many shoppers were usually there at that hour. Before production day arrived, he drew overheads of the toy store so that everyone on the set could see where the characters would be, how they would move in the space, and where the camera would be set up for every shot. George had eight setups (12 shots) to do in one hour, but he was so well prepared that he got what he needed on the first take, every shot (Figure 5-4).

One small note: Although scene #3 also takes place at the toy store (see script Fig. 2-14), most of this scene was in fact shot in a studio, since the real location wasn't necessary and more time could be taken for lighting and shooting in a more controlled location.



■ **Figure 5-4** George Racz's thorough research, marked shooting script, and overheads for his short, *The Miracle*, allowed him to be efficient and precise while shooting under extreme time pressure.

These examples should make it clear that in order to make accurate overheads, you need to have a good sense of the layout of your location, so it's important to do your location scouting ahead of time (see Chapter 6). Because overhead scene visualization involves character placement and movement, overheads often reflect work accomplished during rehearsals with the actors as you work out the blocking of the scene. Also, if it's available, this can be done in the actual location, but often blocking is done in a mockup location (see page 176). Finally, overheads can also incorporate rough lighting placement ideas for each scene and electrical distribution at each location as well (see Fig. 18-13). I think you can see how, once given an overhead with basic camera placement and character movement, the D.P. can start to sketch in a lighting scheme for each setup.

Storyboards

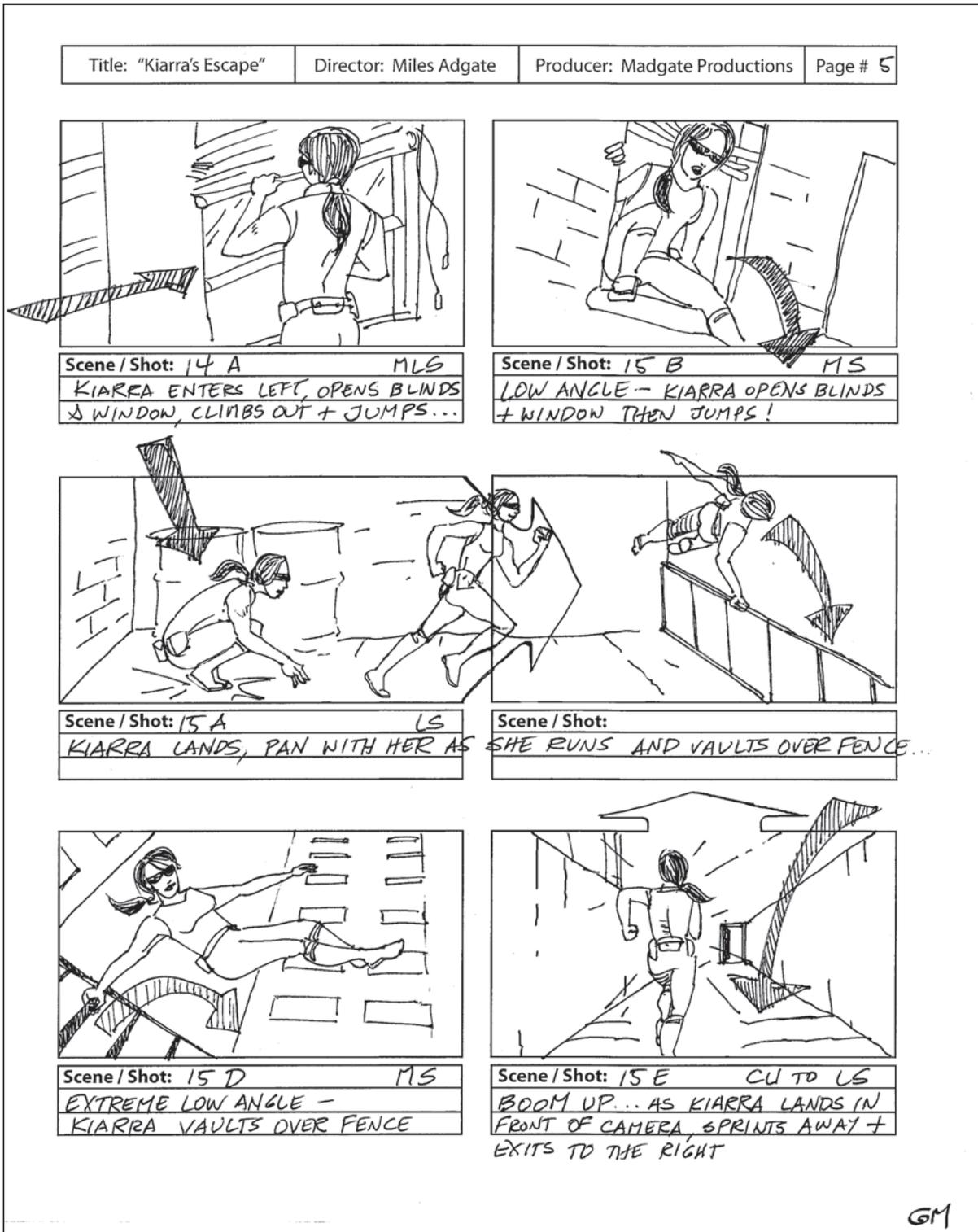
The third previsualization tool commonly used is storyboards. **Storyboards** are drawings of shots, arranged on paper in the order they appear in a sequence. Storyboards are always drawn in frames with the same aspect ratio as your camera frame. Written under each drawing is a description of the shot and the actions or lines of dialogue it covers. Usually, each frame of a storyboard represents one central moment within a single shot; however, long moving shots, which include different framings, might be represented by a number of frames. As the storyboards for *Kiarra's Escape* (scene #15) illustrate, the movement of characters within the shot is indicated with arrows inside the frame, and movement of the camera is indicated by arrows outside the frame (Figure 5-5).

Storyboards are the most direct way to see what your film will look like before you shoot it, but it is by no means necessary to storyboard an entire film. In the professional world, storyboard use is quite idiosyncratic. Some people base their storyboards on the shooting script; other people do just the opposite by previsualizing with storyboards first and then transcribing the results into the shooting script. Some people create storyboards with detailed and intricate renderings of costumes, sets, facial expressions, and lighting, to establish the style of the film, while others use bare bones sketches to do nothing more than figure out shot size, screen direction, and sequencing. Some people use storyboards for every scene, while others use them only for sequences that involve an intricate interplay of movement, action, and composition. It is true that once you get the hang of shot/reverse shot technique, you really don't need to storyboard these scenes; however, sequences that require tricky graphic or movement matches from shot to shot might require drawings. Several computer programs are available to help you create storyboards, including Frame Forge 3D or Storyboard Artist, but hand drawing is still by far the preferred method, especially with short films produced on tight schedules.

It's Only on Paper, Not Written in Stone

Once you have completed previsualization, resulting in a marked shooting script, overheads, and perhaps storyboards, then you have, in fact, already made your first, fairly complete, visualized version of your film—on paper. Now you are ready to go into production because you know exactly what shots are needed to tell the story of your film. For some directors the production process is mostly the realization of the creative decisions they've made in preproduction. For most filmmakers, however, the previsualization process is just the next step in the development of the film's visual strategy. It's not uncommon for a director to rethink choices made in preproduction based on the energy of production: being in the real location, looking through the camera, interacting with the actors, seeing the lighting, negotiating logistical problems, and seeing how the movie is actually coming together. It's common to hear a director on the set say things like, "Let's combine these three shots into one with a slow pan left and a tilt up" or "Lose the close-up and let's stay with the two shot; I prefer to keep the tension between the two of them

in the same frame when he says that line” or “Look at those trees in the background! Instead of a medium close-up here, let’s use a long shot to get them in the frame.” This is the importance of having thorough and detailed previsualization. When you go onto a set knowing exactly what you need to realize your movie, you actually gain for yourself the freedom and confidence to respond to the moment and improvise with your camera from time to time.

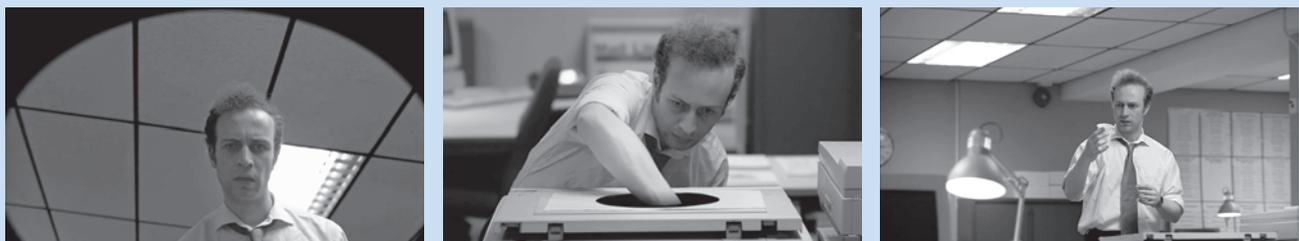
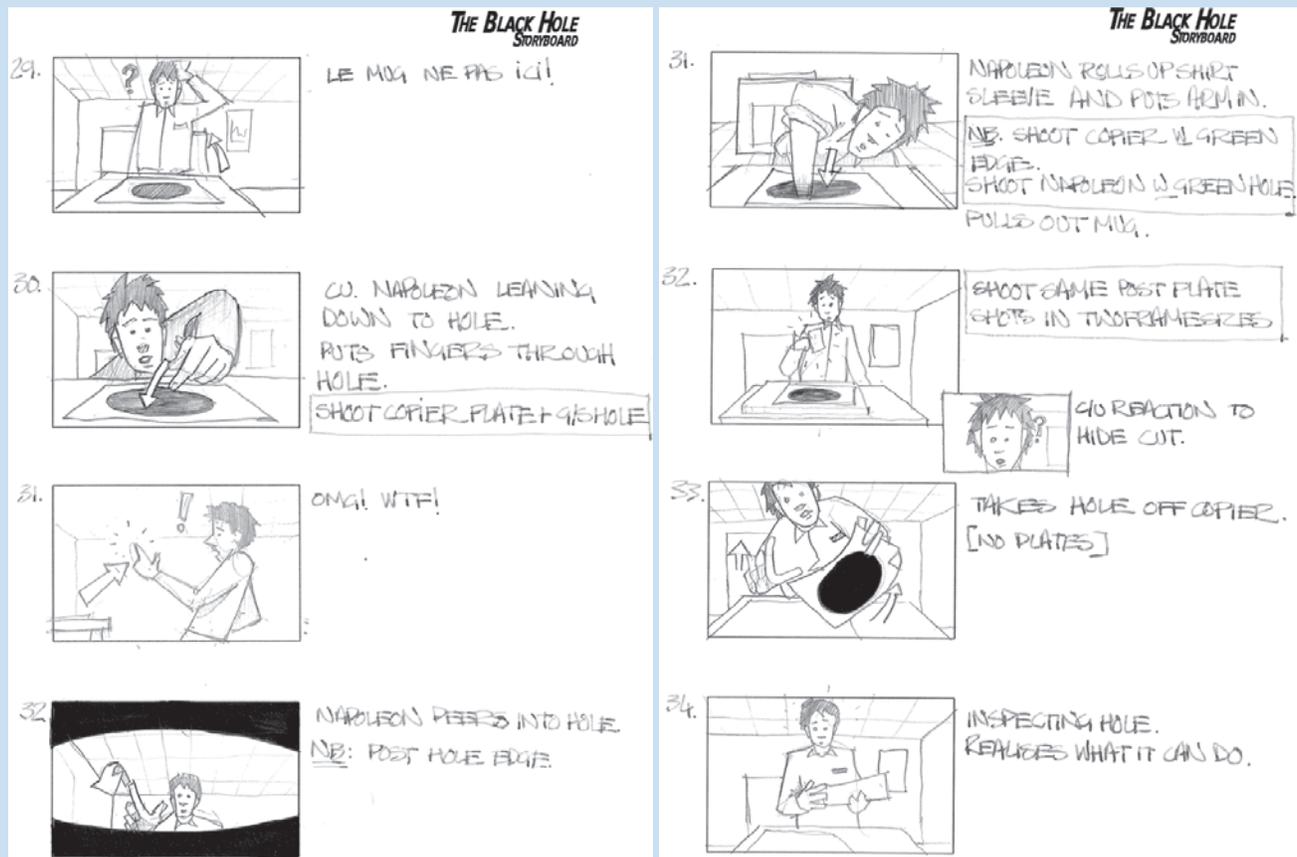


■ **Figure 5-5** Storyboards for *Kiarra's Escape*. Storyboards are a useful tool for previsualizing the composition and editing of a film. They depict a central moment of a shot and include arrows to show actor or camera movement.

The award-winning short film *The Black Hole* by Phil and Olly (a.k.a. The Diamond Dogs) is a little gem of a story. Told in less than three minutes, the narrative revolves around a bored office clerk who discovers the magical powers of a black hole bizarrely printed out by a photocopier. Since the film was so short and involved absolutely no dialogue, the directors decided to eschew the screenplay process altogether and work directly from detailed storyboards that included every shot in the film, right down to the exact angle (Figure 5-6). They also include the basic actions in each frame and even little exclamations like “?” “OMG!” and “Realizes what it can do” to provide the running internal thoughts of the main character (Napoleon Ryan). There is also a technical aspect to these boards, as you will see small notes to create the hole

edge in postproduction for the inside-the-hole POV shot or how to shoot the green screen effect shots. What is especially remarkable about these storyboards is that, despite the simplicity of the renderings and the inclusion of technical information, the filmmakers managed to capture the style, tone, and spirit of the film.

Essential for storyboards to be effective is that they include: basic composition, movement (camera and character), and connection (from shot to shot). As long as you communicate these three details visually, it really doesn't matter how your boards look. In other words, you do not need superior drawing skills to make useful storyboards. The short film *This is It*, by Alexander Engel is a good example. The film, only three minutes, is a very fast paced

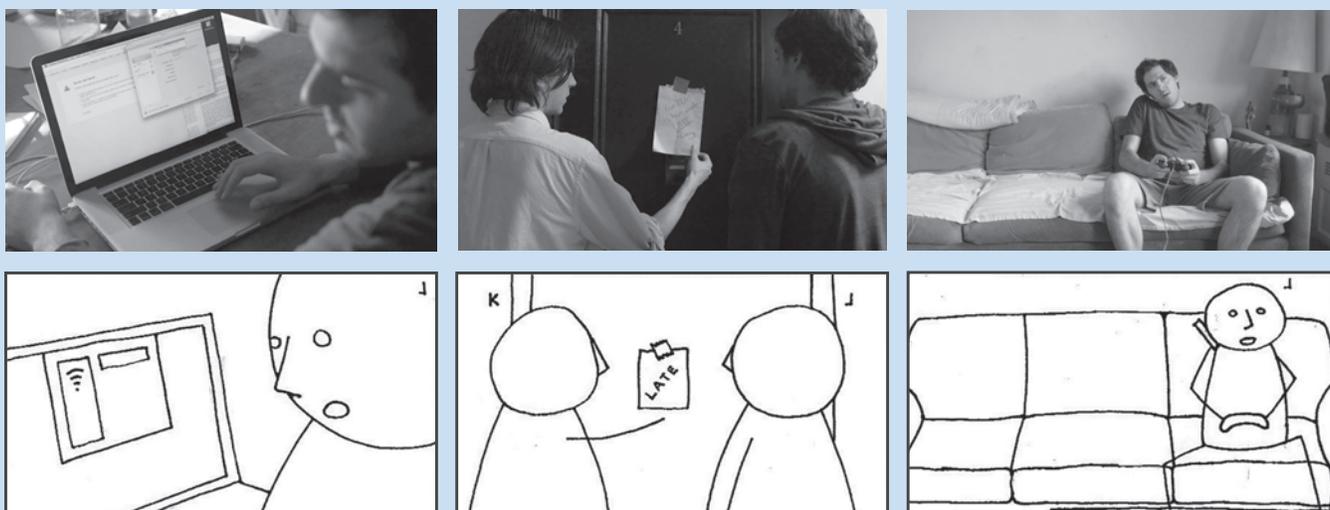


■ **Figure 5-6** Phil and Olly's three-minute film *The Black Hole* was shot using storyboards in lieu of a screenplay.

story of two roommates whose domestic compatibility erodes soon after moving in together. The film relies heavily on dialogue, so Engel wrote a screenplay, but given his tight production schedule and budget, he also sketched out basic storyboards for every shot in the film. Even though he admits that he cannot draw, they are nonetheless perfectly readable and contain all the critical information for

previsualizing the film, shot for shot. Engel's storyboards were followed very closely on the set, and they allowed for an efficient and precise film shoot (Figure 5-7).

See the short films *The Black Hole* and *This is It* along with their complete storyboards on the *Voice & Vision* companion website.



■ **Figure 5-7** You don't have to be a great artist to create useful and effective storyboards, as with these stick figure storyboards from Alexander Engel's short *This is It*.

THE DIRECTOR AND PREVISUALIZING: A METHOD

Framing and editing determine the eye-path of the viewer. It might not be too much to say that what a film director really directs, is his audience's attention.

Alexander Mackendrick (From *On Filmmaking*, 2004)

Some people like to do it in the shower, some people like to do it lying in bed, others do it at their desks in the early hours of the morning when everyone else is asleep. Personally, I have always enjoyed doing it while jogging first thing in the morning: imagining how the film will unfold—shot for shot, moment by moment, and scene by scene. The ability to “see,” in specific detail, how you want your film to play out in specific images and how sequences hold together to tell a story is a skill a director must practice and cultivate.

In general, when we first approach a script we begin from the broadest aesthetic concerns and work toward the details. We also want to find an approach that supports the ideas and intentions of the script, rather than imposing a style regardless of the script content. Your job in the previsualization process is to find a visual style that will add something to what is on the page, not simply illustrate it and certainly not clash with or undermine it.

The Big Picture

First, consider the overall tone, mood, and pace of the film and determine a general visual strategy. Does the narrative suggest an energetic style involving many quick shots cut together, or is a contemplative pace, with long takes playing out over time, more appropriate? Would a fluid, moving camera feel right, or are highly composed and graphically

complex static shots more revealing? What is the overall point of view of the film, and how will the camera present this point of view? Will wide objective frames work better than tight, intimate angles, or vice versa? Remember, there is no universally “right” answer and no universally “better” approach. You need to find the style that works best with your specific story material and resources.

The Details: How to Cover Scenes

Next, working within your general aesthetic approach, look at each scene individually and determine how every scene and each moment in your film will be visualized, including shot compositions and sequence coverage. As you decide on shots, ask yourself three questions: What is this scene about/what really happens in this scene? Whose scene is this/from whose point of view should this scene be presented? And finally, are there any important moments, actions, or details that need to stand out above everything else? Answering these questions (and working with overheads and storyboard sketches) will help you to determine specifically what shots and sequences will best convey the content of the scene. Then you’ll note them directly on the shooting script. For each shot, sequence, and scene, you are attempting to express a dramatic point through visual choices, so it’s important to know what you want to express and then decide on the coverage that will best express it.

For example, take a look at the shooting script for the six-scene excerpt from *Kiarra’s Escape* again (see **Fig. 5-1**). You’ll notice that there are two specific things that the visualization emphasizes over all the other action. The first is Vogler’s general creepiness. His sniffing the air after he breaks into Kiarra’s safehouse warrants a reaction shot of his partner Smith (a minor character) just to highlight Vogler’s animal behavior; and, of course, the moment in which Vogler sees Kiarra’s lip print on the glass and tastes it for himself is elevated as a character-defining action with three shots including an extreme close-up (ECU) of his mouth on her lip print. If the moment had remained in a wide shot, it may have seemed that Vogler just takes a swig of whiskey for himself, but after witnessing this act in close and closer detail, we know that this is not just an ordinary job for Vogler—he’s getting some sort of intimate thrill from hunting Kiarra. The second character detail that is highlighted through previsualization is Kiarra’s athletic physical abilities. The scene in which she jumps to escape Vogler is defined by many dynamic shots, which help the viewer realize that she may be chased, but she will not be easy to catch.

Some moments are critical and need careful attention, special emphasis, or extra technique (Kiarra leaping from the window and escaping: five shots), while other moments get us from point A to point B and should be conceived with simplicity and efficiency (Kiarra getting to the window itself before she leaps: one shot). Where it gets *really* interesting is when a critical moment presents several valid coverage and emphasis options to consider. Here is a simple example: A young soldier is saying good-bye to his fiancée moments before he is to leave her to join his platoon on the front lines. Let’s say we start with a MLS two-shot as he says goodbye and they kiss for the last time before he leaves. Then, at the moment he walks out the door, leaving his fiancée alone, we are faced with a choice: Which shot is best for this highly emotional moment? Where do we put the camera? Should we cut to a close-up of her face to show her distress and sadness, or do you cut to a wide shot and show her as a small, lonely figure within the emptiness of her surroundings? The first option draws the audience into a close identification with the fiancée by bringing them into her intimate space, but the second option creates an equally valid and powerful understanding of her situation. Again, there is never one “correct” answer, but often there is a “best choice” for what you want to express and for the stylistic unity of your project. This is an example of an emotion that must be conveyed through an image, but you will face similar questions with other details, like visually presenting physical tasks in shots or sequences, or simply finding the right composition to match the scale and dynamism of an event or action. Thinking in visual terms like this allows the camera to become the storyteller—and that’s what cinema is all about.

Figure 5-8 provides an example of a carefully visualized scene in which the camera is the primary storyteller. In the following interview of Alfred Hitchcock (A.H.) by François Truffaut (F.T.; from Truffaut's book *Hitchcock*), Hitchcock discusses his carefully planned and considered shot strategy for a key scene in *Sabotage* (1936) and the role the camera plays in building the tension and revealing the inner thoughts and emotions of the characters. In the scene where Verloc is “accidentally” killed by his own wife, there isn't one aspect of any shot that is taken for granted. Notice, too, how Hitchcock anticipated editing the sequence as well as the audience's reactions to each shot.

A.H.: *We had a problem there. You see, to maintain the public's sympathy for Sylvia Sydney, [the actress playing Verloc's wife] her husband's death had to be accidental. And to bring this off, it was absolutely essential that the audience identify itself with Sylvia Sydney. Here we weren't trying to frighten anyone; we had to make the viewer feel like killing a man, and that's a good deal tougher.*

This is the way I handled it. When Sylvia Sydney brings the vegetable platter to the table, the knife acts as a magnet; it's almost as if her hand, against her will, is compelled to grab it. The camera frames her hand, then

her eyes, moving back and forth between the two until suddenly her look makes it clear that she's become aware of the potential meaning of that knife. At that moment, the camera moves [cuts] back to Verloc absently chewing his food as on any other day. Then we pan [cut] back to the hand and the knife.

The wrong way to go about this scene would have been to have the heroine convey her inner feelings to the audience by her facial expressions. I'm against that. In real life, people's faces don't reveal what they think or feel. As a film director I must try to convey this woman's frame of mind to the audience by purely cinematic means.

When the camera is on Verloc, it pans [cuts] to the knife and then back again to his face. And we realize that he, too, has seen the knife and has suddenly become aware of what it may mean to him. Now the suspense between the two protagonists has been established, and the knife lies there between them.

Thanks to the camera, the public is now living the scene, and if that camera should suddenly become distant and objective, the tension that's created would be destroyed. Verloc



■ **Figure 5-8** The careful visual story design of this scene from Hitchcock's *Sabotage* allows the audience to feel the fear that pushes Mrs. Verloc (Sylvia Sydney) to murder her own husband (Oskar Homolka).

stands up and walks around the table, moving straight toward the camera, so that the spectator in the theater gets the feeling that he must recoil to make way for him. Instinctively, the viewer should be pushing back slightly in his seat to allow Verloc to pass by. Afterward, the camera glides back to Sylvia Sydney, and then it focuses once more on the central object, that knife. And the scene culminates, as you know, with the killing.

F.T.: *The entire scene is utterly convincing! Someone else might have ruined the whole*

thing merely by changing angles when Verloc rises to his feet, and placing the camera at the back of the room for a full shot before going back to the close shot. The slightest mistake, like the sharp pulling back of the camera, would have dissipated all of that tension.

A.H.: *That would ruin the whole scene. Our primary function is to create an emotion and our second job is to sustain that emotion.*

(From Hitchcock, by François Truffaut and Helen Scott, 1985)

One conventional way to visualize a scene is to start wide, with establishing shots (master shots), and then move in tighter (MCUs and CUs) when tension starts to mount. The tightest shots are reserved for the most climactic moments when seeing the emotional reaction of a character is vital. For example, in the scene from *Sideways* (2004) described in Chapter 4 (see **Fig. 4-8**), Alexander Payne starts with an LS (master shot) and moves in closer and closer as it becomes increasingly clear that Maya is interested in Miles. Toward the end of the scene, the tight CU on Miles shows us that he is both very attracted and very nervous. The subsequent ECU of Maya laying her hand on his is the climactic moment in the scene and puts the question to Miles: It's your move, what are you going to do? The next moment Miles balks and the shots become wider again. He blew it.

Even the Hitchcock sequence described in Chapter 3 (see **Fig. 3-5**) uses this pattern. We start with ELS establishing shots of the location, then an LS of the swimmer in the waves, and then an MLS of her washing ashore, and finally the sequence culminates in the CU of the belt, which announces to us that there has been a murder.

This conventional pattern, however, is certainly not the only way you can visualize a scene. You could, for example, start with tight shots to create a sense of mystery about where we are or who is in the scene and then broaden out to fully contextualize the scene and answer the mystery. Scene #13 in *Kiarra's Escape*, for example, begins with an ECU of the table. The shot is filled with a sense of espionage because it tells us in vivid detail: computers, surveillance, gun, whiskey; and it begs the question "Where are we?" The next shot reveals Kiarra and the question is answered, "This is Kiarra's domain."

If we consider the hypothetical scene of the young soldier and his fiancée introduced earlier, we could start our scene of the young man leaving his fiancée with a CU of the woman crying. The audience might wonder, why is she crying? What's going on? Then pulling out to a wide shot and seeing the young man next to her in a soldier's uniform might be all an audience needs to see in order to understand her tears. He's been inducted! The choice is yours.

Back to the Big Picture

Just as a painter will step back to see how the small details are working within the broader canvas, you, too, need to step back from time to time to look at the overall picture as you visualize each individual scene. The transitions from scene to scene are especially important to consider. Your scenes may be visualized beautifully, but scenes are not totally distinct dramatic units. You must look at the larger architecture of the film and determine how each scene will link with those on either side to create the overall shape and rhythm of the film.

For example, I had a student who made a simple chase film. A tourist in New York City thinks he is being chased by two young hoodlums but discovers in the end that they were only trying to *return* his wallet, which he had dropped. The chase takes us through several areas of Central Park and midtown Manhattan. This student carefully considered the larger shape of the film and decided that the pace of the film should speed up toward the end, in order for us to feel that the hoodlums were getting closer and closer. Each successive scene was constructed with increasingly quicker shots, more angles, and more dynamic frames than the previous one, to give us a sense of acceleration. The final sequence was done entirely with a handheld camera to reflect the main character's anxiety. This film was a success because the student did not think about each scene in isolation; rather he imagined the film, and composed it, almost as a single, unbroken piece of music.

■ PREVISUALIZATION AND COLLABORATION

It's important to understand that a director is not alone in the previsualization process and that a smart director will draw on the experience and expertise of his creative team.

Director and Cinematographer

In the professional world, a director is lucky to be able to make one film every two or three years, but it is not unusual for a cinematographer to shoot two or three films every year. That is why the creation of a shooting script, overheads, and storyboards is usually done in collaboration with the cinematographer. Cinematographers are trained to find visual solutions to narrative challenges, and this second set of eyes is invaluable. Cinematographers are also knowledgeable about practical techniques and technical capabilities (from sensors, to lenses, to camera support), which the director might not know.

Damien Chazell's *La La Land* (2016) combines various shooting strategies (Figure 5-9). For most of the dance numbers he wanted long takes with minimal or no editing (single takes), while for other scenes he preferred coverage. In describing their previsualization collaboration method, the cinematographer Linus Sandgren also acknowledges the symbiotic relationship between aesthetic desires and practical concerns:

Me and Damien sat every morning and went through the whole film, from scene one to the last scene, and thought about how we could block them and involve the camera, the character, and also, where would be the best position for the camera to be involved in the scene. We thought about other scenes and how to box them with single takes. Then some scenes, he wanted coverage, like in the argument scene when they're sitting, having dinner. That dinner scene, we deliberately had coverage, to be able to cut that scene dramatically between them. Otherwise there was a lot of scenes that Damien wanted to be efficient, have as much as possible in a short amount of time, to be able to move on into a new scene.

(From "‘La La Land’ DP Linus Sandgren on the Challenges of Capturing the Poetic LA Musical in Long, Fluid Takes," Matt Grobar, *Deadline Hollywood*, 2017)



■ **Figure 5-9** Chazell and Sandgren met regularly to strategize the shooting of each and every scene in *La La Land*. They decided to shoot the dance numbers in long, unbroken takes (*left*), while more dramatic scenes, like the dinner argument (*right*), were shot using conventional scene coverage.



■ **Figure 5-10** George Racz, going over camera setups during a production meeting with his D.P., Tim, and his A.D., Kanako.

Even on student shoots, where the director and cinematographer have similar experience, the pooling of knowledge and the additional perspective of the person who is responsible for lighting the scene, choosing the lenses, and using the camera can provide indispensable creative contributions (**Figure 5-10**).

Director and Actors

The other important creative collaboration that informs previsualization is the one between the director and actors. During rehearsals, which often happen simultaneously with previsualization, the director and actors explore the emotional and psychological dimensions of the story, the characters, and specific scenes. This process often yields ideas for **blocking** (the movement of characters in the space) as well as an understanding for where critical moments in a scene are located. For action-oriented

sequences, like most of *Kiarra's Escape*, it's fairly simple for actors to work within the visual design of the scene, but for longer, more emotionally involved scenes, it's not always easy for actors to perform at their best if their movements have been completely prescribed for them beforehand. If, for example, you were to block the intensely emotional scene I introduced on page 118 in which the young soldier gives his fiancée the news that his unit has been called to go to war and you tell the fiancée that she *must* cross over to the window and start to cry there because you've already planned for a nice close-up with great lighting at the window, you'll likely get a mechanical performance. But if you rehearse the scene and watch carefully how the actors engage each other and discuss what feels best for the actor in terms of emotions and movement, then you'll start to get ideas for where to place the camera based on the strongest performances those actors can give you. You may discover through the actor's choices, for example, that it's best for the fiancée not to break down until after her soldier boy has left the room, where she then weeps all alone against the door he's just walked out of. One of the main functions of rehearsals is to help directors previsualize scenes by allowing performances to inform their visual design, in fact, it's not unusual for the cinematographer to attend rehearsals and shoot some rough footage just to experiment with various framings and movement (see Chapter 7 for more on rehearsals).

Director and Production Team

During previsualization, it is also important to include someone from your producing team who is responsible for the practical and logistical aspects of your shoot. This person keeps an eye on the feasibility of the director's creative aspirations and helps the director stay within the practical parameters of the project, like how many shooting days there are, how big the crew is, what equipment is available, and so on. To imagine dolly shots in every scene when you only have the budget to rent a dolly for one day is counterproductive. To cover a scene with 25 shots when you have only two hours at the location is futile. It's very common for inexperienced directors to get overly optimistic during previsualization and forget to check their exuberant and expansive creative vision against the realities of production resources. Director's occasionally need a reality check.

Once, as a student, I was the cinematographer on a project with a four-person crew. The director had many great ideas and some that were not so great. One idea was to send me up on the roof of a six-story building to get a handheld, subjective camera shot for a nightmare sequence. In one swift movement I was supposed to transport the camera

from behind a chimney, along the roof tiles, and hold it, suspended over the edge of the roof. “It’ll be a great shot!” the director insisted. But the producer intervened, “Nope, can’t be done.” “Why?” the director asked. The producer replied calmly, “One, we don’t have access to the roof and I doubt that the university will give it to us. Two, it’s dangerous; Mick could fall and die! And three, if the professor sees on screen that we were dangling the school’s camera over the edge of a roof, we’ll all lose our equipment privileges for the year.” The director said, “Oh, okay. I guess you’re right,” and he came up with a different shot. I think it was the idea of losing equipment privileges that ultimately convinced him.

In the professional world there is no shortage of people who perform the role of “reality checker.” The production manager, assistant director (A.D.), and associate producer all function as overseers of the practical, financial, and logistical feasibility and progress of the film. On small crews this could be the producer or associate producer’s role. On very small shoots (with a crew of three or four), a director might ask everyone during previsualization to help keep an eye out for the impractical and unachievable and to devise alternative solutions that are equally strong and creative, but more practical. Additionally, everyone along the line should be considering the safety of the ideas proposed during the previsualization process. Red flags should go up if anything seems to remotely endanger the health and safety of the cast or crew, or the safety of the equipment (see Chapter 18 for more about project safety).

■ THE SHOT LIST: FROM VISUAL PLAN TO PRODUCTION PLAN

Once you have completed your previsualization (marked/shooting script, overheads, and storyboards), you should have a clear and specific idea of every shot you need to bring the script to the screen. Now you need to take the next step and transform your creative visual approach into a practical production plan. As we mentioned earlier, the scenes and shots in a film are rarely shot in the order in which they appear in the script or on the screen. Instead, actual shooting is organized to maximize efficiency of time and resources, which usually means shooting out of sequence. So how do we know what to shoot first? What setup follows after that? How do we organize the order of our shooting to be most efficient? The answer to these questions lies in understanding how to create a tight shot list.

Obviously, a marked shooting script constitutes a shot list of sorts because you can see, at a glance, every shot you need to cover your scenes. I’ve been on sets where someone has simply created a separate document that lists all the shots in script order, but that’s merely duplication of information and no more helpful in terms of organizing the shooting day. A truly useful **shot list** is a list of all of the shots that make up the film *in the order in which they will be shot*. A shot list contains exactly the same shots as in your marked scripted, but they have been rearranged according to the practical and logistical considerations of the production process. With a good shot list the entire crew knows, at a glance, what shots they must accomplish in a day and in what order they will be taken—and every shooting day has its own shot list.

This type of shot list incorporates basic production logistics and film scheduling knowledge. Film scheduling on professional shoots is quite a complex process and doing full blown production scheduling is often way overkill for short films. But, this shot list method incorporates just enough production scheduling to make your shooting days effective and efficient.

Creating a Shot List

The shot list is usually created by the director and the production manager. The shot list is the first step in the larger task of scheduling the production, and the principal factor in organizing the shot list is efficiency. The considerations determining the organization of our shots, in more or less descending order of importance, are: (1) major location (and time of

day), (2) camera setup angle, (3) shot size, (4) on-set logistics, and (5) pickups. Additionally, there may be some (6) exceptional considerations that determine when certain shots must be scheduled.

For the following discussion, refer to the *Kiarra's Escape* marked shooting script (see Fig. 5-1), overheads (see Fig. 5-3), and shot list (Figure 5-11). Also refer to the *Kiarra's Escape* script breakdown in Chapter 6 (see Fig. 6-8). All four of these preproduction documents work in concert with one another.

1. Location and time of day.

The first and broadest organizing principle for ordering shots concerns location and time of day. In general, we organize our shooting schedule so that we shoot all scenes occurring in the same location together, regardless of where they appear in the script.

■ **Figure 5-11** Shot list for two production days on *Kiarra's Escape*. A shot list is a list of all of the shots for each scene in the order in which they will be shot.

SHOT LIST (7/11/10)			
TITLE: <i>Kiarra's Escape</i>	Dir. Miles Adgate	Scenes: #14, #15, #17	Shoot Date: 7/11
SCENE: #17 EXT. CITY STREET – DAY			
SET-UP 1: Angle on front gate to street			
1) 17A: MCU K. enters checks if coast is clear, exits left.			
SCENE: #15 EXT. BACK ALLEY – DAY			
SET-UP 1: Angle on window (low angle)			
1) 15A: MS K. opens blind, window and leaps out.			
SET-UP 2: Angle on Kierra			
2) 15B: / PAN WITH K. lands, recovers runs and leaps over fence.			
SET-UP 3: Extreme Low angle from ramp			
3) 15C: MS X-TREME LOW ANGLE K. leaps over fence (and over camera)			
SET-UP 4: Angle down alley			
4) 15D: CU – LS/BOOM UP K. lands in front of camera. BOOM as she sprints away.			
SCENE: #14 INT. KIARRA'S SAFEHOUSE / BACK ROOM – DAY			
SET-UP 1: Angle on window			
1) 14A: MLS K. enters left, open blind, window and leaps out.			
SHOT LIST (7/20/10)			
TITLE: <i>Kiarra's Escape</i>	Dir. Miles Adgate	Scenes: #13, #16, #17, #18	Shoot Date: 7/20
SCENE: #17 EXT. CITY STREET – DAY			
SET-UP 1: ANGLE ON CAR - DRIVER'S SIDE			
1) 17B: LS/PAN WITH Kierra. Start up street, pan with and follow action to end.			
2) 17C: MCU on Driver casual. K.'s hand hits window, roll down window. To end.			
SET-UP 2: ANGLE ON CAR – PASSENGER'S SIDE			
3) 17D: MS on Driver casual, hand hits, window down, K. enters screen left, attacks!			
4) 17E: CU on Driver's Feet (hand held) Feet struggle as he is dragged out window.			
SCENES: #13 (and #18D) INT. KIARRA'S SAFEHOUSE – DAY			
SET-UP 1: POV ANGLE ON STREET			
1) 13D: POV from west window.			
Start with blinds shut, cracked open, then snapped shut. (Kierra's hand)			
2) 18D: POV from west window.			
Start with blinds shut, cracked open, then snapped shut. (Vogler's hand /stand in)			
*** Car & Driver are done and can go home ***			
SET-UP 2: ANGLE ON WINDOW (EAST)			
3) 13-C: CU Kierra enters left. Opens blinds, looks, reaction, close blinds. Exit left.			
SET-UP 3: ANGLE ON TABLE			
4) 13A: ECU table top. K's hand lifts glass out of frame (top)			
5) 13B: MS K. looking at footage, noise, reaction. K. exit frame right.			
6) 13E: MLS (<i>hand held</i>) K. enters right. Packs up. Follow to door. Exit right.			
7) 13F: MCU (<i>hand held</i>) K. enters right. Packs up. Exit left.			
SET-UP 4: ANGLE ON DOOR (SAME AS SETUP 1 SCENE 16)			
8) 13G: MS K. enters right w/backpack. Listens. Registers noise. Bolts right.			
Kierra is done for day and can go home			
SCENES: #16 and #18 INT. KIARRA'S SAFEHOUSE – DAY			
9) 16A: MLS 2 SHOT MASTER Smith & Vogler. Break in. V. exit left. S exit right.			
SET-UP 5: 10) 16B: ANGLE ON VOGLER: CU reverse shot			
SET-UP 6: 11) 16C: ANGLE ON SMITH: CU reverse shot			

CONTINUED:

For example, if we have a script with four scenes in a restaurant kitchen (one in the beginning, two in the middle of the film, and one at the end), we will, nonetheless, group all of these scenes together and shoot them back to back. This way, we minimize the number of times we need to travel to a location and set up lights, camera, sound, etc. Imagine the waste of time if we were to shoot the first kitchen scene, then strike the set to go shoot the next scene somewhere else, and then return to the kitchen location another day and set up all over again. **Figure 5-11** shows the shot lists for two shooting days for *Kiarra's Escape*. Scenes #13, #16, and #18 all take place in the KIARRA'S SAFEHOUSE location around the same time of day, so these scenes were shot on the same shooting day, back to back, and then that particular location was no longer needed (see **Figure 5-11**, Shot List 7/20/10).

Although Scene #14, KIARRA'S SAFEHOUSE/BACK ROOM is in the same apartment according to the script, in reality, the location chosen for the safehouse was a studio apartment with no additional room. Scene #14, in fact, was shot a week earlier and miles away in a different apartment where there was also the BACK ALLEY location (scene #15) and the front gate for the first shot in the scene #17. So all of the shots that shared this one location were placed on their own shooting day (see **Figure 5-11**, Shot List 7/11/10).

For scenes that use natural light, day or night, becomes a significant organizing detail. These sample scenes all take place during the day, but for the rest of the film one would cluster all EXT. BACK ALLEY—DAY scenes together and then shoot all EXT. BACK ALLEY—NIGHT scenes at another time, regardless of where they occur in the script. The Cover-Set: You'll also notice in **Figure 5-11** that each shooting day begins with the exterior locations and then the production moves indoors. If it's possible, we try to shoot exterior scenes first, taking advantage of fair weather when we can, but have an interior set ready to go as a backup should the weather turn inclement. An interior scene that can be used in case your exterior shoot is cancelled because of bad weather is called a **cover-set**. By scheduling exteriors first, we have our interiors as backups and we waste less time. But if we shoot all of our interiors first, then when bad weather strikes all we can do is postpone.

2. Camera setup angle.

As we mentioned earlier, a camera setup is the placement of the camera for each principal camera angle from which we can shoot one or multiple shots. Once a camera placement and angle is determined, a great deal of production time is spent dressing the set, lighting that area, and wiring it for sound. For this reason, we cluster all shots with the same general setup together on the shot list (the same way we did on the overheads; see **Fig. 5-3**). This way we move the camera, position the lights and microphones, and all the rest of it, fewer times. Scene #13 has four shots taken from the camera angle on the table: shot 13A, 13B, 13E, and 13F. Even though there are shots (13C and 13D) between these shots, we will take the four shots in setup 3 back to back so that we set up the camera, lights, sound, etc. for the angle on the table only once. The same is true for the two shots from exactly the same POV angle out of the window even though they are from completely different scenes (setup 1: 13D and 18D). The two shots (13G and 16A) in setup 4 will also be taken back to back because they share the same angle on the door (see **Figure 5-11**, Shot List 7/20/10).

3. Shot size.

Generally speaking, we further organize our shooting to go from wide shots to close-ups. For example, we would shoot a wide master shot before we shoot the close-up reverse shots or cutaways in a two-person interaction. You can see this with scene #16 (see **Figure 5-11**, Shot List 7/20/10). The master shot 16A is first to be shot, followed by the reverse shots 16B and 16C. We shoot from wide to detail for several reasons. First, the master scene generally covers more of the script and shows more of the space, so it therefore requires more attention to set details, lighting, and so on. If we run out of time and have to abandon a shot, it's usually easier to reshoot a close-up later or even do without it. Most close-ups also require fewer cast on camera, so fewer

people need to be call back to reshoot. And it's also much easier to begin with the broadest lighting setup and slightly adjust lights as you move in closer than it would be to light a close-up and then have to relight the entire scene for a wide shot.

4. *On-set logistics.*

On-set logistics is where common sense comes into play. It is important to avoid keeping your cast waiting for hours needlessly until you get around to their shots. For example, if we have a scene in which a teacher is lecturing to a class of 25 students and we plan to cut back and forth between the teacher at the chalkboard and the class taking notes, we would shoot all shots that involve the class first (i.e., master shot of class with teacher and the reverse shots of the class). Then we can let the class go home—preferably before lunchtime to save on our food budget!—and shoot the reverse shots of the teacher without the 25 people hanging around on the set. In the *Kiarra's Escape* example, we don't need to have Smith and Vogler on set while we shoot Kiarra's shots for scene #13. However, the camera setup that they all share is setup 4 (angle on door). This setup includes Kiarra's last shot of the day (13G) and she can go home, and then, using the exact same camera setup, we can shoot 16A, Smith and Vogler's first shot of the day. This is why that particular setup is placed where it is in the shot list.

5. *Pickup shots.*

Pickup shots are quick shots that are often not part of the original script previsualization but are taken after (and sometimes during) production to fill in gaps, to make editing smoother, or to add something that, in retrospect, can improve the scene. Pickups are not to be confused with **reshoots**, which means reshooting significant shots or scenes for one reason or other. Pickups are usually taken with a skeleton crew and often don't require actors; pickups include shots of landscapes, location-establishing shots, and shots of objects and cutaways. There is no need to have a sound recordist on the set while you shoot cutaways that require no synchronized sound and no need to keep actors waiting while you shoot CUs of location details. Often these shots are done after everyone goes home or on another day.

Kiarra's Escape has a good example of a pickup shot that you will not find in the lined script, overheads, or shot list, but you will see it in the film online. That's because the shot was an impromptu idea on the part of the director at the time of shooting. During the final takes of shot 13G (scene #13, setup 4, in [Figure 5-11](#)), Smith and Vogler were already in costume and makeup ready to go for the next shot in that camera setup (16A). According to the shooting script, shot 13A shows Kiarra at the front door as she hears "heavy footsteps coming fast up the stairs." She then dashes off to the backroom. But the director had a little extra time and thought, why not shoot a quick pickup shot of Smith and Vogler, guns drawn, stalking up the stairs? If he didn't like the shot, he could always just use the audio portion for the off-screen "heavy footsteps" sound effect. For slating and logging, when you add impromptu pickup shots to a scene they are marked "**PU**" for pickup. So the shot of the thugs coming up the stairs was slated as #13 PUa. If the crew happened to shoot another unscheduled pickup shot, then that would be logged and slated #13 PUB, and so on.

6. *Exceptional Considerations.*

Every now and then (or a little more often than that) you'll have no choice but to organize your schedule around exceptional considerations. Actors' schedules, location restrictions, prop and equipment availability, location sound issues, weather conditions, and other factors can force you to stray from your ideally efficient shot list schedule. In these cases, you just roll with it and do what you need to do—but keep the rest of your scheduling as efficient as possible.

In the case of *Kiarra's Escape*, the exceptional consideration was the car. The film needed an appropriate car for the "spy hunters" Smith and Vogler. Luckily, one of the crew knew a guy who worked at an auto dealership and was willing to provide the movie a floor-model, black Mercedes sedan for free. The catch was that he had to get the car back to work before noon. Shooting day 7/20/10 reflects

this special case and all shots involving the Mercedes were taken first, from the scene #17 attack on the driver to the POV shots of the car (13D and 18D).
The Performance Factor

One other special circumstance to consider, and this one supersedes all others, is the directorial and performance approach. There are times when a director needs to preserve the momentum of the cast's creative and interpretive energy by shooting a scene more or less in order. It may be inefficient, but if you get better performances from sequential shooting, then it is worth the trade-off. This is especially a factor when dealing with nonactors or actors not familiar with single-camera-style, out of sequence, shooting.

in practice

■ SCHEDULING AROUND LOCATION CONTINGENCIES

Ryan Coogler's 2013 film *Fruitvale Station* tells the true story of Oscar Grant (Michael B. Jordan), an unarmed black man who was shot by a transit police officer at a Bay Area Rapid Transit (BART) train station. The plot of the film meticulously recreates Oscar's last day leading up to the shooting from a very tight point of view (we never leave Oscar's side).

"Authentic" is a word that critics and the filmmakers themselves use frequently to describe the movie, and the authenticity doesn't just come from the naturalistic style of the film, but also from the fact that Coogler managed to film in many of the real locations that Grant passed through during the final day of his life, including the Fruitvale BART Station where he was shot. Insisting on actual specific locations like this means that you are obliged to fit the shooting schedule around the availability of the locations, which can be difficult (Figure 5-12).

The film's cinematographer, Rachel Morrison, recalls how location contingencies influenced scheduling and how the crew coped with these limitations:

We were very much at the mercy of locations. It is nothing shy of a miracle that we were granted access to a lot of the real spaces that Oscar inhabited on that day. We filmed in the grocery store where he worked, on real BART trains and the BART platform where he was shot. The locations were the driving force behind scheduling. BART was the last to sign on — it was obviously very controversial. We ended up having to shoot all of the BART footage in the middle of the night, after they closed. So, from 1:15AM – 5:15 AM on three different days we got four hours on the platform. As you can imagine, that was not a lot of time. It amounts to one shooting day spread out over three nights. We ended up rehearsing all of the actions in a parking lot taped out to the specifications of the platform and ran the shots almost like you would football plays. Ryan comes from football, so we had laminates and a game plan in order to get something insane, like 20 shots in four hours.

(From "Fruitvale Station D.P. Rachel Morrison" Interview with Alix Lambert, *Filmmaker Magazine*, 2013)



■ **Figure 5-12** Often it is necessary to accommodate the shooting schedule around location availability. For the making of *Fruitvale Station*, Ryan Coogler wanted to shoot on the actual BART platform where the crime occurred, which restricted his access to only four early morning hours on three specific days.

■ SCHEDULING FOR PERFORMANCE CONSIDERATIONS

A friend and colleague of mine, Andrew Lund, shot his short film *Snapshot* (2005), in a highly controlled filming situation—two guys in one room. The drama unfolds around the kidnapping of a celebrated photographer by one of his subjects who is disgruntled about how he is portrayed in a widely reproduced photograph. The location was free and came with very few time restrictions, so Andrew took advantage of this luxury and planned a shooting schedule which he knew was not the most efficient use of time, but would yield the best performance from his lead. Andrew chose to shoot the scenes in script order because he anticipated the real exhaustion of the actor, Henry Darrow, who portrays the photogra-

pher and who remains tied to a chair. The fact that his actor would truly be getting more and more fatigued (and anxious) as shooting progressed under hot movie lights, Andrew felt, would add authenticity and intensity to the final moments in the film. As Andrew recalls it:

I got the idea to shoot sequentially during rehearsals. I saw how Henry would get tired and a bit agitated toward the end of each rehearsal day, and how that emotional state would actually help him portray a tired and agitated character. Even he seemed more pleased with what he was doing toward the end of each rehearsal. I felt that the best way for him to truthfully embody the character's frazzled state of mind was for us to build organically to that emotional crisis by filming in the order the character experiences the story's events.

The extra shooting time to accommodate this performance strategy paid off. By the time they shot the



■ **Figure 5-13** Occasionally you may wish to schedule around specific performance strategies, such as Lund's decision to shoot sequentially in order to achieve the right emotional intensity from his actor Henry Darrow in the short film *Snapshot*.

ending of the film, the lead actor was truly worn out and at the end of his rope, and the dramatic climax contains a visceral sense of the frantic anxiety that only a man who has actually spent hours bound to a chair can have ([Figure 5-13](#)).

■ DAY-TO-DAY PRODUCTION SCHEDULING

As you can see, creating a shot list already anticipates the day-to-day film production scheduling because it divides the script into the smaller production units of location, time of day, setup angle, and shot and then organizes them into an efficient order. The next step is to schedule your production by dividing up the shot list tasks into specific production days and to generate call sheets. **Call sheets** ([Figure 5-14](#)) are simply forms for each shooting day that they detail: what portion of the script is being shot on a specific day, who needs to be on the set, when each person needs to be there, and how to get to the set. Arrival times include setup times for the crew and makeup and rehearsal times for the cast.

On very simple shoots involving a crew of three and a cast of two, the “call sheet” might simply be an email to everyone involved. But on more elaborate shoots, it's good to hand the schedule out in hard copy form (and maybe follow up with emails). These days, filmmakers often create Facebook pages for each project to keep cast and crew informed of the shooting and rehearsal schedules by posting call sheets online and to discuss other production details. It's the duty of the production manager (and A.D.) to create the call sheets, to see that everyone gets them, and to make sure that the production stays on schedule.

The length of time for a shooting day, of course, varies. You should never schedule a shooting day longer than ten hours. On rare occasions you might need to schedule a 12-hour day. In these cases, do not schedule long days back to back. It's imperative that you allow time for your crew to rest. You must have a *minimum* of ten hours of **turn-around time** between the end of one call and the beginning of the next, but 12 hours is standard (12 hours is also the minimum for minors on the set). Don't expect your crew to pull all-nighters—they'll make sloppy mistakes and these mistakes can potentially put people at risk.

PRODUCTION CALL SHEET

Title: <i>KIARRA'S ESCAPE</i>		Shooting Date: 7/20	
Producer: Madgate Productions		PM: Sharine M.	
Director: Miles Adgate		AD: Michelle H.	
SET	SCENES	PAGES	LOCATION
EXT. CITY STREET	#17	pg. 6	867 Riverside Dr., Apt 3-G. NYC
INT. KIARRA'S SAFEHOUSE	#13, #16, #18	pp. 6, 7	

CAST CALL TIMES

CAST MEMBER	ROLE	MAKEUP	SET CALL
Jessica Krueger	Kiarra	8:30 am	9:30 am
Victor Varela	Driver	8:30 am	9:30 am
Robert Youngren	Vogler	10:30 am	11:00 am
Rick Varela	Smith	10:30 am	11:00 am
EXTRAS & STAND INS		MISC. INSTRUCTIONS	
N/A		Victor is also bringing car @ 8am	

CREW CALL TIMES

CREW TITLE	NAME (S)	SET CALL
Director	Miles A.	7:30 am
P.M.	Sharine M.	7:30 am
A.D.	Michelle H.	7:30 am
Art Dept.	Gus M., Jenni P., Michael C.	7:30 am
Makeup & Wardr.	Michael C.	7:30 am
D.P.	Nick V.	8:00 am
A.C.	Richie U.	8:00 am
Elec. & Grips	Nico P., Jenni P.	8:00 am
Sound Dept.	Tristan A. (sound mixer), Eric S. (boom op.)	8:00 am
Other: P.A.	Donna C.	7:30 am

NOTES & DIRECTONS:

Location is between 158th & 159th streets. (take the 1 or 9 train) Very important: the building is not facing the water (west), it is facing east, on the other side of the complex.

Victor is bringing car @ 8am, must be done by 1 pm.

Fire, Police, Ambulance emergency: 911
NEAREST HOSPITAL:
Columbia Presbyterian 608 W 165th street New York, NY 10032-7901 (212) 781-8640

■ **Figure 5-14** Call sheet for *Kiarra's Escape*. Call sheets are printed for each shooting day and tell cast and crew when they are expected to arrive on set.

Deciding how much (or how many script pages) you can do on a particular day depends on many factors: the amount of coverage, the style of shooting (e.g., moving cameras take longer to set up than do stationary cameras), the shooting environment (e.g., controlled interior set versus uncontrolled exterior location), the size of the cast and crew, and the shooting style of the director. The more films you make, the more you will come to understand your own particular production pace and the better you will be able to predict how much you can get done in any given day. One general rule, however, is that it takes some time for a film crew to find its groove and work at maximum efficiency. For this reason, the first day is usually scheduled very lightly. It's a great morale booster for a film production to accomplish everything on the first day's schedule. Conversely, if you try to pack in too much on the first day and you do not succeed, your crew will feel like they're already falling

behind on day one, which can be a drag. But a light, accomplishable first day allows everyone to get to know each other, hit their stride, and fly for the rest of the project.

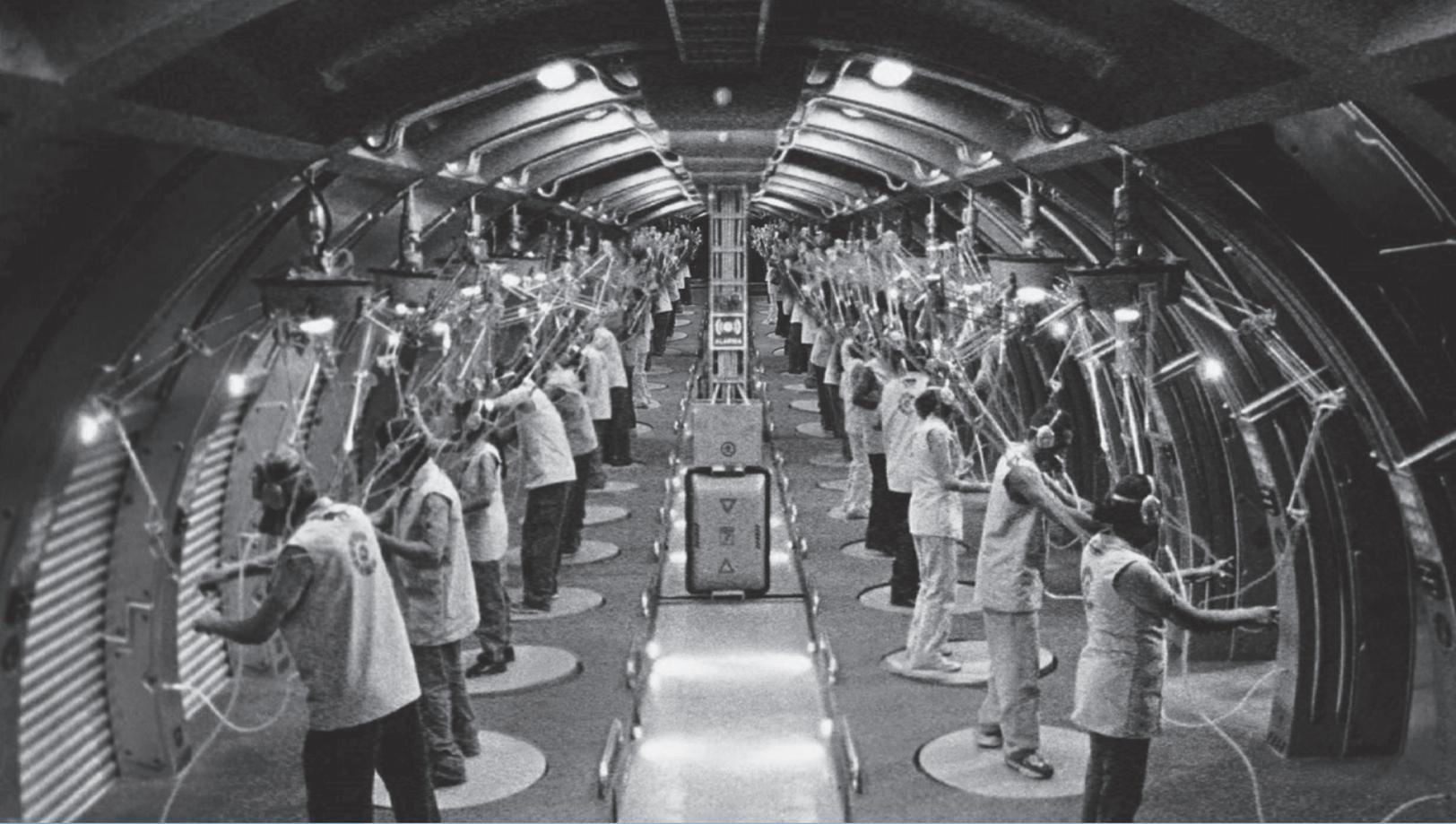
When you're creating call sheets, it's easy to write down that you'll do 30 setups in a day, but in reality that might be impossible to accomplish. So be realistic. It's counterproductive to be overly optimistic about how much can be accomplished in a day. If your film clearly requires six days to shoot, then budget for six days. Don't try and cram a six-day production period into four days.

in practice

■ PREPRODUCTION FORMS ONLINE

Blank storyboard forms and production call sheets can be downloaded from the *Voice & Vision* companion website. In addition, you will find all of the production paperwork for *Kiarra's Escape* available to

download as well as the video of the excerpted scenes used in this chapter. And, if you'd like to get familiar with professional breakdown, budgeting, and scheduling software—which often includes shooting script and storyboard integration—see the box on page 156 for more information.



PART II PREPARING FOR PRODUCTION





Taylor & Francis

Taylor & Francis Group

<http://taylorandfrancis.com>

Preparing for Production

■ LINE PRODUCING AND THE CREATIVE PROCESS

Making a narrative film, on any scale or in any format, is a multipronged effort. There is, of course, the creative dimension, which involves writing the script, visualizing the shots, working with actors, etc., and then there is the practical dimension of film production, which involves the organization of time and personnel; coordinating the locations, props, and costumes; dealing with film labs and other vendors; and working with budgets. We call these practical considerations the **line producing** or **production management** aspects of a film, and we cannot make a movie without them. However, it is essential to remember that these practical tasks are not divorced from the creative element of making movies. Selecting your crew, casting your actors, finding locations, selecting props, scheduling shooting time, and working within a budget are all tasks that will have an impact on what a filmmaker can achieve creatively and what the audience will see on the screen.

How Much is Enough?

For narrative films, our shooting days are the most precious hours of the entire project. A great deal of coordination must happen in order to get everything we need—actors, crew, equipment, and props—on location, on time, and ready to go. It can be disastrous if something basic is forgotten or overlooked. Any film professor can list numerous film shoots that had to be scrapped because someone forgot to charge the camera battery, or no one secured the location, or no one thought to bring the film stock. Countless are the stories of actors getting hopelessly lost because no one gave them directions to the set, or of production being stalled because no one checked to see if there was enough electricity for the lights, or if there were enough crew members on the set to attend to all the technical duties required, and on and on. This is production management, and on every film set, someone must see to these details or you will have no movie.

However, while many film projects fall apart because not enough attention or care was devoted to production management, the converse can also become a problem. Many films wind up feeling lifeless or mechanical because of an overemphasis on line production, to the exclusion of creative inspiration and exploration. It's not unusual for a producer and director to get so wrapped up in logistics, paperwork, and technical factors that important creative steps like visualization, rewriting, and working with the actors get only cursory attention. One must not let the practical side of filmmaking overwhelm the creative side.

Line producing run amok can also result in a film being “overproduced,” which means that the line-producing elements and production technology take precedence over the creative aspects of the film—like a good story, or vivid performances, or truly expressive camerawork. In some ways, it's easier to create a technically slick surface than it is to create a film with depth, poignancy, and originality. In the absence of good ideas and creativity, money, big crews, and technological bells and whistles will not make a good film.

The creative side of filmmaking and the practical side of filmmaking remain in close dialogue for the duration of every film project, big or small. Balanced and proper attention as well as a healthy collaboration between the producer and director assure a successful process and satisfying project. Every film shoot, from the smallest to the largest, involves unforeseen challenges and extenuating circumstances. To deal with these adequately, you

must make sure that all of those production elements that you can control, plan, and prepare for are taken care of. The bottom line is that line producing is an essential part of filmmaking and it supports the creative efforts of the entire cast and crew.

Production Design

Production design is all too often overlooked on low-budget and student films. Many filmmakers just starting out recognize the importance of scriptwriting, directing actors, cinematography, and editing as essential creative elements, but they often reduce the process of production design (and sound, but we'll get to that later) to a purely utilitarian function. The **production design** of a film (also called **art direction**) determines the look of the environment in which your scenes take place (including locations, colors, textures, and space), the choice and design of the specific objects that are used in the scene, and the presentation of characters through costume and makeup. All of these details have a profound impact on the tone, the characterizations, and the meaning of your movie. I'm constantly amazed at students who take great pains choosing just the right film stock, filters, and lighting scheme to achieve a specific look but end up shooting in utterly bland locations, with no thought to the color of the walls, the arrangement of objects in the space, or the background beyond the performers.

Recently a student of mine screened a film in which he got great performances in a scene involving two people playing a tense game of cards, but just behind the head of one of the characters was a huge, ugly air conditioner that dominated the shot. I asked the student why he had that thing so prominently in the frame, distracting us from the subtle eye contact during the card game. He answered, "Wow, I didn't even notice that." He hadn't noticed it because he shot in his own apartment where he has become used to everything. All he needed to think about was a little art direction and simply move the card table a few feet to one side. Remember, from the discussion on *mise-en-scène* in Chapter 3, the audience responds to everything that is in your frame—yes, obviously the audience sees the performances and camera angles, but they also see the background, the clothes people are wearing, the color of the walls, the kind of lighter a person uses to light a cigarette, and the air conditioner just behind the head of your lead character. Every detail the audience sees is part of the filmic world you are creating and therefore part of your expressive palette. You need to think carefully about what you want that location or costume to "say" and how we can use art direction to "say" just that (**Figure 6-1**).

Let's take a scene shot in a dorm room as an example and let's say you have easy access to a real one. A "real" or unprepped location may look fine to the human eye, but on camera it might not read the way you intend. A dorm room can look exactly like a prison cell if the walls are bare cinder block and the room contains nothing more than a bed, a desk, and a garbage can. *You* may know it's a dorm room, but on film it's not so clear. Beyond this, not all dorm rooms are alike. What sort of dorm room does the script require? What sort of student inhabits this dorm room? How would this student set up the room? Are they neat or a slob? What happens in this dorm room, and how is the audience supposed to respond to it? It is the job of the **production designer** (also called the **art director**) to make sure that every location, in this case a dorm room, has the appropriate look for the film (see page 165). Just as the cinematographer is responsible for the visual interpretation of the script in terms of lighting and camera work, the production designer is responsible for



Figure 6-1 One glance at the stickers on the door of this neighbor in *Hedges's Pieces of April* (2003) tells us everything about her political and social convictions, an example of an economical and effective art direction choice.

the visual interpretation of the script in terms of lighting and camera work, the production designer is responsible for

the interpretation of the script in terms of locations, set dressing, costumes, props, and makeup. Production designers don't simply hang a few posters on the wall and throw some dirty laundry on the floor; rather, it is their job to read the script, consult with the director, do some research, and imagine what this particular character would have in this specific dorm room—what objects, posters, details, and colors would support the character and the dramatic needs of the script.

Let's say our script is about Elise, a classical piano student at an elite music conservatory. The second scene shows Elise walking into her dorm room after expertly ripping through a Chopin polonaise for her professor. If we were to create a dorm room for her in which there is nothing but a grand piano, piles of sheet music, and a futon wedged under the piano as a bed, we would give the audience one impression of her. If we create a room covered floor to ceiling with rock posters, tie-dyed fabrics, beer bottles, candles, half-smoked cigarettes, and dirty laundry, we give the audience another impression entirely.

We should also consider what Elise is wearing—her wardrobe, how she presents herself to the world. Is she in ripped jeans and a leather jacket? Or does she wear modest wool skirts with a coordinated sweater set? How's her hair? Does she keep it in a neat ponytail, is it shaved close to her scalp, does she have a dyed streak that changes color every other scene? And what about props, like her book bag? Is it a canvas backpack, customized with patches, key chains, and a big "EcoJustice" sticker? Or maybe Elise carries her sheet music in an expensive designer alligator skin case? What if that designer case were then plastered with a huge "Pussy Riot" bumper sticker? And that's just the second scene! Making material decisions so that your character and the story come alive through your characters' surroundings (**location** and **set dressing**), the way they present themselves to the world (**wardrobe**, **hair**, and **makeup**), and the things they use (**props**) is what production design is all about.

Locations and Set Dressing

On low-budget and student films, one always tries to find locations that are as close to the needs of the script as possible, but almost always a "real" location needs some degree of tweaking and fixing up so that it looks just right on screen. This is called **set dressing**. Set dressing includes things like rearranging, adding, or removing decorations, objects or furniture; painting or hanging things on walls; installing a specific window dressing, etc. Sets are **dressed** (or **prepped**) before the camera crew arrives to set up the lights. Here are a few tips that should help you successfully work with locations, especially when they belong to other people:

1. You must always take care to protect the location. You should leave a location in the same condition you found it in, or better (see page 425).
2. Always take photographs of a location before you dress it so that you know exactly how to return it to its original state when the shoot's over.
3. Never assume that you can use the things that are in your "perfect" location if it's not your space; you must always ask if you may use them. This was a huge lesson I learned as a film student. My classmate's aunt had a remarkable home packed with 19th-century furniture, antiques, etchings, lace curtains, and healthy plants. It felt like stepping into the 19th-century home of English gentry. I loved this location so I devised a short film exercise that was to be a period piece and I asked my friend's aunt if I could shoot in one room of her house for a day. She agreed and I was all set—or so I thought. When I got there on the day of the shoot, with cast, crew, equipment, and wardrobe, I discovered that she had packed away all her precious antiques, lace, art, and plants to protect them from the upset of a film shoot. All that was left were four bare walls and some large pieces of wood furniture.
4. The flip side to this lesson is to not simply use any old place and then try to make it conform to your needs. Always try to get as close as possible to what you need for a scene so that you don't have to fight the location. I once had a student who wrote a scene in which a couple goes out to a "romantic dinner in a fancy restaurant," but he couldn't convince any "fancy restaurants" in town to let him shoot in their establishment. At that

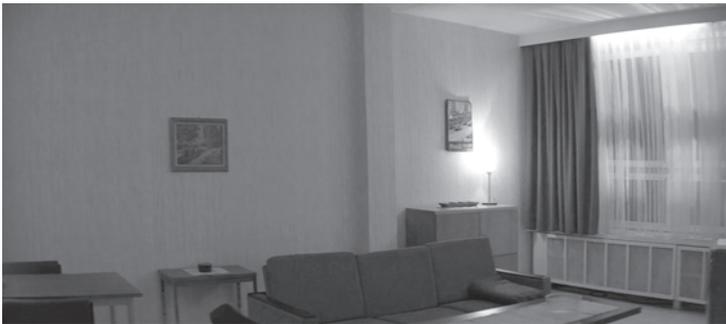
point he should have rewritten the scene for a location that he could actually get—a “romantic picnic in the park,” for example, would have worked. Instead the director decided to dress his dorm room to make it look like a fancy restaurant. Let’s just say it really didn’t work.

Figure 6-2 shows two locations from Florian Henckel von Donnersmarck’s *The Lives of Others* (2006). The production design team for *The Lives of Others* included Silke Buhr, production design; Christiane Rothe, art director; and Frank Noack, set decorator. Like all art department teams, they had to consider (1) the tone, mood, and style of the film; (2) the specifics of the historical era and location in which the story takes place; and (3) the particularities of each character.

This film takes place during the late 1980s in the former East Germany and revolves around two men who are strong believers in the socialist system. Georg Dreyman is a popular state-sponsored playwright and Captain Weisler is an agent of the East German secret police (Stasi). The film consistently contrasts these men—their fundamental characters—in many ways, and one vivid example is through their living environments. The top frame shows Weisler’s apartment, located in a vast, multistory apartment complex. It has the typical cold, industrial square lines of modern socialist architecture, which gives the impression of living in a sterile box or the factory housing of ideological conformity. Other than a few utilitarian pieces of furniture and two small posters from a communist military parade, there is nothing in this apartment: no art, no music, no books, no plants, no knick-knacks, no souvenirs, no clutter. His environment is obsessively orderly and barren, utterly devoid of warmth and passion. One feels that there is nothing else in Weisler’s life but the work he does interrogating and spying on political subversives. The bottom frame in **Figure 6-2** shows Dreyman’s apartment, located in an older building with decorative moulding, wood floors, and wood trim. The furniture is warm and well used and even includes a piano. The walls are covered with posters, paintings, and photos, and everywhere there are books, personal trinkets, plants, and photos of loved ones. This is the abode of an artist and intellectual, someone who wants to surround himself with art and ideas—perhaps even

subversive ones. Each of these environments efficiently and indelibly defines the character who lives there, and each provides tangible and visual evidence for contrasting these two central figures.

Sometimes a location in your script may be so specialized that you may not be able to find what you need, so you must construct it (more or less). Building a set, whether on a sound stage or at an empty location, requires set design. **Set design** means the art director draws sketches for what they plan to build, and once approved by the director, they build that set. If it’s an elaborate set, then they might create three-dimensional models to scale and hire a set construction crew of carpenters and painters. This process can be simple and cheap or elaborate and expensive (see **Fig. 6-4**). For a short introductory film, one of my students needed a jail cell and managed to gain access to the decrepit basement of their apartment building. This gave the student great prison-like walls and a tiny window. The student brought in an old toilet and a cot and set it up in one corner then constructed a set of bars out of wood and painted it to look like iron. It was simple, inexpensive, yet totally convincing.



■ **Figure 6-2** Set dressing as the expression of character in von Donnersmarck’s *The Lives of Others*. The austerity of Stasi Officer Weisler’s apartment illustrates many of his personal characteristics (*top*), while the intellectual clutter of playwright Dreyman’s apartment reflects the nature of its inhabitant (*bottom*).

■ FINDING LOCATIONS

Ramin Bahrani's *Chop Shop* (2007) is a case where the director didn't find a location to work for an existing script; instead the location found him and the story emerged from there. Bahrani discovered the forgotten corner of New York City called Willets Point when he accompanied his friend and cinematographer, Michael Simmonds, to have his car repaired. Willets Point Queens comprises 20 blocks of scrap yards, cut-rate auto repair shops, and dirt roads adjacent to the Mets Shea stadium. Bahrani knew instantly that this was a great location for a movie, but he needed a story. Rather than write any old story to paste onto the location, Bahrani returned to Willets Point regularly for over a year and a half to explore the neighborhood, take photographs, and do research. He wanted to know in depth what went on there, who the people living there were, and what the rhythm of life was. He wanted the location to suggest a story to him so that the environment would be more than just a backdrop. He wanted Willets Point to be a character (**Figure 6-3 left**).

The story started to come together as he watched young kids working for the chop shops in this very tough neighborhood, while across the street, at Shea stadium, a huge billboard proclaimed, "Make Dreams Happen." The juxtaposition got him wondering, "What kind of dreams can happen in this location? What kind of dreams could these kids have?" As Bahrani and co-writer Bahareh Azimi incorporated more and more story details and characters gleaned from the location, the story—about a 10-year-old boy who works the chop shops and who has a dream to buy a food truck to provide a stable income for him and his sister—started to take shape.

But in order to portray Willets Point on film with authenticity and to create the same powerful impression the area had on Bahrani himself, he would need the cooperation and trust of the people who worked there and owned the shops. This could have been a daunting obstacle, but he lucked out when Rob Sowulski, a longtime repair shop owner, one day walked up to this strange guy who had been hanging around for a year taking notes and asked him directly, "Whatchadoin'?" When Bahrani told him he wanted to make a movie about Willets Point, Sowulski pointed to his own shop in the middle of the busiest street and said, "You're gonna shoot your movie right there."

Sowulski's shop was not only an ideal central location for the film, allowing Bahrani to shoot in the real environment with minimal set dressing, but Rob's prominent stature among the auto shop owners opened many other doors for the project. Bahrani refers to Sowulski as "the angel and hero of the movie," because not only did he deliver the principal location and play one of the prominent roles in the film but he trained the lead actor (Alejandro Polanco) to work in the business, including sanding, priming, and painting cars. During the three-month rehearsal and shooting period, Alejandro virtually worked for Sowulski, who paid him for his labor, and often Bahrani would just roll camera and document the real action of the moment (**Figure 6-3 right**).

■ BUILDING LOCATIONS

While most low-budget, independent filmmakers stick with locations that are easily available and close to complete in their detail, director Alex Rivera set himself a challenge for his first feature film, *Sleep*



■ **Figure 6-3** Willets Point Queens is more than a central location in Bahrani's *Chop Shop*; it becomes like another character in the film (*left*).

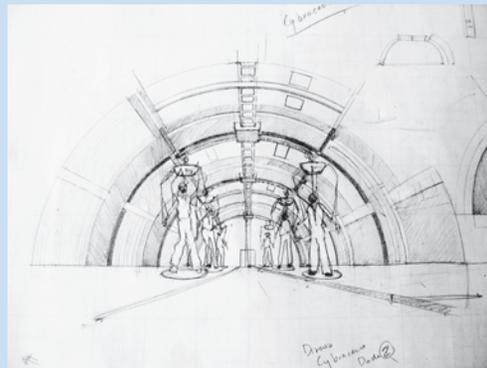
A working auto body shop provided a perfect location that needed little alteration and also gave Bahrani opportunities to shoot real, unscripted actions, like Ale (Alejandro Polanco) truly sanding a client's car (*right*).

Dealer (2008). He wanted to make a science fiction film that takes place on the Mexican–American border in the near future, but he had a very low budget. Rivera imagined a highly militarized future where the border is closed tight and Mexican workers travel to huge cyber-labor factories in Tijuana where their manual labor is exploited through a computer network transmitting their physical movements to robots in the United States—cheap labor and no immigration problem.

Rivera was able to find many of his locations in Mexico and create the futuristic context through set dressing, but clearly some locations had to be built as sets, particularly the futuristic cyber-labor factory. Rivera credits production designer Miguel Ángel Álvarez for working with his rough doodles

and designing sets that were absolutely convincing of a high-tech future yet relatively inexpensive to construct. **Figure 6-4** shows the progression from set design sketch (a), to scale model (b), to finished set (c). The way the final location appears in the movie is a combination of the ingenious construction of a small space with digital manipulation to make it appear larger. The story of Rivera's low-budget preproduction and art direction process is remarkable, and he has graciously provided us with a highly informative behind-the-scenes documentary of his creative steps called *Before the Making of Sleep Dealer*. In this documentary he reveals, in detail, the evolution of his story ideas, costumes, locations, and sets. The documentary can be screened on the *Voice & Vision* companion website.

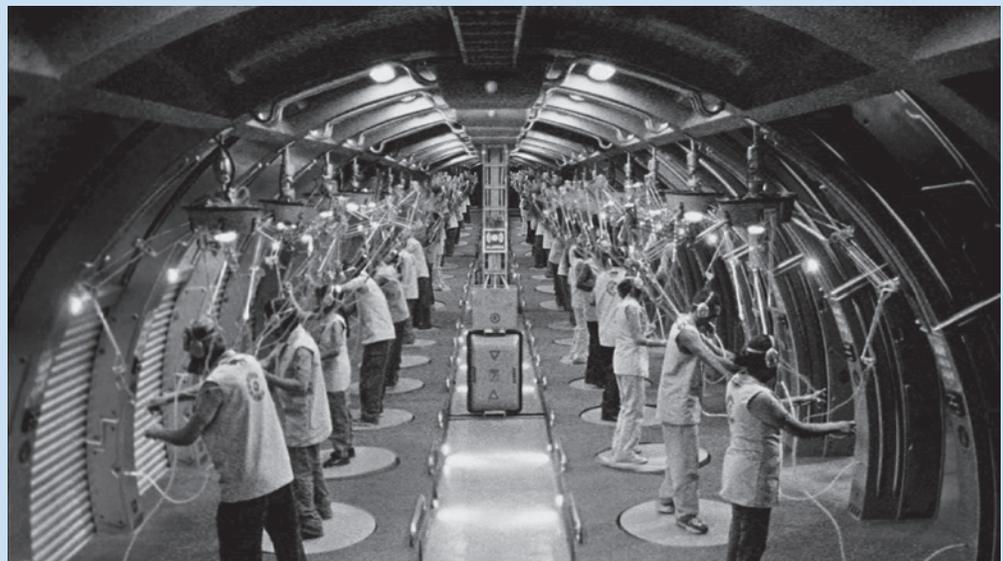
■ **Figure 6-4** Rivera's cyber-labor factory set in *Sleep Dealer*. The set design process proceeded from a sketch (a) to a small-scale model (b) and finally to the completed set (c).



a



b



c

Location Scouting

A great deal of production design is done during preproduction so that everything is available, secured, and in place when the camera starts to roll. One of the first steps is finding your locations. Whether you're making a two-minute exercise or a feature film, you should never arrive at a location on a shooting day without first scouting and surveying that location ahead of time, or you will inevitably get some nasty surprises. Deciding where you want to shoot requires **location scouting**. This means visiting several location possibilities for each setting, to find the one that will work for your film. Here is a simple series of concerns, and questions you should ask as you scout each location to determine if it's right:

- *The look.* The most important aspect of selecting a location is what it looks like—the physical space, architecture, backgrounds, light, colors, etc.—and what that look can contribute aesthetically and thematically to the film. Is the location appropriate for the action of the script? Does the location add to the overall emotional tone of the script and scene? Is this place aesthetically what you are after? If the answer to any of these questions is “NO,” then don't waste time; move on and scout another location. If the answers to all of these questions are “YES,” then continue on to ...
- *The access.* A location that looks perfect doesn't help you if you don't have access to it; this is the next step in determining if a location will work for you. Can you get access to that location? Can you get access to that location on the days and for the hours you need it? If there is rental money involved, can you afford it? If there are strings attached, do you really want to get involved in that way (e.g., you want to use your grandma's house, but she'll ask you to mow her lawn for one solid year in return)? If the answer to any of these questions is “NO,” then don't waste time; move on and scout another location. If the answers to all of these questions are “YES,” then continue on to ...
- *The logistics and safety.* Another factor in determining if a location is workable for you has to do with its functionality as a film set. Is the location safe for people and equipment? Is there adequate natural light, or if you need to use artificial light, is there enough power and access to electricity? Is there enough space to contain your crew, equipment, and cast? Is it possible for everyone to get to the location? Are there bathrooms accessible? If the answer to any of these questions is “NO,” then don't waste time; move on and scout a different location. If the answers to all of these questions are “YES,” then you might have found your location, if you don't later find an even better one.
- *The sound.* If your film involves synchronized sound recording, then you'll need to scout for the sound environment as well. Close your eyes and listen to the sounds that exist naturally in the environment (**ambient sound**). Do you hear noisy air-conditioning motors, a barking dog next door, or kids on a nearby playground? Is there a highway nearby that creates a constant drone of traffic, or is the location under the flight path of an airport? Is the location quiet enough for you to record sound, or is the ambient noise at least appropriate for the scenes you're shooting? How controllable is the sound environment? How are the acoustics of the location? Does the space have a lot of echo? (More on ambient sound and acoustics in Chapter 15.) If your film involves a lot of sync sound recording, like dialogue, and the sound environment is not conducive to location recording, then you should consider finding another location.
- *Securing the location.* Securing a location means making sure that you don't lose that location between scouting and shooting and that you're not kicked out once you do start shooting. Public spaces often require a **location permit** for you to shoot. Every city has different requirements for obtaining a location permit, so it's best if you go to the City Hall or, if it's a larger city, the film and television office to find out the specific rules. Most places make it fairly simple for students to obtain shooting permits. In some cities there are fees involved; in other cities (like New York) it's free, but you must have proof of production insurance and fill out the appropriate paperwork. I once scouted locations for a film in New Jersey and discovered that each township had completely different regulations for location permits. One township required only that you notify the chief of police, whereas the neighboring township required proof of a \$2



■ **Figure 6-5** Permit hell. Even Al Pacino's celebrity was no match for the NYPD officers asking to see a shooting permit, which he did not have. This real-life event was cleverly integrated into Pacino's innovative narrative/documentary hybrid film *Looking for Richard* (1996).

million liability insurance policy and \$250,000 in an escrow account. It was clear that the latter township was discouraging film productions within its borders. To find out more about shooting permits in your area, simply call the local City Hall.

Do you really need a permit to shoot on the street? Think of a permit as a kind of production insurance. No one can stop your shoot or chase you off your location if you have one. In New York, especially in recent years, at least two-thirds of my students' projects are scrutinized by the police. Without a permit, they are often shut down, and this can be disastrous for a project timetable that allows for only three shooting days (**Figure 6-5**).

 Shooting on private property often requires that you obtain either formal permission or a **location contract**. At the college where I teach, for instance, my students must obtain permission from the Office of Buildings & Grounds before they can shoot on campus. For locations like friends' houses, grocery stores, or local restaurants, it's necessary to have someone who is truly authorized to do so sign a location contract (see the sample location contract on the *Voice & Vision* companion website). Basically, the location contract protects both parties involved. The filmmaker is protected because the shoot is approved and secure and the owner of the property is protected because the contract releases owners from any liability should someone get hurt during the shoot. The contract also usually states that the filmmaker is responsible for any damage to the property.

Whether you are shooting in a public or private space, you must securely establish, well in advance, the availability and reliability of all locations. In other words, get a permit! It's a serious setback for a film when cast, crew, and equipment show up at a location only to be kicked out. Finally, if you are denied a permit to shoot at a location do not attempt to sneak in and shoot anyway—you are only asking for a production disaster (see page 432); simply move on and find another location.

The Location Technical Survey

Once you have secured your location, you may need to revisit the location to do a thorough survey. A **location technical survey** means closely scrutinizing the location for its technical and aesthetic capabilities. For minor locations the scouting and survey can be done in one visit, but major locations, especially those that require extensive visual planning and lighting, need another visit dedicated to the survey. The director, D.P., and production designer often go on location surveys together. If your scene involves critical sound recording in the field, then your sound recordist will want to check the location for sound. Also, if your scene involves available light, it is important to visit the location at the same time of day that you anticipate shooting.

During the survey, try to imagine what shots will work in the space. Think in terms of angles you would like to shoot from, and the size of your shots. Figure out roughly how much of the space will be visible. Is there movement in the shot? From where to where? What

will be in the background? How many shots will you need in this location? Take notes as visual ideas and impressions occur to you. Digital photos are extremely helpful for recalling location details or ideas for shot angles as you later visualize your screenplay or do rough blocking during rehearsals somewhere else.

After you have determined some rough ideas about where and how you'll shoot, the location starts to look more and more like a film set. A **film set** is a location that is being used, customized, and controlled to serve the needs of a film shoot. To establish the set, you need to consider the following aesthetic and practical elements:

- **Light.** How much of the room will you need to light? Will you be mixing light sources? Research the distribution of the electricity in the location and make sure you know how much power is available.
- **Art direction.** What does the setting look like in its unaltered state? What are the colors of the walls? What is on the walls? What are the furnishings? What is in the background of all of your imagined shots? And then, what art direction will you need? What will you need to add, remove, or change to make the space look the way you need it to look? Make sure you'll be allowed to do this. Of course, for low-budget films shooting on a tight schedule, it's best to find locations that need as little art direction as possible.
- **Sound.** If you are shooting sync sound at the location, then you'll need to pause a moment, be quiet, and take note of the natural sounds of the location. Are there any sound issues that might pose problems on the shoot? For example, is there a construction site across the street or a German shepherd next door that barks his head off? Get a sense for the aural ambience and acoustic qualities of the location. Is the space acoustically "live" or "dead"? (See Chapter 15.)
- **Other concerns.** Make sure that there are bathrooms available and inquire about getting food to the location. Are there food stores nearby? Take the time to note the nearest hospital in case of emergency. Check to see that there is a safe and secure place to hold equipment during the shoot, called a staging area (see page 404). Also, make sure you know the "house rules," meaning the limits of manipulating the space. Are you allowed to move furniture around? Is there a carpet that you must cover? Are you allowed to paint a wall?



You will always run into surprises on the set, but the location survey should be thorough enough that those surprises are relatively minor. A location scouting form and a detailed location scouting "how-to" are available for downloading at the *Voice & Vision* companion website.

Wardrobe and Props

Wardrobe (costumes) and **props** (short for **properties**) are powerful and efficient elements in defining our character. Props are different from set dress in that props are those things that characters actually handle in a scene. A production designer (with the **costume designer** and **prop master** on larger films) will review every scene with the director to determine how wardrobe and objects can contribute to our understanding of each character.

Earlier we saw how von Donnersmarck used location and set dressing to define aspects of his two principal characters in his film *The Lives of Others* (see **Fig. 6-2**). Now let's look at how he and the other members of the art department—costume designer Gabriele Binder and propmaster Olaf Kronenthal—used costumes and props to further build character.

Captain Weisler, the State Security Stasi officer (**Figure 6-6 top**), is consistently dressed in shades of gray: light gray shirt, gray suits, and a gray jacket. He is almost never without a tie (gray, of course), and the few times we see him without his tie, he keeps the collar of his shirt buttoned, even when he is having sex with a prostitute! His style of dress is just as colorless as his apartment décor; however, it is also just as compulsively tidy and sharp. His shirts are always perfectly pressed, reflecting his military discipline. The playwright



■ **Figure 6-6** Wardrobe as the expression of character in von Donnersmarck's *The Lives of Others*. Stasi Officer Weisler (*top*) and playwright Dreyman (*bottom*).



■ **Figure 6-7** Props as the expression of character in von Donnersmarck's *The Lives of Others*. Captain Weisler in his kitchen making dinner—tomato sauce from a tube on pale noodles.

Dreyman, on the other hand, wears warm, brown corduroy jackets and loose white shirts (**Figure 6-6 bottom**). When he's at home writing, Dreyman goes without the jacket and his shirt is slightly wrinkled with collar and cuffs unbuttoned. Dreyman's collar is almost always open and he practically never wears a tie. In fact, one scene makes the point very clearly that he doesn't even know how to tie one. It's a socialist ideological thing with him; he calls ties "middle-class fetters."

Turning our attention to the props, we can see a fantastic example of how von Donnersmarck and Kronenthal used a small, yet precise, detail to further reinforce the character of our Stasi officer (**Figure 6-7**). When Captain Weisler returns home to cook himself dinner, the choice of meal and preparation was not arbitrary. We see Weisler in his austere kitchen where strangely there are no pots, pans, cooking utensils, spices, or anything that even looks like food. He just boils up some pale noodles, squeezes a red substance from a tube onto the noodles (presumably something tomato-ish), and that's dinner. Consistent with his environment and costumes, his eating habits are totally utilitarian, which is to say efficient but devoid of flavor, pleasure, or sensuality. It's the perfect choice for Weisler who would only require basic fuel for the body.

Consider now the total portrait of Captain Weisler created by the location and set dressing (his sterile boxlike apartment), the wardrobe (gray shirt, jacket, and tie), and props (the "meal" he makes) in the first 15 minutes of the film while the central story-

line and other major players are being introduced as well. Through these visual details, without any need for dialogue, we understand that this man is barely flesh and blood; he functions as a piece of the bureaucratic state-run socialist machinery. Great! Now this character is perfectly set up for how the narrative will transform him and make him human.

Wardrobe Considerations

Costumes are so important to the expression of character that no filmmaker can leave the selection to chance. Young filmmakers will often typecast a friend in a role, thinking that he looks perfect for the part, and then assume that he'll arrive on the set dressed as he always is, say in jeans and a baggy sports jersey. But as the day of the shoot approaches, this friend becomes self-conscious about being in front of the camera and arrives dressed the way he wants to be seen instead, in a suit and tie, destroying the conception the director had in mind.

Student and independent films often plunder the wardrobes of their actors for suitable clothes. Why not? The clothes fit and the actor is comfortable in them. But you cannot assume that your actors will wear the right thing when the shooting day arrives. If you're

using the actors' real clothes, you should go to their homes before the shoot, carefully look over their wardrobe with them, and once you find what you need for the film, mark those items "COSTUME." Either give the actors instructions to come to the set wearing those clothes or take the clothes away and hold them for the shoot.

Be careful of clothes that have logos on them. It's easy for us to overlook words and graphics on shirts, hats, or jackets, but they read very strongly in film. If there are words on your costumes, make sure they're expressive of character and appropriate for the scene. I once had a student whose film included an emotional scene in which a couple on the verge of breaking up engage in an intense argument. It was difficult for the audience to feel the tension of the scene because the actress was wearing a T-shirt that read "C is for Crunk!" Instead of listening to the argument, I myself was trying to figure out what the heck a crunk is. In fact, everyone in the class was wondering the same thing. When I asked the student why he chose that particularly distracting shirt, he replied, "That's all the actress brought with her." That was the very first film this student ever made and the very last time he'll overlook wardrobe considerations.

If you don't find the clothes you're looking for to really bring this character to life, then you'll need to get measurements and either buy, borrow, rent, or make the costume items you need. However, beware of slick costume tricks. I had a friend who needed a wedding dress for a scene. She bought an exquisite wedding dress on her credit card with the clever idea that she'd use it in the film then return it within two weeks and get her money back—a great idea until the actress spilled Kool-Aid on the dress during a break in shooting. I think my friend is still paying off that credit card debt.

Props Considerations

Just like wardrobe, props are more than simply utilitarian objects, they can efficiently convey a tremendous amount of information. It is well worth a little extra time to find *just the right* object that will reflect something about the character using it, or about the time period, or that will carry any other narrative or thematic inflection you'd like in your film.

But even the best prop isn't any good if it never makes it to the set when you need it to shoot a scene. On student films, this is the sort of detail that regularly falls through the cracks amidst all of the activity of putting a film together. Even if you're working with a tiny crew, someone must be propmaster, assigned the specific responsibility of getting necessary props to the set on the days the props need to be there. I recently asked a student why, in his film, he chose to have a burglar tie up the owner of the house with one of the orange extension cords from the school's lighting kit. "He was supposed to tie him up with duct tape" came the explanation, "but no one brought any." He glared at the project's production manager, who defended himself by saying, "No one *told* me to bring duct tape!" If your film is about two guys who mix up their identical briefcases, then you need to find identical briefcases and make sure they're on the set when you need them. If your film involves a guitar-playing Don Juan, then you need to get a guitar (with strings) and make sure Romeo knows how to fake it enough that you can dub in romantic guitar playing later. And remember, props are not only crucial to the action, they can express character.

The Script Breakdown

The **script breakdown** is a process by which all of the mise-en-scène details that are necessary for every scene (cast, wardrobe, props, makeup, set dressing, special effects, and so on) are marked right on the shooting script itself. Using color pencils, highlighters, or a highlighter tool in an app, each element gets a specific and unique marking, as follows:

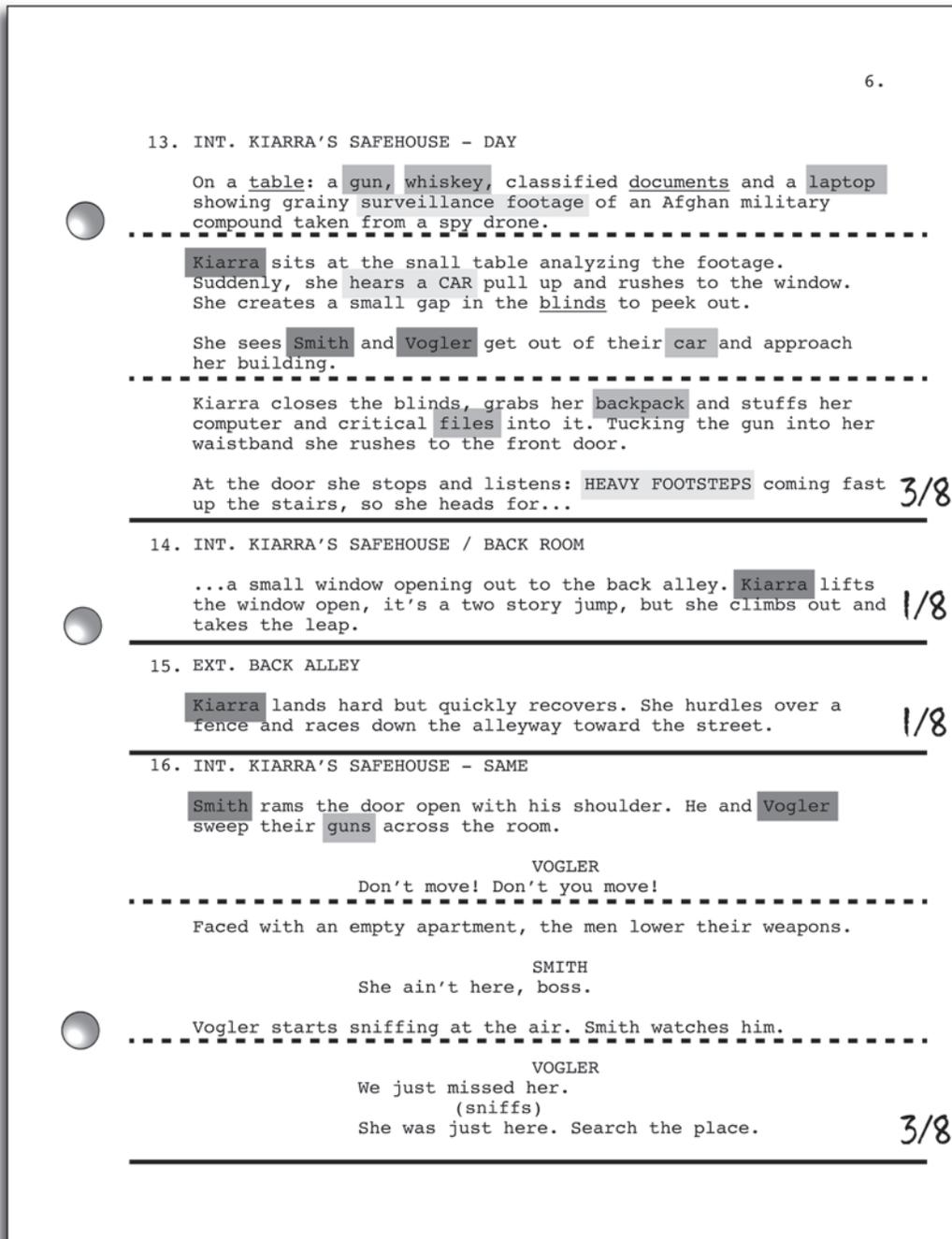
Speaking Cast—Red	Bit Players—Yellow	Extras—Green
Wardrobe—Circled in black	Props—Purple	Hair and Makeup—*Asterisk
Set Dress— <u>Underline in black</u>	Stunts—Orange	Visual Effects—Blue
Sound Effects—Brown	Vehicles/Animals—Pink	Misc. needs are noted

■ **Figure 6-8** A completed script breakdown sheet for *Kiarra's Escape*, scene #13 (see figure online for color)

Script Breakdown Sheet		
TITLE: <u>Kiarra's Escape</u>		Shoot Date: <u>7/11/10</u> Page # <u>6</u>
Producer: <u>Miles Adgate Prod.</u>		Director: <u>Miles Adgate</u>
Scene #. <u>13</u>	Scene Name: <u>KIARRA'S SAFEHOUSE</u>	<u>INT.</u> or EXT. <u>Day</u> / Night <u></u>
Script pp. count <u>4/8</u> Scene Description <u>Kiarra is analyzing surveillance footage on her laptop (drinking whiskey). She hears a car approach. She opens blinds and sees Vogler and Smith approach her bld... She packs computer and files into backpack and flees.</u>		
Cast (red)	Wardrobe (circle)	Props (purple)
<ul style="list-style-type: none"> • Kiarra • Vogler • Smith 	<ul style="list-style-type: none"> • Blk. tights /top/boots (K) • Aviator frames (K) • Raincoat / suit (V) • Sunglasses (V) • Suit and tie (S) 	<ul style="list-style-type: none"> • Prop handgun • Whisky bottle and glass • Files / Papers • Laptop comp. (w/spy footage) • Backpack
Bit Players – non-speaking (yellow)	Extras (green)	Stunts (orange)
<u>Driver</u>		
Hair & Makeup (* asterisk)	Set Dress (underline)	Vehicles / Animals (pink)
<ul style="list-style-type: none"> • Red nails (K) • Red Lipstick (K) 	<ul style="list-style-type: none"> • Dining table w/ chairs • Venetian blinds • Bed • Files / Papers 	<u>Black car (V's)</u>
Sound Effects (brown)	Visual Effects (blue)	Special & Misc.
<ul style="list-style-type: none"> • Spy footage chatter • Car approach • Footsteps on stairs 	<u>Drone spy footage for laptop</u>	
Notes		
<u>Kiarra's safehouse is minimally appointed, studio apartment. Only essentials.</u>		

From the initial script markings, the all important **script breakdown sheet** is generated which shows the basic requirements for every single scene (**Figure 6-8**). Breakdown sheets are essential for the scheduling and budgeting process as well as allowing everyone to see, at a glance, what is necessary for each scene so that the responsibility for acquiring it all can be assigned in an organized way.

On short film projects, simply highlighting the script for the various details and then filling out one breakdown sheet per scene will suffice for organizing your shoot. On larger scale projects, like feature films, where scheduling is especially complex it's common practice to divide every script page into one-eighths (approximately one inch per section) and add up how many eighths make up each scene. This helps you see exactly the page count for every



■ **Figure 6-9** A script page, broken down and marked by eighths, for *Kiarra's Escape*, scene #13 (see figure online for color).

scene down to fractions of pages, which in turn helps you schedule actual production time (hours and days) (Figure 6-9). In these cases, professional software is helpful (see page 156).

On very low-budget or student films, the script breakdown is often a collaboration between the director and the art director, since most of these details fall under the purview of the art department. On larger film projects, the script breakdown is usually generated by the assistant director (or production manager), but the production designer will carefully double-check the list, adding specific details that are part of the designer's interpretation of the scene. For example, an A.D. might not know specifically what posters will hang on the walls of a character's dorm room or what kind of book bag the character will carry if it's not specifically mentioned in the script.



Let's take a look at an example of a low-budget, yet highly expressive, use of sets, wardrobe, and props from the film *This is It* by Alexander Engel, one of the sample films streaming on the *Voice & Vision* companion website. The film is deceptively simple and every detail is so organic that nothing announces the artifice of filmmaking. It feels totally natural, like Engel simply opened up a window onto the world—and yet everything in every frame was carefully selected and intentionally placed there (Figure 6-10).

■ SETS

With only three shooting days scheduled for the interior apartment shots, Engel did what any smart low-budget filmmaker would do, he found a location whose natural state was as close to the story as possible: a typical, cramped, shabby first apartment of two college guys. Engel's primary art direction challenge was that the apartment was tidy and had some nice artwork and furniture that were a bit too "adult" for his characters. So to make the place more reflective of his characters, he tossed some clothes, dirty dishes, and general clutter around the rooms, removed artwork from the walls and covered up the lovely china cabinet as much as possible. Luckily, the apartment was having the window frames re-sealed at the time and the chipped paint around all the windows leant another nice detail to the atmosphere of general neglect.

The other challenge was that Engel had shots that included the hallway outside the apartment door. Unfortunately, the hallway for the main location looked too nice, so a second location was used to cheat



■ **Figure 6-10** Every detail (set dressing, wardrobe, and hand props) in Engel's *This is It* is designed to be accurate for two college dudes and their first apartment.

any shots that included front door, building hallway, and staircase (e.g., "Did you feed the meter?" "Did you pay rent?" "You locked yourself out." "Did you and Marla ...?" and so on (see "Cheating" pages 97–98)

■ COSTUMES

You'll notice in the credits that Engel's crew is very small, yet he did have a costume designer (David Tabbert) and two costume assistants! In fact, the wardrobe department had one of the biggest budgets on the film. Why? It's clear that the costumes perfectly reflect what college-aged guys wear day to day; however, a consideration that was just as important as the "look" of the wardrobe was accommodating Engel's core narrative strategy. To convey the feeling that the narrative leaps forward in time (tracing the frustrations of the roommate experience from beginning to end in three minutes) each shot *must* feel like it takes place on a different day (and sometimes a different season). Naturally, this meant different clothes for nearly every shot. I stopped counting after 35 costume changes for Kip alone! Had Engel and Tabbert used only a few outfits, it might have felt like very little time had passed between events, and had they recycled outfits, the viewer might have gotten confused that we were returning back to earlier encounters. So, with so many wardrobe changes and only three shooting days, Tabbert had to have an extensive wardrobe collection (racks and racks) on set and ready to go. Obviously, it would have been folly to rely on actors to provide and bring so many clothes, so most of the costumes were provided by Tabbert himself—although he did ask for the green shirt right off the director's back during one shot because he thought it'd look good.

■ PROPS

A mug, soda cans, an electric shaver, tooth brushes, a laptop, a diary, luggage, a live plant, a dead plant ... there are a lot of props in this short film, but none as funny or revealing of character as the video game controller prop that is used twice in the film. The first time Jules uses the controller to play a video game (with intense concentration and distraction) is when he's on the phone with his mother, "Hey Mom, did you send the rent?" It's a great detail that shows him regress into his child state when asking his mom to take care of him. The game controller gestures and that pie-eyed stare make him look like a 10-year-old. Imagine the same scene with Jules sitting on the sofa giving his full attention to the call, or cooking, or sipping coffee. The shot would not have so quickly and vividly conveyed his stunted

progress toward maturity, nor would it have been half as funny. The second time he's absorbed in the video game is when he asks his girlfriend, "Babe, do we really have to go?" With Jules preferring to play a video game instead of going out with his girlfriend we're not surprised to learn, seconds later in the film, that the relationship is falling apart.

Although *This is It* flows effortlessly and looks like a simple film, it delivers because nothing was left to chance. All of the visual details (the sets, costumes, and props) work perfectly in tight coordination with the script and the comic tone. But keep in

mind, sets, costumes, and props don't take care of themselves. You must invest a good bit of preproduction forethought and planning to have exactly the right thing on the set when you need it. It doesn't work to say, after lights and camera are set up and actors rehearsed, "Oh, I've got a good idea, what if he were playing a video game when he calls his mom; hey anyone here got one of those video game control thingies we could borrow?" Not only does lack of planning waste time and squander opportunities, but too much of that sort of 11th hour decision making will erode the trust of your actors and crew.

BUDGETING YOUR FILM

The project budget is, as they say, where the rubber meets the road. **Budgeting** a film means considering how much money (and other resources) one has available to make a movie, determining what expenses you will incur in making a film, and deciding how your available funds will be distributed across the various needs of the project.

There are generally two ways of approaching your budget. One approach is to figure out how much money you have (or can reliably get) and devise the best film you can make with that amount. The other way to go about it is to write the script you want to produce, break it down, and find out how much it will realistically cost to make that film. Then you go out and raise the necessary funds. The latter approach is common practice in the professional industry but can be risky for a student filmmaker who needs to produce a movie in a few weeks for a grade. There are, of course, many strategies between these poles; for example, you can shoot your film with all of the resources you have, getting it "in the can," and then raise money later for postproduction expenses.

In any case, it is essential, before you begin production on your movie to know just how much it will cost you. Serious sticker shock awaits anyone who makes films on a spend-as-you-go basis. A detailed budget includes a price line for every item, service, or person that comes with a fee, and it will let you know how much your film will cost and where the money will go. In student and independent productions, some items ordinarily costing money can be borrowed or found for free. When budgeting a film you must consider *all* of your resources, not just the available cash. Budget line items that you are able to secure for free, like a camera, or a location, or food, are called **in-kind support**. For example, director Alexander Engel, who directed the short film *This is It* (streaming on the *Voice & Vision* companion website), was able to borrow much of his equipment from a production company he had worked for (but only for three days). If you're a college student, your production crew, being students themselves, work for free, and the school generally provides basic production equipment and facilities like editing rooms and rehearsal spaces. Still, it's always a good idea to list *every* item in your budget, including those that are provided as "in-kind" support. But obviously, no school covers every expense of a simple film, so working up a budget in preproduction is essential so that you can do what's necessary to secure essential funding (Figure 6-11).

It is not a good idea to be blindly optimistic about budgets and how far a buck will stretch; it's always best to be bluntly realistic. As I mentioned in Chapter 1, resources and ideas are inextricably linked, so working up a budget often becomes an occasion for rewriting the script. In the real world, when you're trying to raise money for a movie, every production company, grant-awarding agency, or investor will invariably ask to see not only the



■ **Figure 6-11** The preparation of a realistic budget must include all projected expenses. These students are using a camera and a tripod provided by their school, but the Porta-jib necessary for a dramatic shot had to be rented at a cost of \$125 per day.

screenplay but also the budget for your movie, so it's a good idea to know what's involved and what it means to translate ideas into clear financial needs.

The factors that go into working up an accurate budget fall into two obvious categories: resources and expenses.

Resources:

- The cash money you have on hand
- The funding you can reliably expect to come in during the making of the film
- In-kind contributions (incl. equipment, locations, rehearsal space, facilities, etc.)
- Cast and crew who are willing to work for free (or deferred payment).

Expenses:

- Length of the film
- Number of shooting days
- Workflow (acquisition, editing, mastering, and distribution formats)
- Equipment (rental and purchase)
- Facilities (hourly or daily rental with or without personnel)
- Materials, supplies, expendables
- Personnel (cast and crew)
- Location expenses (rental fees, food, transportation, etc.)
- Insurance and legal fees.

Do not optimistically rely on *potential funding* that maybe-might be coming in, like a competitive production grant that you applied for but haven't heard from yet. You might not get the grant and wind up in debt and unable to finish the film. And speaking of debt, I am not one who advocates going into serious debt to make a movie. There are people who very glibly say, "Heck, just go for it, max out the credit cards." That's easy to say when it's not your credit card. I believe it's better to use what money and resources you actually have to hand and make a great film for that amount. If it's good, it'll lead to more opportunities and possibly greater resources.

Obviously not every budget looks the same because not every film project has the same requirements. **Figure 6-12** is a sample budget for a typical intermediate/advanced level student film where the primary equipment (cameras, lights, sound gear, etc.) is provided by the school for free; it shows some of the typical and unavoidable expenses that factor into the production

Shooting Days: Film Length, Scale, and Shooting Ratio

Calculating the number of shooting days you need for your project is essential to arrive at accurate budget figures because many significant budget items are paid on a per-day basis, including equipment rentals, location rentals, meals, transportation, and personnel who charge by the day. You should never be overly optimistic with this. If your film will clearly take five days to shoot, then budget for five days. It would be pennywise and pound foolish to try and cram a five-day shoot into three days just to save money. However, you should not only consider the number of shooting days you want, but also the number of shooting days you can afford. Financial realities should be accommodated in the story and the visual conception of the film. Here are the major factors that go into determining your project's production period.

Project: SAMPLE BUDGET FOR TWELVE MINUTE HD STUDENT FILM

Length: 12 min	Format:4K UHD (C-Log, 24p)	Shooting Days: 6
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PRE - PRODUCTION BREAKDOWN:

Item / Service / Personnel	Units	Unit price / rate	Cost:
Audition & Camera Test studios and equipment provided by the college			---
Transportation (scouting)	3 days	car rental @ \$50 / day	\$150
Photocopying	12 pcs	12pp script @ \$0.07 / sheet	\$13
Hospitality	allow	Aud. & camera test (food, drinks, etc.)	\$100
Camera test	allow	Set dress, charts	\$75
Misc. audition & tests	2	SDXC class 10 (64 GB) @ \$35 ea.	\$70
PRE - PRODUCTION TOTAL			\$408

PRODUCTION BREAKDOWN:

Item / Service / Personnel	Units	Unit price / rate	Cost:
CAMERA DEPARTMENT			
Main camera gear supplied by college			---
Video record media	3	SDXC class 10 (64 GB) @ \$35 ea.	\$105
Data BAK Drives	2	LaCie 2 TB (USB 3) @ \$125 ea.	\$250
Camera Support	2 days	1 EZ Jib system pro @ \$100 / day	\$200
Filters	1	4x4 Polarizer @ \$180 ea.	\$180
Camera Expendables	allow	USB/SATA cables, batts., lens cleaner, etc.	\$100
LIGHTING & GRIP			
Main lighting & grip equipment supplied by college			---
Lighting Rental	3 days	LED 1x1 panel @ \$50 / day	\$150
	2 days	Chimera Lantern @ \$25 / day	\$50
Gel & Diffusion	12 shts.	CTB & tough opal @ \$6 / sheet	\$72
Grip expendables	allow	Gaffer tape, bulbs, blk. wrap, C-47's, etc.	\$150
SOUND DEPARTMENT			
Main audio gear supplied by college			---
Audio record media	2	SDXC class 10 (64 GB) @ \$35 ea.	\$70
Microphones rental	1 week	2 Senn. wireless lavs. @ \$100 / week	\$100
Sound expendables	allow	batteries, tape, miscellaneous	\$100
ART DEPARTMENT			
Set dressing - Purchase	allow	Curtains, wall dress, flower vase, etc.	\$150
Set dressing - Rental	2 days	Chaise lounge, chairs, table @ \$50 / day	\$100
Prop Rental	2 days	Electric guitar and amp @ \$25 / day	\$50
Wardrobe	1 day	Tuxedo rental @ \$75 day	\$75
Hair & make up	allow	Misc. make-up and hair products	\$75
Art expendables	allow	Tape, clamps, dry cleanin, paint, etc.	\$150
LOCATION EXPENSES			
Location Rental	4 days	Office location @ \$50 / day	\$200
Auto Rental	1 week	Cargo van @ \$375 / week	\$375
Transportation / fuel	allow	Subway cards, gas, taxi fares	\$200
Meals	6 days	Meal & craft service @ \$85 day	\$510
Miscellaneous	allow	Cleaning supplies, first aid, safety, etc.	\$150
PRODUCTION TOTAL			\$3,662

POST - PRODUCTION BREAKDOWN:

Item / Service / Personnel	Units	Unit price / rate	Cost:
EDITORIAL (edit, finish, master)			
Edit and color correction facilities supplied by college			---
Edit Media Drives	2	4 TB USB3 @ \$170	\$340
Edit supplies	allow		\$75
Sound Mix Suite	6 hours	ProTools suite @ \$65 / hr. (w. snd. mixer)	\$390
Recording Studio	1 day	H&D studios @ \$150 /day (piano incl.)	\$150
Musicians	1 day	Pianist - \$100 / flat rate	\$100
Master File Drive	1	1 TB external USB# drive @ \$75 / each	\$75
Project Archive Drives	2	1 TB internal drive @ \$75 / each	\$150
POST - PRODUCTION TOTAL			\$1,280

SUB-TOTAL	\$5,350
CONTINGENCY	\$530
GRAND TOTAL	\$5,880

■ **Figure 6-12** A sample budget for a 12-minute student film where the primary equipment is provided by the film program. The budget is divided by department and all items must be itemized so that you know precisely how much funding is necessary to make the film.

Film Length and Film Scale

Clearly, the **film's final running time** is one of the principle factors for determining the number of production days you'll need to get the project done. As we discussed in Chapter 2, the length of the script is our yardstick for anticipating the length of the film because we can be fairly certain that with a properly formatted screenplay one page equals one minute of screen time. So, the longer the screenplay, the longer the film, and the more time it'll take to shoot. A five-minute film can be shot in about two days, a 12-minute film may take a week or two, a 30-minute film could take about two weeks to a month, and a feature-length film can be made in anywhere between a few months to a year. However, there is no absolute formula for directly translating film length into shooting days because the film's final running time is not the only consideration in this equation; the **scale of the film** is another critical factor. By scale I mean the personnel, technical and logistical requirements of the film as determined by the film's artistic design. How a film is visually conceived can either add to or reduce the number of shooting days required.

- *Number of scenes and coverage strategy:* more scenes and more camera angles per scene require more camera setups and more time. Complex shots involving things like a moving camera and character choreography will also add significantly to production time (see Chapter 5).
- *Number and complexity of locations:* more locations require more time for travel, loading-in, prepping, equipment setup, strike, and so on. Long-distance locations or waiting for very specific weather occurrences (like a snowy day) will add time as well.
- *Size and experience of production crew:* A larger crew can get more done in a given day than a small crew, especially when small crews are forced to double up on duties. However, one must also factor in the *experience* of the crew. A novice will take more time to accomplish tasks than an experienced crew person who performs all sorts of common tasks practically automatically and will, without being told, anticipate what they must do next. More experienced crew also make fewer mistakes when the camera is rolling and this cuts down on the number of camera takes necessary to get the shot you're after. This, in turn, allows you to shoot more pages per day. However, keep in mind that the bigger your cast and crew, the larger your food and transportation costs will be. So there is a trade-off.

Another crew-related issue that factors into your shooting day calculations is scheduling. You must allow adequate rest time between shooting days, i.e., at least ten hours between the end of one call and the beginning of the next. This is a safety issue and a morale issue. Don't expect your crew to pull all-nighters just so you can save a few bucks—they'll make sloppy mistakes and these mistakes will not only slow down the production, but can potentially pose safety risks.

Shooting Ratio

Very closely related to production scale is shooting ratio. The **shooting ratio** of a film is the amount of footage you shoot compared to the final running time of the movie. If you shoot a total of 20 minutes of footage for a five-minute movie, then you have a 4:1 shooting ratio. If you shoot 60 minutes of footage, then you've got a 12:1 shooting ratio. Estimating your shooting ratio in preproduction takes some experience, but it's important in budgeting because it helps you calculate your data storage needs (see "Data Rate" page 215) and anticipate postproduction service costs because some lab and postproduction services are billed by the minutes-of-footage. Primarily, however, understanding shooting ratios will help you anticipate how many script pages you might shoot per day and therefore how many shooting days you'll require to finish the film, and that is a significant budget issue.

The factors that go into determining your shooting ratio include:

- *Coverage:* The amount of coverage you choose to do on a scene. Shooting from multiple angles necessarily means that you are duplicating actions and increasing the

amount of footage that remains unused in the final edit. If you want to keep your shooting ratio manageable, you'll keep scene coverage as simple as possible to tell the story you need. Filmmakers who feel too much freedom with digital shooting, and shot from a million angles "just in case" it might look good in the edit, wind up with hours of footage they never even use. Again, planning your optimal coverage in pre-production can save a lot of time and expense.

- **Takes:** The number of takes you record for each shot that makes it into the film can greatly increase your ratio. This is a slippery factor because naturally we must shoot until we "get it right." But it's not just the egoist directors who go overboard with retakes. Inexperienced filmmakers often make the mistake of going into production ill prepared (e.g., without proper rehearsal or previsualization) expecting to just figure it out along the way, or they too can become ultra-picky and call for takes when a single hair is out of place (see page 410).
- **Shot complexity:** Finally, the more technically complicated your shots are the more things can go wrong during each take and the higher your shooting ratio is likely to be. Adding location sync sound, dynamic camera moves, dollies or cranes, multiple actors, complex camera/subject choreography and so forth will inevitably add to the amount of footage you will need to shoot.

Shooting ratios are obviously not standardized and there can be a broad range given these and other factors, but here are a few points of reference: student films on very tight deadlines will often have something like a 6:1 shooting ratio; independent feature films usually come in around 12:1 to 15:1. Hollywood feature films are more like 30:1 and higher (sometimes *much* higher), and this is one reason why the gargantuan budgets are necessary.

It's true that calculating shooting ratio was especially important when people shot celluloid film because of the great expense involved in buying, processing, and transferring film stock, but it's financially unwise to consider the relative affordability of shooting digital video as an invitation to shoot take after take, accumulating hours upon hours of footage. It's not the larger capacity memory cards and drives that will break the budget—it is the time (time for production, time to ingest, time to sync your dailies, time to evaluate all your footage, time to edit, and so forth) that will kill your budget (and your deadlines). Show a little discipline and establish a fixed shooting ratio and stick to it as much as possible. Solid rehearsals, thorough preproduction planning, and professionalism on the set will greatly minimize the number of takes you need to get a shot in the can. If you're shooting on a very tight schedule (because of deadlines, location restrictions, or lack of funds) then you should keep coverage and shot complexity as simple as possible and set definite (low) shooting ratio goals.

In the final analysis, determining the number of shooting days you must budget for relies on the complex interrelationships of all of these issues, and there are no simple formulas for predicting the number of days it will take you. But with a little experience on your projects and working on other people's sets, you'll start to understand how much time it takes to prep and execute shots and scenes, your own personal working pace, and your ability to motivate your crew to focus and crank out the footage.

Workflow and Budgeting

The choices you make concerning your shooting, editing, mastering, and distribution formats have a significant impact on the budget for your project. Although it is a mistake to believe that shooting on digital video is, across the board, cheaper than shooting on film, it is possible to produce effective movies on digital video, with visual effects and complex sound tracks, for very little money; however, making your movie on film (especially finishing on film) is almost always a costly endeavor because of the unavoidable involvement of a film lab for intermediate prints, transfers, effects, optical track masters, and so on. Information on how to budget projects originating on celluloid film is located on the *Voice & Vision* companion website (under the "Celluloid System" tab), so here we'll discuss digital workflow exclusively. It's important for myriad reasons that filmmakers plan their

complete workflow in preproduction, and budgeting is not the least of them. Here is how workflow considerations break down:

- *What is the shooting format?* HD Rec. 709 (720p, 1080i); UHD or D-Cinema (2K, 4K), uncompressed, RAW, or Log Format? (Chapter 8)
- *How are you editing?* Picture and audio formats, codecs, frame rate, resolution. (Chapter 19)
- *How do we want to finish and master the movie?* Professional or personal color grading and sound mixing? Master as HD video (720p, 1080i), professional codec (e.g., ProRes 4:4:4), DCDM 2K, 4K? (Chapter 24)
- *How do we want to exhibit and distribute the project?* Broadcast HD Rec. 709, Digital Cinema Package (DCP), Blu-ray, DVD, internet streaming, or multiple formats? (Chapter 24)

Without getting into the specifics of each choice along the workflow path (go to the indicated chapters for more information) it's critical to understand that each choice along the way has budget ramifications. In addition to the cost of specific cameras, lenses, and ancillary gear to acquire the footage format you want, your mastering process and distribution goals can also mean expensive professional services—especially in post (as is the case with D-Cinema/professional color grading and sound mixing/and DCP distribution) or it can mean nearly no professional services (as is the case with Rec.709 HD, Log format/NLE color correction and sound mixing tools/ProRes codec output, BluRay and internet streaming distribution).

Whatever the case, *do not attempt to produce a budget until you know your workflow.*

Department Structure

Budgets are most often organized by department (camera, art, sound, editorial, etc.) and that makes each department responsible for managing their own sub-budgets (answerable to the producing team of course). Within each department you will then list expenses for equipment (purchases and rental), facilities (rental), supplies (purchase), expendables (purchase) wherever appropriate. You'll notice in the sample budget in **Fig. 6-12** that even for student films where much of the major equipment is provided by the school, you still need to work up a detailed budget so that you can be clear how much you're likely to spend, where the money is going, and each department can see what financial resources they have to work with.

On super small student films where a crew of three or four people are doing everything and the idea of "departments" is kind of inappropriate, you can simply organize your budget by equipment; facilities; supplies and expendables; and location expenses.

Equipment and Facilities

Cameras, lenses, lights, monitors, editing suites, audition rooms, and screening facilities all require rental fees, but, happily, schools usually provide students with the basic equipment and facilities necessary to make their films. However, there will be times when something you need for your film can't be accomplished or obtained through the school. Maybe you're shooting a scene through the windshield of a moving car and you need a hood mount for the camera or maybe you're shooting an exterior night scene and require a portable generator to power a few lights. These are not items that schools usually provide, and so they must be rented. If you need a specialty item, then you must find an equipment rental house in your area and check its online catalog for rental prices when you draw up your budget (**Figure 6-13**). How much and what equipment you need for the shoot is much easier to predict and budget for if the director has done thorough preproduction planning and previsualization with the department heads. What type of camera, what variety of lenses, camera handling needs (like dollies or jib arms), array of lights, and so forth can be established early on in preproduction, or big ticket items (like dollies) can be nixed if there is no budget. But projects that skimp on their preproduction planning and go

into production with only a vague idea for how the film will be shot, wind up renting loads of equipment they never use “just in case” they might need it.

The cost of digital editing software, like Adobe Premiere Pro or Avid Media Composer, has come down so drastically in recent years (especially with the educational discounts) that many students, frustrated by the limited access at their school’s communal editing facilities, simply put editing software in the budget of their first film, and then they have it for every subsequent project. They find the convenience of editing in their room worth the added expense the first time around. Also, you should never rent or use school supplied storage media for your footage or backup—always purchase your own memory cards and storage/backup drives and take those into postproduction. Your footage is too valuable to put on worn, and possibly abused, loaner drives.

Supplies, Materials, and Expendables

Supplies, materials, and expendables are those non-equipment items that everyone needs on the set. Some material needs can include big ticket items, like set construction materials, while others are relatively inexpensive, like gaffer’s tape, extra batteries, diffusion paper, gels, sharpie markers, and so on. Take note: these small items can really add up, so make sure you anticipate them in your budget. Some expendables get tossed out (or donated) when the production is over (e.g., paint, small props, and set dressings), but some of your supplies you will keep; for example in the **Fig. 6-12** budget, the SDXC memory cards, data BAK and edit hard drives, gels, unused batteries, lens cleaner, C47s, all will be useful to help trim the budget on the next project.

Location Expenses

Location expenses are all the costs associated with being on location. This includes: location rental and necessary insurance fees; truck rental, transportation, and parking to get people and equipment to and from the set; and craft services (food and drinks) during the hours of shooting. It also includes the costs associated with returning a location back to its original condition after shooting (cleaning and repair). Location expenses can constitute a major percentage of a budget. If your film involves significant traveling, then obviously train or plane fare and room and board for cast and crew must be factored in—and *that* will bump your budget up significantly.

Personnel (Cast and Crew)

On a professional film, the fees for cast and crew are significant. Some people on the team are paid a flat rate for the project if they’ve negotiated their fee in this way, but usually most production personnel are paid a day rate. On small-budget films, any of the principal production team members (e.g., director of photography, art director, sound recordist) can make anywhere between \$75 and \$1,200 per day. Student productions on the introductory and intermediate level, however, usually use fellow students on the production team, which works out well for both the student filmmaker’s pocketbook and the teammates’ film experience and education.

The screenshot shows the CSI Rentals website interface. At the top, there is a search bar and navigation links like 'Cart is empty' and 'My Account'. Below the navigation, there are several category buttons: Cameras + Lenses, Camera + Video Accessories, Computers, Pro Digital Capture, Lighting, Grip + Electric, Production Gear, and Presentation. A rental form is visible with fields for 'Rental Start: Date & Time', 'Location', and 'Rental End: Date & Time'. The main content area displays the 'PORTA-JIB Traveler Kit' with a code 'SK5097230'. The pricing is listed as: Daily rate: \$125.00, Weekend rate: \$125.00, and Weekly rate: \$375.00. There is also an option to 'Add A Head' (Please Select) and 'Add Monitor Bracket' (+\$20.00).

■ **Figure 6-13** Most equipment rental houses, like CSI Rentals, have their entire rental catalog online, making the preparation of a budget an easy task..

The sample budget in **Fig. 6-12** is clearly for a student film in which cast and crew are working for experience rather than money; however, on advanced student projects, like thesis films, or high production value short films, you may find that you must include one or two crew members who have professional-level knowledge and expertise in a specific area that is rarely found from within the student body. For example, one of the first crew positions that students actually pay money for as their projects become more complex is a gaffer to take care of complex (and potentially dangerous) electrical issues. If I remember correctly, the first crew members I ever paid were a professional sound recordist and a postproduction sound mixer. I can remember being fed up with sub-standard sound quality of my very early student films. The same can be said of other specialized positions that are hard to find at the student level—like postproduction colorist, stunt and fight coordinators, digital effects consultants, special effects makeup artists, and so on. Obviously, this can be a significant budget consideration.

As your filmmaking becomes more sophisticated and ambitious, you may also find yourself wanting to cast professional actors who are members of a union like SAG (Screen Actors Guild) (see page 174). SAG certainly understands the financial constraints of student and low-budget indie filmmakers and they have special contracts for both which allows their members to perform in these films. But there is always a minimum fee and strict stipulations about talent compensation should the film garner any profits whatsoever in distribution. If you plan to employ a union actor in your film, then you'll need to check the details of the SAG contract to know what expenses to include in your budget. Information and contracts are posted on the SAG-AFTRA.org website.

Legal and Insurance

A large budget item that students tend to avoid is production insurance; however, every filmmaker should consider insurance a necessity for all projects, regardless of size, scale, and budget. On page 430 I discuss the necessity for liability and workers' compensation insurance in case of injury on the set, but production insurance should also include location and equipment insurance. Union actors and union crew cannot work unless you provide proof of insurance, and many equipment rental houses and locations require proof of insurance. If you're a student, your department should have information about where and how to acquire production insurance. If you're an independent filmmaker, the Independent Feature Project (IFP) website is a good place to start your search for affordable insurance (www.ifp.org). Insurance is complicated territory, so be sure to research exactly what kind of policies your project requires.

In the professional film industry, lawyers are a fact of life because films are built on contracts at every level, and attorney fees make up a significant line item in every film project budget. However, with simple student and independent short films, lawyers are not absolutely necessary, as many of the contractual issues are standardized enough that producers can find their way around them (e.g., SAG student contracts, location contracts, and so on). Occasionally, a student or small indie may need the services of a lawyer for special circumstances, like a special location contact at a sensitive location, or securing third-party material rights or music clearance, distribution deals, and so on. If you are a student, your department should be able to provide you with legal resources if any of your projects require legal advice.

As your ambitions, projects, and budgets become larger, you will inevitably find the need for legal advice. As independent filmmakers there are several services around the country that can help. One current service is the Cardozo Indie Film Clinic (<https://cardozo.yu.edu/clinics-professional-skills/clinics/indie-film-clinic>) which is a not-for-profit program that provides free legal services to indie filmmakers in New York. A similar indie film legal clinic exists on the west coast through the Chapman University School of Law, Entertainment Law Clinic (www.chapman.edu/law/legal-clinics/entertainment-contracts.aspx).

Hidden Costs and Contingency

Finally, it's important that you think very hard to anticipate any exceptional or unusual expense that might crop up. It's obvious that you have to budget for equipment rentals, craft services, and transportation costs for crewmembers, but what about the cost of cleaning up the house you used as a location, or the dry-cleaning bill for the costumes you borrowed but must return cleaned and pressed? What about the special dietary needs of an actor who cannot function on the normal crew meal you're providing? How about the late fee you had to pay because you didn't return the equipment on time, or the \$75 replacement cost for the 2,000-watt bulb that blew during your shoot? What if you encounter terrible weather and have to extend your shoot (and all rentals, and fees, and expenses) an extra day? And what if the sound you got at several locations was poor, requiring extra sound mix hours to fix it ... There are a thousand places where hidden costs can sneak up on you. Most unexpected costs occur because the filmmaker hasn't done thorough research, especially in the area of postproduction services, but a lot of budget overruns simply come from not accounting for the little stuff, which can really add up. However, no one can predict every eventuality, and it's for this reason that most filmmakers routinely figure in a **10% contingency allowance** as a line item in the budget. This ensures that there will be money on hand to cover unforeseen expenses.

Feature-Film Budgets

Although this book is intended for the introductory and intermediate filmmaker, I think it might prove interesting to look at some principles of feature-film budgets (those that actually pay people) for reference, so that you can see how film budgets are essentially the same, even while myriad complexities are introduced as projects enlarge.

For feature films where people are paid, or given the promise of deferred payment if the film earns a profit, the budget is divided into **above-the-line** expenses and **below-the-line** costs (even low-budget films). The line itself is the division between getting the project off the ground (preproduction) and going into production. The **above-the-line personnel** are those whose efforts get the movie from an idea for a film to a project in production. These people include the **producer** (whose public relations, organization, and fund raising secures the finances for the project); the **director** and **writer** (whose early work forms the creative nucleus and blueprint of the eventual film); and the **lead actors**, director, and writer (whose reputations and commitment to the project can attract funding). Once the funding for the film is secured, the below-the-line personnel are hired and start work. Above-the-line personnel are often compensated with either a salary, a fixed fee, or a share of profits (or some combination), while below-the-line personnel are usually paid daily or weekly rates for the time they actually work.

Above-the-line costs include:

Story rights	Screenwriter's fee
Producer's fee	Director's fee
Principal actors' fees	Preproduction legal fees

Below-the-line costs include:

Production department crew wages	Audition and rehearsal expenses (space, hospitality, etc.)
Art department (sets, props, and costumes)	Supporting cast, stand-ins, and extras
Camera, electrical, sound, grip, and other equipment and supplies (purchase and rental)	Studio and location rentals
Hotel, living expenses, meals	Film stock or digital storage media
Special effects, stunts, pyrotechnics, etc.	Production services (payroll, craft service)

Legal costs and production insurance	Transportation (equipment and personnel)
Music rights and composition	Laboratory and postproduction services (processing, transfers, color grading, special effects, sound mix, mastering, etc.)
Festival expenses (entry fees, travel, accommodations)	Distribution copies and publicity materials

Professional film production budgets are incredibly long and elaborate documents generated by professional accountants using specialized software (see following box). For the purposes of small-scale, low-budget, short films we can do with a lot fewer details. The short film budget sheets available on the *Voice & Vision* companion website should suffice for most small film projects. Keep in mind that you do not need to use every line item on the budget for every film and that you can add line items as you need them.

■ BREAKDOWN, SCHEDULING, AND BUDGETING SOFTWARE

For short student exercises and films you can certainly use the breakdown, budgeting, and scheduling forms provided on the *Voice & Vision* companion website. However, for more complex and lengthy films, like short thesis films or features, software can help you accomplish all these tasks in an efficient and integrated way. Also if you plan to raise funds or other production support from granting agencies or from people in the professional film world, you *must* have a professional standard budget (and other paperwork) generated by one of the industry recognized budgeting and scheduling software packages. The industry default budgeting and scheduling software

package is Movie Magic™ by Moviesoft, however, less expensive and very popular with independent filmmakers is Gorilla™, by Jungle Software. Either one of these very powerful packages will systematize and integrate the process of generating script breakdowns, budgets, shooting schedules, call sheets, prop lists, shot lists—they will even monitor your daily cash flow. Jungle software offers a trimmed down version called Chimpanzee™ specifically for students and beginning filmmakers. Many film schools make one or the other of these software solutions available to their students. While they may be a bit overkill for exercises and simple short film projects, it's a good idea to become familiar with budgeting and scheduling software as soon as you're able.

■ SUMMARY: PREPRODUCTION PAPERWORK

The key to a creatively successful shoot is organization and planning. Every film production, regardless of the size or budget, encounters extenuating circumstances, unforeseen challenges, and at least one brush with Murphy's Law. Being organized and prepared will ensure that you can meet these challenges without the whole project going under. Here are the preproduction forms we've discussed in Chapters 5 and 6 (these will help you get organized in preproduction and stay organized throughout the production process):

Marked shooting script (page 108)	Scene breakdown sheets (page 143)
Storyboards (page 114)	Call sheets (page 128)
Overhead diagrams (page 110)	Budget (page 147)
Shot list (page 123)	Contact sheet (page 180)

 You can see all these forms filled out for the example film *Kiarra's Escape* on the *Voice & Vision* companion website. Also, blank storyboard forms, call sheets, breakdown sheets, and short film budgets for your use can be downloaded from the website as well.

The Cast and Crew

I think the secret to directing is collaborating and I had truly an extraordinary group of collaborators in my crew.

Kathryn Bigelow (From acceptance speech, 2010 Academy Award for Directing)

Filmmaking is a communal activity in the sense that an artist has to go out and interact with a lot of other people and inspire and energize them. Unless you have the ability to convey your internal vision to enough people in a way that enthuses them and makes them want to help you translate that vision back as cinema vision, you won't make the jump.

Mike Figgis (From *Digital Filmmaking*, 2007)

■ THE PRODUCTION CREW¹

Narrative filmmaking on any scale is a collaborative art form requiring the effort and creative expertise of a team of people. The filmmaking team is the crew and the cast, and choosing the right group of people to pull off the movie you are envisioning is a task of paramount importance. When you build your production crew, it is essential to remember that the size of the crew must fit the scale of the project; the size of your team must be adequate to pull off the film but not so large that it becomes cumbersome. Short narrative films are typically produced with as few as three and as many as 15 people. The more technical production tasks your project requires, the more people you need. Take the time to build a crew that you can trust and with whom you can collaborate, because your production crew is your creative team. Even in a case where you are assigned a crew in a class, you should take whatever steps are necessary to foster cooperation and a collaborative spirit.

Production Department Structure

Whether you're shooting film or digital, making a five-minute short or a feature film, or working with a big budget or miniscule resources, the core production tasks for all narrative motion pictures are essentially the same. All film crews are divided up into departments. A **department** can involve one person or many people who are responsible for a circumscribed set of tasks. In the professional world, where production crews can be very large, these tasks have become narrowly defined and department teams are therefore staffed with many specialists. For example, on a big-budget feature film, it's very common for there to be six or more people responsible for the cinematography and functioning of the camera alone (i.e., D.P., camera operator, 1st A.C. (assistant cameraperson), 2nd A.C., digital loader, DIT (Digital Imaging Technician), Steadicam operator, video assist tech, camera P.A.—and then there is the second unit camera crew!). But if we consider the duties of the departments *broadly*, it will give us a good idea for the fundamental tasks on any narrative film of any scope and with any size crew:

- Someone must be responsible for budgeting, scheduling, and the logistical coordination of the project (personnel, locations, production resources). This is the **producing team**.

¹ This chapter deals with the production crew; for postproduction personnel see Chapter 19.

- Someone must be the definitive creative decision maker of the movie, the person who makes sure that everyone's efforts are working toward a common and expressive end. This is the **director**.
- Someone needs to be in charge of lighting, exposures, camera movement, and recording the image. This is the **camera department**.
- Someone needs to attend to the look of the physical space (locations and sets) for the movie and acquire the costumes and objects used by the actors in the film. This is the **art department**.
- Someone must be in charge of recording sound on location, if it's necessary. This is the **sound department**.
- Someone must appear on camera to perform the dramatic roles in the movie. This is **the talent**.

There is, of course, much more detail involved in the tasks of each department, but considering it in this general way can help you distribute the duties among smaller production teams on low-budget films, where people often need to perform multiple roles.

■ DEPARTMENTS AND DEPARTMENT HEADS: THE CREATIVE CORE

The **principal production team** includes those crewmembers with substantial responsibility and often direct creative input. These people are the heads of the various departments, and in the professional world these key positions are supported by technical teams with highly specific jobs. However, on short films, where budgets, technical demands, and production crews are much smaller, these people often work alone. For our purpose we'll look at the role of each position as it pertains to short projects on the introductory and intermediate levels.

The Producing Team

It's not easy to create a precise list of duties for a producer, because this role can be very different from film to film. The best definition I've seen comes from Christine Vachon's book, *A Killer Life* (2006), which details her experiences as an independent film producer: "Producers are the ones who get movies made, from the concept to the contracts to bankrolling the folks at the craft services table" (see the In Practice box that follows). **The producer** oversees the logistics of the film from preproduction to distribution, including funding, personnel, scheduling, equipment, locations, and other production resources. The producing team makes sure that the project is accomplished on time and on budget. The producer is responsible for providing the director with a realistic assessment of the budget, including what resources are available and how they can be distributed across the various needs of the project. The producer then keeps a close eye on the expenditures of the film for the duration of the project. The producer also helps devise strategies to make maximum creative use of limited budgets. It's considered a high compliment to a producer for someone to say, "The producer made a \$5,000 budget look like \$500,000!" Producers select their own support staff, including the production manager, and help directors choose the rest of the production and postproduction team. Indeed, sometimes the producer is *the* original force behind a film project and brings together a writer and director with compatible sensibilities and styles to develop the film.

The **production manager** (P.M.; sometimes called the **line producer**) is the producer's right hand during the production process. While the producer has the bird's-eye view of the project and organizes the big picture, the P.M. is responsible for the day-to-day operations of the film set and overseeing all budget expenditures. The P.M. manages the master schedule, ensuring that everything and everyone necessary for every shooting day will actually be on the set, on time. The P.M.'s job is formidable. P.M.s coordinate people, props, equipment, transportation, food, money, and locations. In many ways the production manager is the linchpin for the entire, logistical effort of film production. The P.M. helps the director and A.D. break down the script and is therefore acutely aware of the time,

material, and personnel needs of the project. The P.M. then creates the shooting schedule and breakdown sheets from the shooting script with the A.D. (see Chapter 5).

The **locations manager** and **locations scout** are responsible for finding, securing, and scheduling all locations for a film project. Because the locations team has considerable legal, logistical, and scheduling responsibilities, they are considered part of the producing team—but in their creative capacity they will work very closely with the director and the art department. On large productions the locations can even be its own department.

Although each department is responsible for the safety issues in its own area, the producing team is ultimately responsible for the general oversight of safety and security concerns. If a project is large enough and includes risky elements, it is wise to add a **safety coordinator** to the team. On small shoots, this supervision falls to the producer and P.M.

in practice

Veteran film producer Christine Vachon truly puts the “independent” in the term “independent film” (Figure 7-1). Producing movies since the 1980s, her credits include some of the most groundbreaking, risky, innovative, and influential movies of American independent cinema, including *Poison* (Haynes, 1991), *Kids* (Clark, 1995), *I Shot Andy Warhol* (Harron, 1996), *Happiness* (Solondz, 1998), *Boys Don’t Cry* (Peirce, 1999), *Hedwig and the Angry Inch* (Mitchell, 2001), *One Hour Photo* (Romanek, 2002), *Still Alice* (Glatzer, Westmoreland, 2014), *Carol* (Haynes, 2015) just to name a few! Her company, Killer Films, continues to flourish even though most of the early independent film companies have disappeared. Vachon’s success and longevity can be attributed to maintaining a relentless passion and sense of mission for small films that have something important to say and contribute to the art form. She has never wavered from this mission. Vachon has also authored two books that detail her experiences as a producer. The aphorisms that follow are excerpted from the list of personal maxims that open her second book, *A Killer Life*, and provide a good sense of her producing method and philosophy.

*Enjoy the process.
But get out of the way.
The budget is not the aesthetic.
Never put in your own money.
OK, Sometimes it has to be your money.
(Money is overrated)
Identify talent and stick to it like glue.*

*Every little picture needs a big picture.
In the big picture, we need little pictures.
Less money = more control; more money = less control.
Find the intersection of an investor’s courage and cash.
Do what you love; do it consistently. Everything else will follow.
Every story behind a movie that gets made is a success story.
This is the best job in the world.
Christine Vachon (From *A Killer Life*, 2006)*



■ Figure 7-1 Producer Christine Vachon of Killer Films.

The Director, Assistant Director, and Script Supervisor

The **director** is the creative driving force of a film project. The director is responsible for bringing the screenplay to the screen and maintaining an appropriate, consistent, and coherent stylistic approach. Despite the popular impression of the director as some sort of demigod, they are usually more like the captain of a ship. They oversee all creative activity on the film, and, working from their own vision as well as the suggestions of the

other principal personnel, they make sure that everyone's efforts culminate into an effective and cohesive movie. To this end, the director is responsible for fostering creative input and inspiring enthusiasm and commitment among the cast and crew. Film is a collaborative art form; listen again to what Kathryn Bigelow said when she accepted her Oscar for Best Director in 2010: "I think the secret to directing is collaborating." More than any other team member, the director sets the tone for the production. If the tone is adversarial with the cast and crew, then the experience will be a terrible struggle, which often manifests on screen in the form of unremarkable or sloppy work. If the director has created a collaborative and encouraging environment, then it is astonishing how much great work can be accomplished in a short time with few resources. This is especially critical on low-budget shoots when you are not paying people for the hard work of making a movie.

in practice

For her first feature film, director Courtney Hunt set herself some formidable challenges. *Frozen River* (2008) tells the story of two women, one white and one Mohawk, who reluctantly become partners in crime. Compelled by their personal economic hardship, the women smuggle illegal immigrants from Canada into the United States by driving them across the frozen Saint Lawrence River and into Mohawk reservation territory where they elude the police. *Frozen River* was shot with a small crew on an extremely low budget. As Hunt tells it, "Everybody did two jobs and every job was crucial and everyone worked really hard." This is certainly not atypical of independent filmmaking; however, there was another challenge that was built right into the very premise of the film—the frozen river! In this film the harsh winter landscape along the New York/Quebec border, and especially the titular frozen river, are not mere backdrops; rather they carry critical narrative and metaphoric weight and this guaranteed extensive shooting in frigid conditions. With low-budget independent film wages and harsh shooting conditions, one of Hunt's principal tasks as a director was

keeping everyone invested, engaged, and involved, not just in their specific craft areas but in the project as a whole (Figure 7-2):

We had days that were subzero, we had days that were in the single digits and we had the occasional, terrifying day when it would fly up toward freezing and we'd worry about the ice melting. So, every day had its own worry in terms of weather.

For me, it was just making sure that the storytelling involved the crew, the cast and myself. And that it was compelling enough to give us the courage to go outside and stay outside because there are tons of exteriors in this movie and tons of night exteriors, which can be just grueling. But everyone was committed to the story. They were behind Ray Eddy and her quest. They were behind Lila and her struggle in a very personal way, and that helped us get through.

Courtney Hunt (From "From Law School to Oscar" by Mark Sells, *MovieMaker*, 2009)



■ **Figure 7-2** Director Courtney Hunt credits the hard work and dedication of her crew, who often worked in subfreezing temperatures, for helping her realize her award-winning, low-budget feature film *Frozen River*.



■ **Figure 7-3** Whether you are a film student or a cinema legend, the complex job of directing is essentially the same. Director Miles Adgate giving direction to actor Jarret Berenstein on the student film *Discovering* (2006, left), and director Jean-Luc Godard showing Jean Claude Brialy how he wants him to ride a bicycle in the film *Une Femme est Une Femme* (1961, right).

The director is also the ultimate problem solver. During the course of any film production, there are countless puzzles to solve and endless questions to answer—for example, where do we set up the camera and why? What is the actor’s motivation? How many setups are required to cover a scene? How long will each take be? From what direction should the light come? What are the color tonalities of the set? Which shirt should the lead wear? When do we move the camera and why? How does an actor move in the location? How do we revise the shot list if we’re running out of time? The director’s job sometimes can seem like nothing more than answering one long stream of questions and solving one creative puzzle after another (**Figure 7-3**). However, the director answers all of these questions because every one of them determines the expressive style and aesthetic approach of the film. Because of this, a director needs to be broadly knowledgeable of the process, techniques, and creative possibilities of all aspects of film production. Also, a director needs authority, and that authority comes not only from knowing what one is doing, but also from being very clear about everyone else’s role in the creation of the film and respecting their contributions. It’s equally common for directors to ask the questions. A director might ask a D.P., “I need this scene to feel claustrophobic, tight, suffocating; what lens do you suggest?” Or one might ask an art director, “This character is a rebellious teenager with a penchant for Goth; what do you think she’d have in her room?” With actors, the director enters a very special collaboration, which we will discuss in more detail later in this chapter and in Chapter 17.

One final and important note: the director needs to always keep a level head and should not attempt or demand anything that compromises the safety of anyone on the production team, or anything that is in excess of the available resources, or anything that approaches an abuse of personnel, location, or equipment (see Chapter 18).

The function of the director is to lead. [...] if no one is leading the troops, the troops will become lethargic and disheartened very quickly because they are working for you and they are trying to service your vision. Unless they have some energetic connection to your vision, they end up being functional technicians.

Mike Figgis (From *Digital Filmmaking*, 2007)

The **assistant director** (A.D.) is to the director what the production manager is to the producer. The A.D. is responsible for the smooth operation of the set. This usually means communicating the director’s instructions to the various technical departments (e.g., camera, art, and sound departments) and relating the crew’s concerns back to the director.

The A.D. makes sure that everyone on the set knows the order of camera setups and what is needed of each department. This leaves the director freer to work with the actors and to make creative decisions on the set. The A.D. works very closely with the P.M. The A.D. helps the director create the shooting script and then, with the P.M., breaks down the script to create a shot list and scene breakdowns (see Chapter 5). In scenes that involve many extras, the A.D. essentially blocks and directs their actions. On very small films, the A.D. is often responsible for keeping track of scene coverage and continuity from shot to shot, however most films of any complexity will add a dedicated script supervisor to their ranks.

The **script supervisor** works closely with the director and is responsible for understanding what coverage was planned in preproduction and keeping track of what shots are actually taken during production. They also closely monitor all continuity issues from shot to shot (props, sets, costumes, movement, axis, sightline matching, and so on). As shooting progresses, the script supervisor creates a lined script that shows what was actually shot and what each shot covers, and keeps accurate timing and continuity notes on every take. Also, if time runs short during a production day, the script supervisor can help the director determine what shots to eliminate or merge. Carefully coordinated with the camera and sound logs, the script supervisor's notes constitute the all important **continuity reports** (see page 413) which follow the footage into postproduction. The script supervisor's material is like a bridge between the production and the postproduction team because ultimately their job is to assure that the footage shot will cut together in the editing room. In fact, on short and very low-budget films it's not unheard of for the editor to be the script supervisor. This position requires keeping extensive and careful records, and specialized script supervision software (like *ScriptE*) definitely helps.

The Camera and Electric Departments

The **director of photography** (D.P.; DoP; also **cinematographer**) collaborates closely with the director on the visual interpretation of the script and the photographic look of the movie. This involves designing the lighting, choosing film stocks or digital format, and devising expressive camera angles, compositions, exposures, and focus. The D.P. knows very well the storytelling capability of the image and is in charge of capturing it all on film or digitally. The D.P. collaborates with the director during preproduction, and this collabora-

tion continues into production and postproduction, where the D.P. often oversees final color corrections and in some cases will consult with a colorist at the preproduction stage to establish the film's "look" before the cameras even roll (see pages 341 and 567). Although the director has the final say, the D.P. should never hesitate to make creative suggestions if they believe it will enhance the movie. However, a D.P. should never make suggestions simply as an excuse to play with snazzy camera toys. A good D.P. knows that, in the end, making a movie is not about equipment, it's about visual storytelling. For more on the duties and contributions of the D.P., see Chapters 12, 13, 14, and 17 (**Figure 7-4**).



■ **Figure 7-4** The D.P. and A.C. are a tight unit. Here, D.P. Joe Foley lines up a shot while A.C. Loui J. LeRoy maintains focus with the aid of his own monitor on the set of John Daschbach's *Brief Reunion* (2011).

Whether on a professional or a student level, the trust and the creative energy generated as a result of the director and D.P. collaboration are vital to the success of a film. It is important for both people to nurture this relationship beginning in preproduction.

The cinematographers Ellen Kuras and Michael Ballhaus described the importance of pre-production meetings with the director in this way:

I always, always value the time of the director before photography, because for me the film really gets made during those discussions—in my mind and in our minds. It creates a common language between me and the director to be able to understand the look and what the “third eye” is, in a way. What the vision of the film is.

Ellen Kuras (From “Where the Girls Are,” by Jennifer M. Wood, *MovieMaker*, 2007, Vol. 2, # 9)

Every morning we met in his office. He explained the scenes to me and his ideas. It was like being in heaven for me. I made a shot list and tried my best to integrate all of the fantasy that he imagined. Francis made any changes he wanted and gave it to the storyboard artist. After that, it was like shooting the film by heart. I would watch him rehearse with the actors and figure out the angles we wanted the audience to see. We finished the movie on time and on budget.

Michael Ballhaus on working with Francis Ford Coppola on the film *Dracula*
(From “A Conversation with Michael Ballhaus,” *ASC Magazine*, 2006)

Another key position in the camera department is the **assistant cameraperson**, or A.C. The A.C. is a camera and lens expert. They are responsible for the proper functioning of the camera, which includes setting it up, cleaning the gate (film), checking and pulling focus, and selecting filters and lenses (with the D.P.). They know with precise detail what various cameras and lenses are capable of, both technically and aesthetically. On low-budget shoots, the A.C. can be responsible for data management, footage backups, and keeping accurate camera logs.

The acronym FAST has become the mantra for working A.C.s. FAST stands for the key camera settings that must be checked before each and every shot: *F*ocus, *A*perture, *S*peed (frame rate), and *T*hink, meaning that an A.C. should take nothing for granted before the camera rolls. On most low-budget films, the D.P. handles the camera, but on large-budget films or projects that require multiple cameras, there is also the position of **camera operator**. A camera operator, an expert in composition and the technical implementation of shots, can collaborate with either the D.P. or the director in planning the execution of a particular shot.

The newest addition to the camera department is the **Digital Imaging Technician (DIT)**. The DIT works closely with the D.P. and is responsible for the on-set digital workflow, sound and video file management, and supervising image quality during a shoot. A DIT uses color correction software (like DaVinci Resolve or Adobe Speed grade) in the field and will run regular color grading on sample clips to determine the full visual capacity of each lighting setup. DITs may also collaborate with the director and D.P. to develop LUTs (custom color grading looks) that will follow the footage from production into postproduction. The workflow and color grading aspects of the DIT’s job are particularly critical on projects that are shooting in RAW or Log formats where actual footage cannot be monitored or viewed directly (see Chapter 14).

On low-budget and student shoots, or projects shooting in standard Rec. 709 video, the DIT’s job can be streamlined down to data management and quality control, because on-set color grading is not absolutely necessary. In this case, the DIT is often referred to as the **data wrangler** (or **data manager**). The data wrangler is responsible for dumping all footage (picture and audio) from the memory cards onto hard drives that will go into postproduction; logically and systematically labeling and organizing the footage; checking for corrupted files; and double backing up the footage for safety (see pages 415–417). The DIT/data wrangler also sets up a monitoring station to review footage on the set when necessary. With super low-budget (and small crew) shoots it might be tempting to cut corners and have the A.C. take on the data management duties, however, these tasks require total concentration to avoid valuable footage being lost, so it’s always a good idea to have a dedicated data wrangler.

As movie projects and budgets become larger, the camera department expands to meet the technical demands of the shoot and often include the additional support positions of gaffer and grip(s). The **gaffer** is the hands-on lighting person who implements the lighting designs of the D.P. The gaffer is in charge of the setup and proper (and safe) functioning of the lights. The gaffer is also responsible for getting the necessary electricity to the set. To ensure the safety of cast and crew, gaffers are almost always certified electricians. On large sets, gaffers will be in charge of their own department: the electrical department.

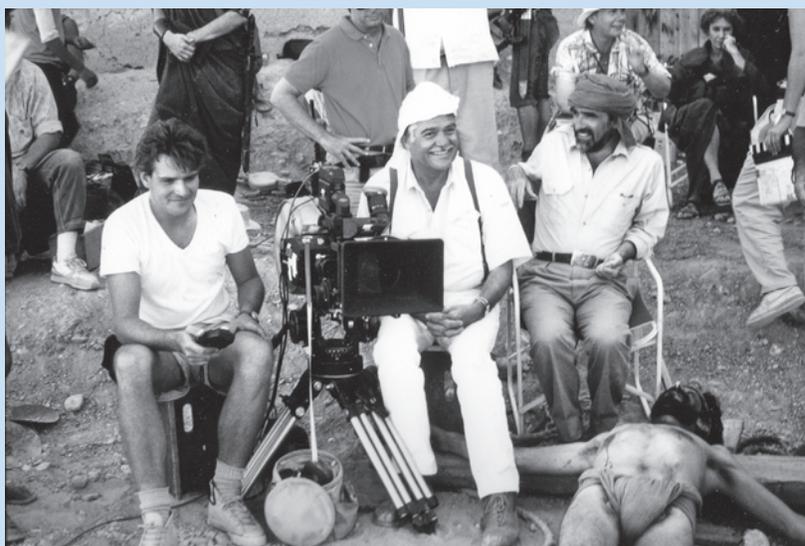
Gaffers and D.P.s are supported by electrical and camera department grips, respectively. **Grips** are the muscle on a film set. They move lights, sets, and dollies. They are responsible for the actual physical placement of the lights on the set and for the safe use of all lighting equipment or any production elements they have set up or rigged. Grips are also in charge of the orderly staging and breakdown of the lighting gear. On very large films, the grips become their own department, overseen by the **key grip** who in turn answers to the D.P.; but on very small projects with small crews, practically everyone on the set doubles as a grip at one point or another.

in practice

A good friend and colleague of mine was on the crew of Martin Scorsese's *The Last Temptation of Christ* (1988) and told me this story from the shoot in Morocco. *The Last Temptation of Christ* was shot on a remarkably small budget and tight schedule in general, and with a much smaller crew than is usual for a film of that scale. Leading up to the shoot for the crucifixion scene, Scorsese lost the original location, an elevated hilltop in the desert, because it was covered with snow! While the crew continued shooting other scenes, a new location was found, which the art department prepped, day and night, in only two days. As my friend remembers, "That the art department could prep that location in only two days was a miracle."

The location switch only made a tight schedule tighter and the crew had to move fast in order to

get everything planned for that location, which included nearly a hundred shots and the crucial crucifixion scene. As my friend tells the story, "Because the sun set early behind the surrounding hills, we had limited hours for each shooting day so we had to work fast. We didn't even have time to break for lunch; we were eating on the run so that we could get all the shots in. This was a key scene in a film that Marty had been dreaming about for years and we were understaffed and had limited time. At one point, when we were moving up the hill to set up a shot, I looked over and saw Marty himself grab two magazine cases weighing about 70 pounds and climb the hill with them to the next setup. For that moment, Marty Scorsese was doing the job of a P.A. to get the film done. I was impressed" (Figure 7-5).



■ **Figure 7-5** On a film set teamwork is crucial and everyone does what needs to be done to get the film in the can. The famous crucifixion scene from *The Last Temptation of Christ* required all available hands (right). Time was so tight on this shoot that Scorsese himself schlepped equipment when necessary (pictured in the photo at left with D.P. Michael Ballhaus, middle, and A.C. Florian Ballhaus, left).

The Art Department

The **production designer**, being the head of the art department, is responsible for the look and design of the film as they pertain to locations, sets, costumes, and props. The production designer works in close collaboration with the director and makes creative suggestions about the interpretation of story and characters in terms of location choices, the visual design and dressing of sets, and specific props and costumes. The production designer and cinematographer work very closely because together they create the total visual environment and style of the film. The production designer is also responsible for all safety issues concerning sets, props, and locations.

The larger the project and budget of a film, the larger the support team for the production designer becomes. Often the production designer designs the film, but the specific tasks are distributed among an **art director**, who supervises set construction and location details, **set decorator**, who dresses the set with objects, a **propmaster**, who locates and coordinates props, a **costume designer**, who finds or makes all costumes and maintains them for the duration of the film, and a **makeup and hair stylist** (Figure 7-6). On films that require set construction, the art director is also in charge of hiring and coordinating a team of **carpenters and painters**. Just a note on nomenclature: sometimes the designations “production designer” and “art director” are used interchangeably or collapsed together. If there is no “production designer” in the credits, then the art director fulfilled both roles; if you see both credits, then the duties were distributed as described here (see Chapter 6).

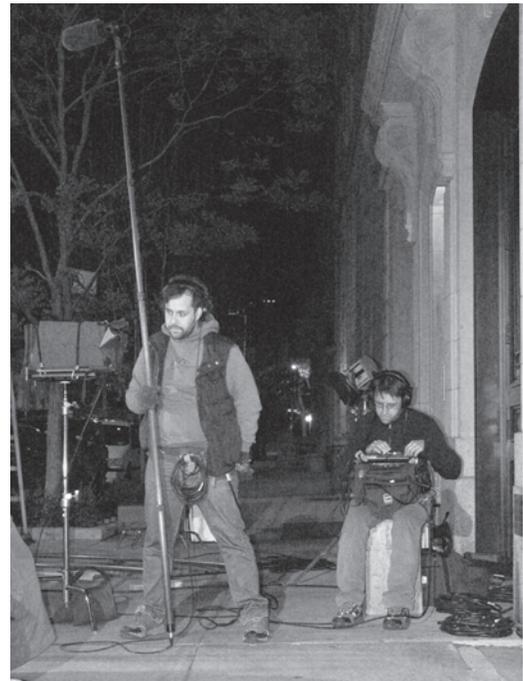
Finally, the production designer also works closely with the **location scouts** to assure that they are finding locations that work within the visual design of the movie. On small-budget films with tiny crews, the production designer or art director will do the location scouting themselves.

The Sound Department

The **sound recordist** (also called the **location sound mixer**) is the head of the sound department and is responsible for recording the best possible quality sound. A perpetual puzzle solver, the sound person chooses the appropriate microphone(s) and microphone placement for every scene that requires sound. They also monitor and maintain proper recording levels. Sound recordists are trained to listen to everything in the aural environment of the set, and they make technical decisions based on the acoustics of the space and the ambient sounds. They also need to be alert to unwanted sounds intruding on takes, like airplanes flying overhead or a refrigerator suddenly kicking on. The sound recordist often teams up with a **boom operator**, who is responsible for the proper use and actual placement of the microphone(s) for optimum quality (Figure 7-7). Sometimes this means planting a microphone on the talent or on the set; other times this means holding a boom pole, which suspends the microphone over the action. The boom operator position is extremely important on any film with extensive synchronized sound, because bad audio is as disastrous and irremediable as bad camerawork. On bigger shoots there is also a third person, called the **cable wrangler**, who sets up the cables, holds a second boom when necessary, and wrangles the cable when the boom operator follows a moving shot. Chapter 16 describes the role of the sound team in more detail.



■ **Figure 7-6** A special effects makeup artist does quick touchup work on the set of Matt Post’s short film *Super Spree* (2011).



■ **Figure 7-7** The sound team. In its most common configuration, the sound team consists of a boom person (left) and a sound recordist (right).

The Appropriate Crew Size

Keep in mind that these descriptions are a guide for small independent films and student projects, which generally do not involve major studios, distributors, lawyers, production office staff, unions, and large technical crews with dozens of people and budgets in the millions of dollars. There are many books on the market that define each film crew position in its full professional dimensions and union affiliations (see the Recommended Readings section at the back of this book).

Now that you have a sense for the essential production crew positions, remember that fitting the size of the crew to the scale of the project is important. Bear in mind the law of diminishing returns. You want just enough people to get the job done well, but not so many that you waste time and money on unnecessary bodies. As a colleague of mine once remarked about large production crews, “more people creates a need for more people because you need extra people to manage and take care of all those people!” When you work with small crews, people are required to double or sometimes triple up on duties. It is essential that no matter how you divide up the duties on a project, all crewmembers must know precisely what they are responsible for and what is expected of them.

■ CREW MEETINGS AND COMMUNICATION

To foster a professional, collaborative, and efficient environment, open and frequent communication is vital. The director/producer should hold regular crew meetings over the course of any project, no matter how small. Crew meetings are essential for conveying the creative vision of the project and everyone’s specific role in bringing that vision to the screen. Meetings are also indispensable for organizing the general production schedule as well as everyone’s individual schedules and duties. No one should show up at the set without knowing exactly what their job is or what the project is about.

It is always a good idea to include your crew in the initial script reading in order to allow cast and crew to get to know each other. After previsualization, you should also schedule **technical read-throughs** with each department so that you can concentrate on the technical requirements of each area in isolation from the rest. Additionally, you should meet with your crew whenever there are major changes to the visualization, production requirements, locations, or production schedule.

Finally, crew meetings are where people feel the progress and momentum of a project and

where team motivation, connection, and collaboration are fostered. A cinematographer can’t make suggestions about the aesthetics of lighting or composition if they never saw a finished script or sat down with the director to discuss the tone, mood, or themes of the movie. A sound recordist needs to know what the locations and shot selections are like in order to bring the appropriate equipment to the set. An art director needs to be informed of their budget so that they know whether to buy, borrow, or make props and set pieces. The grips, like everyone else, need to know the production schedule so that they can clear their calendar for the necessary shooting days. One of the most common reasons student films fail is simple lack of communication (e.g., scheduling shooting days without first meeting with the crew to determine their availability). The more your teammates know, the more they can do for the project and the more efficient the production process will be (Figure 7-8).



■ **Figure 7-8** A student film production crew meeting in progress. Crew meetings are essential for creative collaboration and logistical coordination.

Obviously, communication is essential, but can you have too many meetings? Yes. You need to conduct efficient and informative meetings but not hold unnecessary ones just for the sake of meeting. You will respect people's time by not wasting it.

in practice

Here are a few examples of what types of projects are appropriate for small film crews and how small teams can be organized. Naturally, there are other possible configurations given the expertise of the personnel you have available.

■ THREE-PERSON CREW

Type of project. Very short films, music videos, or exercises shot *without sound* (MOS). Very few locations using only available lighting and relatively little set dressing. Small cast.

Breakdown of duties. (person 1) co-producer, writer, director; (person 2) co-producer, P.M., cinematographer; (person 3) co-producer, art department, A.D., grip. (memory cards backed-up after each shooting day).

■ FIVE-PERSON CREW

Type of project. Short films involving very simple location sound recording. Few locations using limited lighting and set dressing. Small cast.

Breakdown of duties. (person 1) writer, director; (person 2) producer, P.M./A.D.; (person 3) cinematographer, A.C.; (person 4) art department and grip; (person 5) sound mixer, boom operator, and data wrangler.

■ EIGHT-PERSON CREW

Type of project. Intermediate to advanced short films involving multiple locations, LOG format, and extensive sync sound, lighting, set design.

Breakdown of duties. (person 1) writer, director; (person 2) producer, P.M./A.D.; (person 3) cinematographer; (person 4) A.C. and gaffer; (person 5) art department and grip; (person 6) sound mixer; (person 7) boom operator; (person 8) DIT/data wrangler.

■ BEING A CREWMEMBER

When you are just starting out on your filmmaking journey, it is imperative to crew on as many movies as you possibly can. You always learn an extraordinary amount on well-run productions and on poorly run productions alike. There is no substitute for on-set experience—being part of putting a movie together, watching other people at work, and witnessing the travails, struggles, successes, styles, and procedures of filmmaking firsthand is by far the quickest and most valuable learning you can attain.

As a crewmember yourself, it is essential that you endeavor to be as informed, skilled, and cooperative as possible. A great deal of time, money, energy, and hope is poured into making a movie, so reliability and resourcefulness from every crewperson is essential. Never forget that whatever your role on a film project, no matter how humble, in this business we build our reputations, professional relationships, and careers one film at a time. You must maintain a professional demeanor no matter what your role is. The film producer Cirri Nottage (*Girl Six*) once said to my film class that she always keeps her eye out for the person who excels at their job, even if it's a small job like photocopying and stapling script pages. "If that person is the best and most reliable script photocopier I've seen, then that person is going to be hired again and promoted, because that's the attitude I want on my film set." Initiative, effort, dependability, and energy pay off. If you show these traits, you will find yourself on a lot of film sets. Even if you're in school and taking your first film production class, the impression you make on your classmates follows you into the intermediate and advanced courses and beyond, into the professional world. This is how any creative community is developed. Often, the people you call on to help make your first films after graduation are those whom you trusted and collaborated with in school, and if you have proven yourself to be a trustworthy, energetic, and resourceful crew member, you can expect to get a few calls after graduation.

You should be realistic about the scale of your project, your technical needs, and the spirit of the project when building your production team.

■ TOO FEW TEAM MEMBERS

When I was in film school, another student devised a short film that involved a perpetually moving camera. The scene was a small party and the camera mingled with the crowd and caught provocative snippets of dialogue as it entered into and left people's conversations—not unlike a Robert Altman approach to group scenes. It was a terrific idea, but the student filmmaker had only a three-person crew. Practically speaking, he needed a minimum of four people besides himself: one person on camera, one person pushing the dolly, one person holding the boom microphone, and one person on the sound recorder watching the levels carefully. So this director ended up pushing the dolly himself. He also pulled someone from the cast to hold the boom pole. The result was no surprise—unconvincing performances (because the director couldn't pay attention to performances), terrible sound (because the actor knew nothing about positioning a mic.), and, even worse, a cast and crew who lost faith in the filmmaker's judgment and abilities.

■ TOO MANY TEAM MEMBERS

A few years ago, a friend of mine had some significant festival success with a lovely short film she

made about traveling out west with her mother. She shot the film all by herself, over the course of the weeklong trip, with a Super-8mm camera. A professional producer liked her movie and offered to produce her next short film. My friend naturally took her up on the offer and wrote a delicate and poignant script about two neighbors who get stuck on a city rooftop and almost fall in love. With only one exterior location and only two principal actors, the script was designed to be easy to shoot so that she could really connect with her actors and get some memorable performances. Simple, right? Unfortunately, the very generous producer gave the project the red carpet treatment, and on the day of shooting a 12-person crew showed up—including two electricians (for a film using no artificial lighting!). My friend called me from the set, almost crying. She said that the overly large crew felt like a huge anchor and kept her from improvising or even connecting in any intimate way with her cast—yet, she felt obligated to defer to all of these professionals who had made so many films and were there for free. She lost control of her own film. For example, her first idea was to simply hand-hold the camera, but when she saw dolly tracks being off-loaded and laid down, the camera being mounted on the boom arm, and a camera crew of four waiting for instructions, she felt obligated to go that way. The result was a film that looked like a million bucks yet felt stiff, overproduced, and lacked much of the director's individual spirit, which was so evident in her first film made with a crew of one.

■ ON-CAMERA TALENT

Casting a film means finding the right people to play each of the various roles in your movie and securing their commitment to the project. The formality of this process varies widely depending on the scale of your film, but that doesn't mean you can ever be careless about casting. The success of small films and exercises, all the way up to big-budget features, depends enormously on the quality of the on-camera talent. The on-camera talent can determine the success of a film in two ways—through their performance skill and charisma and through their dedication to the project. Deficiency with either of these can likewise sink an otherwise admirable effort. There is a common adage that says that if a role is well cast, then 90% of the director's work is done. Although this may be somewhat exaggerated for effect, there is truth in this statement. Without a good actor/character match, your film will never achieve its maximum power and resonance. This is not just an issue of experience and qualifications, it's a matter of fit and shared sensibilities for the role. For this reason, casting your film must be done thoughtfully, carefully, and with enough time to really find the best possible performer for each role.

Finding an Actor

When we think about actors in a film, we usually think about people who are trained in the craft, just as directors, cinematographers, and editors are trained in their fields. **Trained actors**, those who have studied with a mentor, or in an acting program, or have gained significant experience working on many films, bring a level of expertise to a project and work



■ **Figure 7-9** George Racz with his niece Panna, who was the inspiration for his short film *The Miracle* (2006) and the obvious choice to play the lead role (*left*) (see pages 24 and 42). Ramin Bahrani auditioned more than 600 kids before settling on Alejandro Polanco for the lead in his feature film *Chop Shop* (2007) (*right*).

comfortably with the convoluted process of filmmaking. But not all films require trained actors. For simple projects and film exercises, we often write a script for someone we know or we simply cast a friend (or a friend of a friend) (**Figure 7-9**).

This practice is fine. You certainly don't need to go through an elaborate audition process for a simple chase scene exercise produced for your *Film 101* class, but you should be aware of a few pitfalls:

1. Never use one of your crewmembers as a player in the film. You reduce the size and therefore efficiency of your production team when you pull one of them out. A crew of four people that loses one to become a performer is diminished 25%. Usually this drastic trade-off becomes visible on screen in numerous ways.
2. Cast someone who has a reason to commit to the film. Filmmaking is arduous and time consuming. Actors and acting students have a reason to participate until the very end because it's important for them to gain movie credits and to have a "reel," meaning performance samples. The better the project is, the better their "reel," so they have a strong incentive to perform well. However, a close friend who is an economics major might be *willing* to be in your movie, but after the first ten-hour production day your friend may start to lose interest. With midterms coming up and a job to maintain, suddenly the thought of sticking around for three more shooting days isn't so appealing. Frequently, really good friends find the limits of their friendship on film productions.
3. Think twice about casting family members. Family relations are often complex; add to that the stress and arduousness of the filmmaking process, and you're working with a volatile mixture. Besides, do you *really* think you can direct your mom?
4. The super funny guy at parties who does a spot-on perfect imitation of De Niro in *Taxi Driver* can suddenly seem less than convincing once you look at him through a camera lens. The context of a personal relationship is very different from that of a film. What's funny or brilliant among a group of pals kicking back on a Saturday night often doesn't cut it for a broader public.

Because of pitfalls like these, most films that are more involved, ambitious, advanced, or costly will cast actors who are trained and committed to being in the movie. And, of course, by working with trained actors, you gain valuable directing experience yourself.

Casting for type means casting someone because they seem naturally right for the part in some way, whether they look the part, or behave just like your character in real life, or have the same profession your character has. Casting for type can work well, especially if the person happens to also be a fine actor. **Nonactors** (people who have never seriously thought about acting before) don't necessarily have the skill to perform as anyone other

than themselves, so casting for type is the only way to go. However, one should be careful that the nonactor doesn't suddenly change once the camera is turned on them. I once cast a real-life police officer, mostly because he volunteered to provide two real-life police uniforms for the film. The uniforms looked great, but the performance was another question. With the camera rolling, the officer was unable to keep a straight face. It didn't work so well to have a cop pull up on an emergency call with a silly grin on his face. Cut! You should always do a screen test before you commit nonactors to your movie. Here is what Abbas Kiarostami says about casting nonactors:

I sit and talk with them and turn on the camera without them knowing. After seven or eight minutes, once we've found our subject, I pretend to turn on the camera. If you see no difference between the moments before and after this flick of the switch, you know you have a good actor.

Abbas Kiarostami (From "Four Golden Rules," interview by Paul Cronin, *The Guardian*, 2005)

It can happen that a specific "real person" is the inspiration for a specific part; therefore, as a nonactor, this person is the perfect fit, so no additional casting is necessary or even recommended (see [Figure 7-9 left](#)).

However, finding the "right" nonactor for a part already written can involve a long process. Gus van Sant posted a casting call for his 2007 film *Paranoid Park* on the trendiest social media platform of that era, Myspace, where ordinary high school kids would see it. His casting call listed the types he was seeking: "skaters, honor roll, cheerleaders, punks, drama kids, musicians, artists, student council, athletes, award winners, class skippers, photographers, band members, leaders, followers, shy kids, class clowns." Reportedly, nearly 3,000 Portland-area teenagers turned up for auditions, including Gabe Nevins, a nonactor who would become the film's star² ([Figure 7-10](#)).



■ **Figure 7-10** Gus van Sant (*left*) posted his audition call for *Paranoid Park* (2007) on social media to attract local high school kids. From the overwhelming response he chose mostly nonactors for his cast, including lead Gabe Nevins (*center*). Other cast members, like Taylor Momsen (*right*), had some professional experience.

That said, it takes a skilled director, and lots of patience, to get a great performance out of a nonactor. For most films, casting trained actors who have the ability to modulate their performance as needed and the experience to contribute ideas and insight to a character is

important in order to get just what you need for your film. Even if your film has no dialogue, a good actor can bring a new interpretive energy and creative resources to the project.

Auditions

An **audition** is an organized process by which you schedule and work with a number of potential performers to determine their suitability to your film. The object of running an audition is to see if a performer is a good fit for the roles you have in the script and to see, to some extent, if you can work with the actors who are auditioning. Always remember that, especially for emerging directors, the actors are auditioning you as much as you are auditioning them. You must represent yourself and your project professionally and always treat actors with respect. The actor is one of your principal creative collaborators. If actors feel as though they will not be allowed to be creative or to collaborate, their interest in your project will certainly diminish.

Running a simple audition is not a difficult task, but it must be well organized in order to convey a sense of your abilities and to re-assure the performers that you know what you're

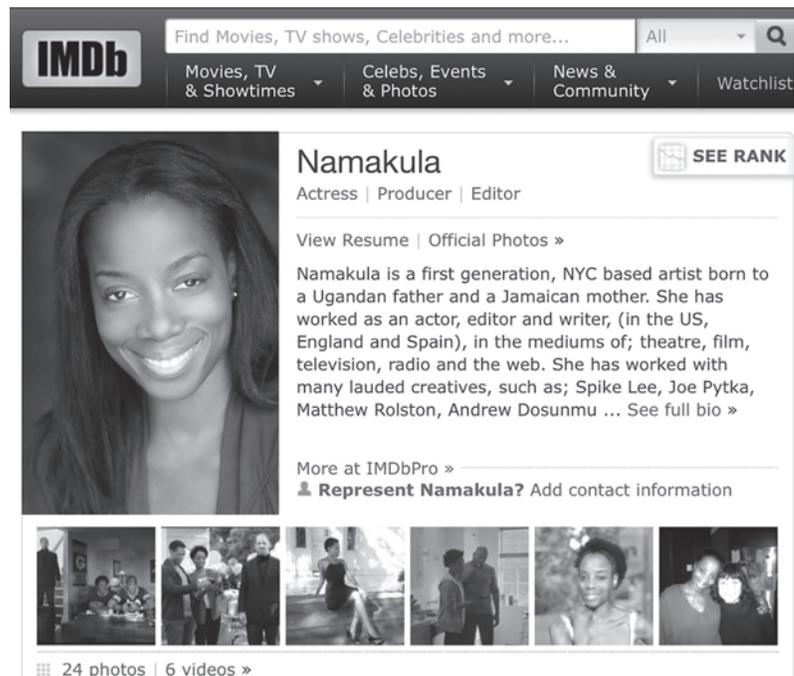
² "Filmmakers Find Fresh Talent on MySpace," by Hugh Hart, www.wired.com, March 14, 2008.

doing. You don't want a chaotic audition to be the actors' first impression of your capabilities, because they are sure to anticipate an equally chaotic shoot and will probably stay away. Here are the steps to running a smooth and productive audition:

1. *Put out an audition call for actors.* An audition call can be as basic as asking filmmakers and actors you know for recommendations (word of mouth) and hanging up fliers in a college acting department, or as broad as paying for advertising in trade journals or online (e.g., backstage.com, Mandy.com, Castingnetworks.com, SAGIndie.com, Craigslist.com). A public call for actors should have all of the basic information potential actors need in order to decide whether they are right for the part and how to contact the filmmaker (Figure 7-11). When an actor contacts you, you may receive a traditional **headshot and bio** which has been the standard calling card for many years. It consists of an 8-by-10-inch photograph on one side and a résumé on the other. However, more recently photos and résumés are housed online and shared via a link. Actors with a body of work under their belts will often have a website or a personal IMDb page with their bio and even video clips that you can view (Figure 7-12). Keep in mind, however, that when you open up your search to people with little or no acting experience, you might get a small photograph attached to an email.
2. *Begin short listing.* Once you have received all of the headshot/bios and word-of-mouth recommendations, you need to select who you are going to audition by reviewing their credentials and evaluating their photographs. It's tough to judge a person based on one photograph, but for the moment it's all you have. As you review the bios you make "yes," "maybe," and "no" piles. This is actually an illuminating process, because for the first time you are being asked to put a face to your screenplay characters. Occasionally you'll realize that you didn't know as much about your character as you thought. You'll also begin to see a certain flexibility in the character by noticing how they seem to change as you imagine each different face in the role. This is only the beginning of your encounter with the interpretation of your characters through the body and performance of an actor. The "yes" pile of performers, those who both look right for the part and have the performance background you are seeking, is your short list. But be advised—keep it short!
3. *Find an audition space.* To hold the audition, find a space that is large enough for all of the people you need at the audition and for the performers to stand, sit, move, and perform comfortably. The group attending the audition usually includes the director,



■ **Figure 7-11** A casting call posted in a trade journal or online casting service needs to be brief but must include all pertinent information.



■ **Figure 7-12** Many actors will respond to casting calls by sending a link to their website or IMDb page where you can see their bio, photos, and even videos.

the producer, and people to read lines with the actors. It is not a good idea to hold auditions in your home. Many potential actors will not go to a private residence to audition for an unknown director. It is also preferable to have a separate, comfortable waiting space to put the next-in-line actor. This is called the **green room**, a place where actors can relax, drink some water, and go over their lines. Incidentally, no one really knows why an actor's reception room is called the "green room," but the term has been part of the theater world since the 18th century.

4. *Decide on audition material.* It is important to be clear about what you want the actors to do in the audition. Obviously, you will need to have them perform a scene or two from your film so that you can see how each actor fits the role. Reading from script pages that actors are given minutes before the audition is called a **cold reading**. If a cold reading from the script involves dialogue with another person, then you need to have someone of decent ability at the audition to read with all of the actors. Cold readings alone are sometimes not the greatest measure of an actor's abilities, so it's also good to have each actor present a monologue of their own choosing, something they have previously developed, to really give them an opportunity to show what they believe is their best, most prepared, and most convincing performance. Most trained actors have several monologues prepared and ready for auditions. But you need to tell them what sort of monologue they should bring so that *you* see what you need to see from them. A Shakespearean monologue? A modern monologue? Drama? Comedy? If you're doing a silent film with physical humor, maybe you don't want any words at all and need to see a short physical performance. I once made a film based on a series of adaptations of poetry by Pablo Neruda, which required the actors to speak stanzas of a poem to each other as if the lines were dialogue. So I asked the actors auditioning for me to bring in either some modern poetry or a modern monologue that they felt had poetic language. Once you have your short list and your audition space and you've decided on the material you want each performer to present, you're ready to schedule the audition.
5. *Contact and scheduling.* Contact each performer and schedule enough time between auditions so that you can reflect and jot notes about what you saw. Do not schedule performers in so tightly that their auditions overlap and a waiting crowd starts to accumulate in your green room. When you contact each performer be clear about (a) where the audition is, (b) what you want the performer to do (i.e., modern monologue and cold read), and (c) how long the audition will last. Also be prepared to answer more detailed questions about the project.
6. *Run the audition.* A typical audition runs something like this: (a) As the actors wait their turns, give them the cold-read script pages to look over. (b) When you are ready, bring the actor into the audition room. Common courtesy is the rule. Greet the actor, introduce everyone in the room, and describe in more detail the project and the specific role. It's important to allow actors to relax and understand just what they're stepping into and who is watching them. (c) Give the actor an idea of your shooting schedule and when they need to be available. If there is an unworkable schedule conflict, then there is no need to waste their time, or yours, with an audition. Simply thank them for coming in and call the next person. (d) Have the actor perform the monologue they've prepared. If after this you are already sure that someone won't work in the role, then there is no need to waste time by keeping the person longer. Simply thank the actor for coming in and call the next person. If you like what the performer has done, then move on to the cold reading. (e) Give the actors any necessary context or background for the script pages they are reading and have them do the cold read. Remember, if the scene involves dialogue with another character, you need to have a person at the audition to read with the actor. If after the cold read it's clear that the actor won't work in the role, then simply express your thanks and call the next person. If they seem promising, then (f) work with the performer on the script pages and try to get a few adjustments and nuances in the performance. Have them try the scene with a different approach or tone. If the actor seems flexible and responds well to directing, then place them on the callback list (see later); (g) thank the actor for coming in and say that you'll be in touch. Once the person leaves, jot a few notes on your audition sheet and call in the next audition.

You should never prolong an audition that you know for certain isn't going well. It's not courteous to keep people working for you after you've already made up your mind, and it's a waste of your time, too. It's always best to politely thank them and let them go. The shortest audition I ever ran ended just after the first handshake. I was casting for the role of Ray, a sweet, overly sensitive, and perpetually worried father of a 15-year-old daughter. One actor strode into the room, shook my hand, and, without allowing me to say one word, proceeded to tell me what he was going to do, in what order, and where he wanted us to sit for his monologue. He also announced that he preferred to do two monologues and skip the cold reading. I simply shook his hand again and thanked him for coming in. I explained that I didn't think he would work out and I didn't want to waste his time. He thanked me, turned on his heel, and left.

Shooting First Auditions

Many directors I know like to shoot the first round of auditions, no matter how many people cycle through or how long they go on. This process simply involves posting a camera at the back of the room to record each actor as unobtrusively as possible. People who do this agree that the footage from these auditions isn't much use for evaluating performance (you should always write your thoughts on performance on the audition sheet), however this footage can be valuable as a reference or a memory aide. Here is what my colleague, producer and director Andrew Lund, has to say on the topic:

When you see twenty or more actors in a day, they can start to blend with each other, especially when they're all reading the same lines. And you can't rely on headshots because the glossy photos often bear little resemblance to the actors that auditioned. So I like to tape auditions. Then, if I need to refresh my memory about particular actors I can always look at my recording. I never watch it from beginning to end, but I revisit several of the performances before making callback decisions.

Other directors I know, myself included, do not record first auditions. My feeling is that, especially if you are asking actors to do a cold reading from your script, it's not really fair to a stranger to record them when you haven't even expressed an interest in them as a potential player in your film, nor have they necessarily decided to participate in your film. Also, I find that the first audition video never tells me anything beyond what I write on the audition sheets and memorable performances remain memorable. That said, I have shot video of first auditions but I can't say I ever once went back and referred to the footage. In any case, it's an optional process and it's your call.

Callbacks

Callbacks are second auditions in which you look closely at a short list of your most promising candidates. Callbacks work primarily with the material of the script to really establish character/actor compatibility. It's common to send the entire script to your callback choices so that they can be more familiar with the material. Often, if a role involves a close relationship with another character, callbacks can involve pairing up performers to see what kind of chemistry exists between them. Although we don't need to record the first auditions, it's important to record video of the callbacks as a screen test (**Figure 7-13**). Some actors can perform wonderfully in front of people but stiffen up when they're on camera. This is especially true of nonactors. You need to know this before you commit to a performer. Also, when recording the callbacks make sure that you take many different angles and shots of the performances. Faces are important, but so is movement and voice. Take time to set up lights and microphones so that you



■ **Figure 7-13** Videotaping callbacks is a good strategy to see how a performer responds to the presence of a camera.

get a high-quality recording. If you're shooting from a single angle, way back in the corner of the room with lousy audio and dim lighting, the tape won't have enough information to help you make your final decisions.

Casting and Commitments

Based on your impression from the callbacks, you should be able to make your decisions and call your chosen actors to tell them you'd like to work with them on the film. Once you have thoroughly explored their availability and secured their commitment, you should inform the other callback actors that they were wonderful, but you decided to go with another performer. Of course, thank them for the time they gave auditioning for you. Actors are extremely valuable for a filmmaker. We need them to turn our literary characters into flesh-and-blood people. You should always be professional and respectful because, as I've mentioned, courtesy is important. Also, you never know when you might need that actor for a future project of yours, or for a colleague's film, and you want them to feel that they'd like to work with you someday.

Releases, Minors, and Unions

The shortest, simplest film, if done well, might play in festivals or be picked up for broadcasting. You never know, but you should be prepared for your film's potential success and public exposure. So it's important to obtain a talent release from each actor before shooting begins. A **talent release** is a legal document, signed before the cameras roll, simply stating that the performer gives you the right to use their image and voice in your film.³ Sometimes securing this right involves a fee, and sometimes actors work for free ("free" usually means giving them food, transportation, and a copy of the final film). The talent release protects you should the actor have a change of heart later on. As a student, I remember a classmate's film in which a fairly minor character felt, after the premiere screening, that the director made her "look fat" in the movie. She told the director that she didn't want him showing this film in public and that she'd sue him if he did. The director hadn't obtained a release and the actor's father was a prominent lawyer. Because he was unable to reshoot her scenes, the film ended up in the director's desk drawer.

If you are working with children as talent, it only stands to reason that you need to obtain a release from their legal guardian. Working with minors also requires you to organize your shoots around school schedules and the parents' or guardians' schedules, because they have a legal right to accompany their child to every film shoot. It is in your best interest to have someone to specifically look after the children on the set. Keeping track of a child on a film shoot is a full-time responsibility, and it's best done by the legal guardian. Also, in general, you need to make special assurances for the safety and well-being of any child on the set. This means working shorter hours, allowing for regular breaks, and having plenty of healthy food and drinks. You may be able to persuade an adult actor to gut it out and stay an extra couple of hours to get those last shots, but when the going gets tough, kids usually need a nap! *Before you proceed with any film involving children, check with your local or state film office:* there are usually fairly strict legal requirements that you must know about and work within.

Actors Unions

You'll notice in the call for talent (see **Fig. 7-11**) that the ad clearly states that the call is for a nonunion film. There are two major unions that look after the interests of those professional actors who have gained enough credits to become members. The union that most filmmakers encounter is the **Screen Actors Guild** (or **SAG**). SAG union actors generally work on union films (those that utilize union crews, union directors, etc.). However, exceptions are made for low-budget independent films and student films. SAG has developed a variety of contract agreements for student films, shorts, and ultra-low-budget projects. To use a SAG actor in your nonunion student film, you must enter into the SAG-AFTRA

³  You can find a sample talent release on this book's companion website.

student film agreement. Generally speaking, this agreement protects the actor by making sure that certain baseline requirements are in place: (1) You must prove you own the copyright on the screenplay that you are shooting—in other words, you have the legal right to make this film. (2) If any money is made from your project (through festivals, broadcast, DVD sales, or other distribution), then the union actors are paid their minimum union wages before anyone else involved in the production is paid. (3) You must adhere to regulation scheduling, meal, and safety procedures and maintain accurate time sheets for each union performer. (4) You must provide proof that the production and the actors are adequately insured. These are just the basics to give you an idea of what it means to use a union actor and to enter into a SAG student contract or independent film contract. (For complete information about these contracts, go to www.sagaftra.org or www.sagindie.com.)

■ WORKING WITH ACTORS I: BEFORE THE CAMERA ROLLS

The Actor as Creative Collaborator

Once you have assembled your cast, you will discover that there is a new energy that actors bring to the filmmaking process. Actors are creative collaborators whose job it is to bring a character off the page and into being. As such, they bring an interpretive energy that a smart director will acknowledge and cultivate. Starting from the callbacks, you are forming both your collaboration method as well as the final form of the characters in your film as you work and rework scenes, gathering from an actor their thoughts, reactions, and insights. This process continues until the last day of shooting. Broadly speaking, one of the principal jobs of a director is to guide actors to an understanding of their respective characters that is in line with the script and with the director's vision of the final film. However, based on the new insight, expertise, and energy of the performers, don't be afraid to allow your characters to evolve into something you might not have anticipated, as long as it remains appropriate for your story. It's not uncommon during rehearsals, and even during shooting, to rewrite lines and scenes to better fit a new concept of a character. This is what director John Daschbach told me about his collaborative rehearsal process during the making of his short film *Waking Dreams*, which you can screen on the *Voice & Vision* companion website:

What I can say about the acting is that these two demonstrate the maxim (to which I heartily subscribe) that when it comes to actors, “90% of directing is casting.” And I would add, the other 10% is having adequate rehearsal time. We shot the film in three days and we rehearsed for three days—a ratio which is not possible for feature films, but for shorts, it actually is and I would encourage as much rehearsal as possible. Our process consisted of the three of us sitting in a room and just going very slowly through the script scene by scene, line by line, and encouraging the actors to stop and ask questions, which they did often, whenever they didn't feel they quite understood a beat or a line. Sometimes I was able to adequately explain the intent; sometimes the other actor helped by explaining their perspective on the moment—what their character was playing/thinking; and sometimes it led to a revision in the script where lines were cut, reordered, or replaced with something new—when one of us threw out an alternative line or beat that made the moment work better. In rehearsals, I always encourage the actors to feel free to suggest alternatives that they feel they can incorporate better into their character and what is happening dramatically at any given moment (Figure 7-14).



■ **Figure 7-14** Rehearsals on Daschbach's *Waking Dreams* included collaborating on script changes with his cast. A simple accommodation Daschbach made for actress Tina Holmes was to change her character from a temp who nervously swigs coffee to one who nervously nibbles red licorice strings. Holmes felt this detail helped her better connect to her character.

Rehearsals

Rehearsals are the time you spend in preproduction running through scenes in preparation for shooting. In general, some degree of rehearsing is always necessary. The length and depth of your rehearsal period depend greatly on the needs of the project and the availability of the cast (especially if they are not getting paid). There are no rules here. Some directors assiduously avoid a lengthy rehearsal period, thinking that it bleeds freshness out of a performance; others engage in long and detailed rehearsals in order to prepare and develop scenes thoroughly in preproduction. On short student films and low-budget independent films, rehearsals are generally not elaborate or lengthy; however, rehearsals of some sort, before the camera rolls, are a good idea. Not only do rehearsals allow for the integration of many new ideas, but they can also cut down on production time and save money by working through performance issues before the camera rolls.

One process that is necessary for any film is a read-through. A **read-through** is a reading of the script by the actors, with all principal creative people in attendance. The read-through allows everyone involved to get to know each other, which is especially important for actors who will be performing together. Also, hearing the script read out loud, in front of people, illuminates any glaring problems with the script, like lines that simply don't work, plausibility problems, or character inconsistencies. It's common for the script to go through a solid rewrite after a read-through. A read-through is also a place where conceptual ideas—from characterization to visualization—are discussed so that all participants understand what the director is striving for. It's important for a director to be thoroughly prepared for the read-through. Everyone will want to understand the film and the director's vision for the film, so crewmembers, especially actors, will ask detailed questions.

Scene work rehearsals are a more detailed examination of specific scenes and aim to refine the interpretation of the drama. Scene work can include a close **script analysis** and **scene run-throughs**, in which dialogue, movement, and interactions are examined to develop—for the actors and often for the director, too—the nuances of characterization, motivation, dramatic context, emotional content, and scene dynamics. Scene work rehearsal also involves rough **blocking**, which is the coordination of the movements of the actors in the scene. More often than not this is done on a mock set, but if it can be done at the actual location, so much the better. As I mention in Chapter 5, scene work rehearsals can be important to the previsualization process because through working with the actors a director can better determine critical narrative moments, emotional pacing, and physical movement, which in turn suggests strategies for camera angles, edit points, and scene coverage in general.

Shooting Rehearsals

Generally, scene work is done with the director, the actors, and perhaps the A.D. However, if the rehearsals involves blocking, the cinematographer might be there too. Shooting your rehearsals, down and dirty with a small handheld camera, can allow you and the D.P. to experiment with various framings, blocking, timing, and camera movements that, again, can help you better determine your approach to scene coverage. You can even do some rough cuts of the rehearsal footage to see what kind of chemistry can happen in the edit. Keep in mind that not every scene needs such thorough rehearsals; usually these are reserved for the more dramatically or physically complex scenes.

On-Set Rehearsals

One final type of rehearsal is actually not part of preproduction but occurs during the production process. **On-set rehearsals** (or **on-set run-throughs**) are rehearsals during the preparation of the actual shooting on location (see Chapter 17). At this stage, on-set blocking rehearsals are mandatory; they are not only important for familiarizing the actors with the actual location, but they are also essential for the camera and sound departments to know exactly where lights, camera, focus, microphones, and recording levels need to be in any given take. Most of the detailed character and scene analysis work should have

been done before this point, but actors, directors, and cinematographers will invariably respond to the actual shooting environment and will want to make adjustments to their interpretations along the way.

Working with Trained Actors

It is not within the scope of this book to engage in a thorough discussion of the actor-director relationship and working method. This is one of the most complex collaborations in film, and like all complex relationships, methods and processes differ depending on the unique chemistry of the individuals involved. There are many, many books on the subject on the market, and some of them are good, so refer to the *Recommended Readings* section of this book for further study. That said, here are a few general and commonly shared thoughts on working with actors:

1. *Establish respect and trust.* The actor's job is to inhabit a role, to become someone they are not and be convincing at it. The public is very aware of actors and what actors do, in a way that exceeds the awareness of any other member of the filmmaking team, so an actor's ability to pull off the job is on display like no one else's—it's the actor's body, face, and voice. For this reason, the actor is especially vulnerable. The first job of a director is to establish trust and make an actor feel safe to experiment, make mistakes, and find their way as they explore a role. You must also demonstrate throughout the production that you know what you're doing so that the actor can trust that you'll make a good film from their good performance. Additionally, it is important that you show the actor—as with every other crewmember—that you respect and want their contribution. One of the most common ways that young filmmakers lose the trust of their cast is by concentrating exclusively on the technical aspects of the film. With money and time so limited and pressure so great on the set, it's easy to get pulled into devising camera angles, setting up lights, attending to location details and overlook the actors completely. Then once the shot is set up, you call the actors in and shout "Action!" and expect them to perform. To a large extent, a film crew needs to protect the director from technical tasks on the set; that way, the director's time can be devoted to getting the actor emotionally prepared for each shot (see page 418).
2. *Offer guidance, not commands.* It is important for actors to feel like they themselves can inhabit a role. If they can't "get there" in a way that makes sense to them, then they'll never be truly convincing. This is why line readings (i.e., the director performing the way a line should be delivered and asking the actor to mimic) never work. Actors need to be coaxed into the performance you are seeking in such a way that they "understand" your ideas and approach in the context of the character and themselves. How a director guides them to the right performance differs depending on who the director and actor are and the actor's training. In fact, it's not unusual for directors to find themselves employing different approaches for different actors on the same film! (**Figure 7-15 top**).

However, the place to start during rehearsals is not quite so mysterious. Remember, you will have already engaged in a few script read-throughs, so you and your actors will have discussed the story and character to a certain extent. Start with a scene that is revealing of character—that way everyone will get a handle of the character right off the bat. Run the scene and see how it works. After the scene is done, simply discuss what worked, what didn't work, and explore why. Ask your actors why they made the choices they made and really listen to them. Suggest some performance adjustments based on your needs and their thoughts. Then, run the scene again. It should be better. Talk with them again about what worked, what didn't work, and why, and repeat as needed. With a little give and take, you'll get there. Always be as articulate as possible as to *why* you are seeking a particular approach or nuance. What it means to be a "trained actor" is that the performer has learned to modulate and adjust the performance according to the expressed needs of the director; however, if you can't convincingly articulate why you want something, then the actor may not ever be able to find it.

3. *Don't overdirect.* There are two issues around overdirecting. The first is doggedly insisting on a specific interpretation, which may not be possible for an actor. In these cases



■ **Figure 7-15** Although similar in their naturalistic tone, *Frozen River* (top) benefited from the experience of professional actors, including Melissa Leo (left) who received an Oscar nomination (with director Courtney Hunt), while Hammer's *Ballast* (2008, bottom) was well regarded for the authentic performances of its cast of nonactors, including Jim Myron Ross (left) and Michael J. Smith Sr. (right).

you need to be flexible and work with the particular abilities of the performer you have and devise another interpretation that works all around. The second kind of overdirecting means to drag an actor through unnecessary rehearsals, character analysis, trust exercises, emotional beat analysis, and so on and so on for simple scenes or moments. Sometimes all the “direction” you need to give is, “Put your coat on, grab your keys, and leave the room.” There’s no need to go through an intensive method acting emotional recall session for every little moment.

4. Keep it fresh. Related to the idea of overdirecting is the idea of overrehearsing. Many directors avoid rehearsing too much for fear that it bleeds the freshness out of the performance. One director I know does scene work rehearsal but asks the actors to only play at half the emotional level (fairly flat). Other directors will take their actors to the threshold of really nailing the scene and then they’ll stop, saving the first dead-on performance for when the camera is rolling. Other directors don’t directly rehearse scenes that are in the script but instead rehearse hypothetical scenes around (before and after) the actual written scene. There are no rules here (and plenty of superstitions) but the principle is important to note—don’t bleed the spontaneity out of a performance by overworking a scene in rehearsal.

Working with Nonactors

As I mentioned earlier, a nonactor is usually cast for type, meaning that the performer is very close to who your character is in the film. Having the same age, background, jobs, preoccupations, and perspectives as the film’s character, the nonactor is close to being the authentic person. So the first task of a director who is working with nonactors is to protect that authenticity. You must be careful not to squeeze the real person out; instead, you must create an environment and a level of comfort that allows the real person to unfold in front of the camera. Think of a nonactor as a source of character material, not someone who inhabits a character you’ve created.

Of course, how to get naturalistic (or un-self-conscious) performances from a regular person when you stick a camera in their face is tricky and depends a lot on the specific person involved. Here are a few approaches to working with nonactors that are common among directors like Abbas Kiarostami, Ramin Bahrani, Gus Van Zant, and Lance Hammer, who all use nonactors extensively (**Figure 7-15** bottom):

- 1. Make sure your film idea is appropriate for nonactors.** Not all films are right for nonactors. If you’re talking about a lead role, the film must, in some way, resonate with the real life of that person. If you want your written dialogue to be performed as-is or if you’re on a very tight schedule, you may be better off with a trained actor.
- 2. Turn the camera on right away.** Put a camera on the nonactor immediately (throughout rehearsals) and keep it on them all the time. The more familiar a nonactor is with being in front of a camera (even a small video camera), the less self-conscious they will be when the actual shooting begins.
- 3. Do not ask the nonactor to memorize written dialogue.** Asking a nonactor to memorize and then duplicate lines of dialogue from a preexisting script is contradictory to casting for type. Many directors who work with nonactors never even show them a script. Instead, outline in detail what the scene involves and tell them generally

what they might say—as they rehearse the scene, the performer will use their own words to express themselves. This rehearsal process involves allowing the non-actor to play out the scene, with their speech, enough times that they essentially memorized their own words. Along the way, the director should be tweaking the scene based on any new ideas emerging from the performer as they negotiate the moments.

4. *Actions help, even small ones.* Giving specific actions can create a context for the performance and makes delivering dialogue easier for a nonactor. Small actions that a performer does during a scene are called **business**. The more familiar your nonactors are with their “business,” the more comfortable they’ll be performing in general. I had a student who used her 8-year-old brother for a scene between a teen-aged sister (played by a trained actor) and her little brother. The filmmaker’s brother, a nonactor, just wasn’t getting the hang of what he was supposed to say; he was self-conscious and was getting impatient. Then my student got a brilliant idea. She told him to play his favorite Xbox video game while he interacted with the sister. It worked. The boy was instantly comfortable and his dialogue came out smooth and natural. Also, the scene gained strength because the boy was doing what boys do, even when an older sister is trying to have a conversation with them. Business is important for trained actors as well.
5. *Don’t overanalyze.* As mentioned previously, when directors talk with trained actors they often engage in metaphoric dialogue or analytical exploration to guide the actor to discover character motivation and nuances. Well, for the nonactor that sort of oblique process can be confusing. It’s better to be direct with your direction. “Right here you’re hurt because she’s forgotten everything you’ve done for her.” Then let the performers show you what they do when they’re hurt and work from there.
6. *Maintain a flexible visual style and procedure.* If you’re working with nonactors as leads, you cannot expect them to work within a rigid and standardized production process. Expecting them to hit specific marks—for example, where a light has been set up or where the focus will be sharp—while they perform, is asking a lot. You need to devise a production process and style that allows for their comfort; otherwise all that lovely authenticity that prompted you to cast a nonactor will be squashed. Abbas Kiarostami offers us a good example. When he works with nonactors he doesn’t use slates or scream “Action!” or “Cut!” For Kiarostami, this is contradictory to what you’re after because you’re essentially saying, “now start performing” and “now stop performing.” But a nonactor isn’t really performing. You want your nonactors to be themselves as much as possible. So Kiarostami just speaks to the actors, eases them into the moment, and when the scene is running he signals camera and sound with a gesture or a look to start rolling.

Working with Extras

If you write a script with a scene set in a crowded bar, you’ll need to find people to play the crowd. If you write a scene in which your hero is the last person in a long line at an ATM cash machine, then you’ll need people to make that line. If you need to shoot a scene in which a young professor is lecturing to a class of 20 students, then you’ll need to find 20 willing people to sit in a classroom while you shoot. For each of these scenarios, you need extras. **Extras** are performers who have no lines or important actions in a film but who populate a scene and give it a sense of realism and authenticity. Extras are one detail that many novice filmmakers take for granted. Inexperienced filmmakers are so immersed in the big demands of a film—lead characters, locations, and equipment—that they often think that extras will just be there when needed; they think, extras have super small roles and no lines, so they must be easy to find, right? The fact is, being an extra requires a lot of time for very little payoff. Extras usually don’t even get a credit in the film. It’s *always* difficult to find people willing to stay on a set for hours and hours, doing very little, while you shoot your scene. So keep this in mind when you write your script. Small films on tight budgets should try to minimize the need for extras or find a clever alternate solution.

■ FINDING THOUSANDS OF EXTRAS

In his first short film, *Vive le Premier de Mai* (1999), the French filmmaker Didier Rouget tells the sweet, simple story of a man who finds his true love, but then loses her in the crowd of a huge public demonstration, and finally, through a clever device, finds her again. Rouget set this film right in the middle of the traditional May 1 workers' demonstration in Paris in which tens of thousands of people march in the streets (Figure 7-16). Cameras are abundant, so no one noticed one more. His film involved a production crew of three and only two principal actors, but a cast of 40,000 extras! You can see this short film at <http://didierrouget.com>.



■ **Figure 7-16** Emmanuel Salinger in Rouget's *Vive le Premier de Mai* (1999). Rouget obtained 40,000 extras for free by setting the story of his short film during the traditional May 1 workers' demonstration in Paris.

■ CAN'T FIND ANY EXTRAS

Here is a cautionary tale. The producer on a recent student film project managed to acquire, for only a few hours, a very hard-to-get location, Grand Central Station in New York City. The film involved three shoeshine men talking and polishing the shoes of an elite business clientele. Everything was in place for the shoot except one thing, the five or so extras who would be playing the elite business clientele. The producer and director erroneously assumed that they could simply enlist passers-by and offer them a free (amateur) shoeshine if they'd be in the movie. But this was Grand Central Station, where everyone is in a hurry. What they discovered was that no one, not one person, was interested in sitting still for ten minutes for a free shoeshine given by an actor playing a role, nor were they particularly interested in being on film.

Rather than scrap the entire shoot (and lose the time and location forever), the crew called up all of their friends and asked them to dress in suits and hurry down to Grand Central Station. A few hours later, about four friends showed up—many with less-than-convincing suits, several wearing sneakers, and most with haircuts that would not exactly cut it in a corporate boardroom. With time ticking away, the crew shot quickly and eliminated a lot of shots. In the end they managed to get the basic footage they needed, but the clientele did not look much like they came from an elite business class; rather, they looked like a bunch of dressed-up college undergraduates, and the film lost an important component of its satire and irony.

The Contact Sheet

In the intense and creative environment of a movie production, the cast and crew become like a family for the duration of the project. Communication is critical to keep this family involved, engaged, and informed. There is one very simple form that is essential for this necessary communication, the **contact sheet**. A contact sheet is a simple list of who is involved in the project, what their role is, and their contact information (phone and email). Keep in mind that your contact sheet also has value long after the film is completed. You may want to get back in touch with some of your extended filmmaking family when you make your next film. So save that contact sheet!



PART III TOOLS AND TECHNIQUES: PRODUCTION





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The Digital Video System

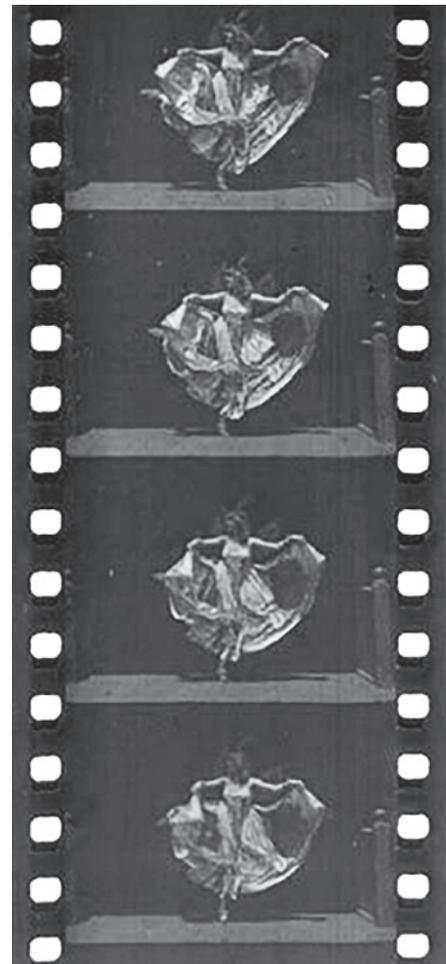
When you pick up a camera—whether it’s the one built into your smartphone or an Arri Alexa XT 4K—you are in fact encountering a history of development that spans almost 150 years. Today’s cameras, even high-definition video cameras, rely on the same basic principles that drove the earliest motion picture systems. As a professional media maker who seeks to be in control of the aesthetic possibilities of the medium you are working in, you will need to understand a complex array of specifications: frame rates, aspect ratios, resolutions, color encoding, sampling and data rates. Each of these has much to do with technological innovations that occurred at various points in the history of the film, and then the video, moving image. Understanding those principles is critical if you are going to make the best use of the technology available to you today, and tomorrow.

■ FILM: A MECHANICAL AND PHOTOCHEMICAL MEDIUM

As early as the 1880s people, especially scientists, were trying to find ways of reproducing motion so they could analyze natural phenomena around them. Forms of photography had existed since the 1830s, but the glass or metal plates, and the long time necessary to fix the image in silver halide crystals, made it unfeasible to capture subjects in motion. It was only in the 1890s that the Lumière brothers in France, and Thomas Edison in the United States, pioneered the first systems for capturing motion and playing it back for audiences.

Film is a mechanical and photochemical motion picture system. It creates the illusion of motion through the rapid presentation of a series of sequential photographic images fixed to a flexible and transparent strip of cellulose. To create the image, a film camera gathers light from the outside world through its lens, and focuses that image onto the film to create individual exposures, called **frames**—one after another. To view the image a film projector reverses this process, pushing light from within the apparatus, through the film frames and through a lens, to focus and project the frames onto a screen—one after another.

The early films were photographed and played back at a **frame rate** of about 16 frames per second, resulting in the flicker effect we associate with early motion pictures. Eventually a frame rate of **24 frames per second**, which allowed for a more fluid sense of motion, became standard. When watching a projected film, each individual frame is held stationary on the screen long enough for the viewer to register the image (1/24th of a second) before it is quickly replaced with the subsequent still image, which is again held for 1/24th sec., and so on through the series of images. The viewer perceives this rapid presentation of still images as motion through the perceptual phenomenon known as **short-range apparent motion**.¹ Simply put, when shown a rapidly changing series



■ **Figure 8-1** A strip of 35mm film from the Edison production *Butterfly Dance* (ca. 1894–95) showing the individual still frames that create movement when projected.

¹ “The Myth of Persistence of Vision Revisited,” Joseph and Barbara Anderson, *Journal of Film and Video*, Vol. 45, No. 1 (Spring 1993): 3–12.

of sequential still images in which there is only a slight difference from image to image, humans process this visual stimulus with the same perceptual mechanism used in the visual processing of real motion. This mechanism transforms the series of still images into motion through the psychological and physiological interpolation of information between the still frames. This “magic” is what creates the possibility of recording and playing back motion in film and video (**Figure 8-1**).

in practice

THE FILM SYSTEM CHAPTERS LOCATED ONLINE

 Celluloid film is certainly still being used for image capturing and theatrical presentation; however, its use is most common on commercial feature-film projects and even at that, we’re seeing the use of film diminish every year. In the last five years or so celluloid film shooting has all but disappeared from college-level film programs, with the exception of specialized cinematography or experimental film tracks. In previous editions of *Voice & Vision I* included lengthy chapters on the celluloid film system, including detailed chapters on cameras, sync sound shooting procedures, film-to-digital workflows, film characteristics, and exposure control. For readers who are keen on taking the celluloid journey, you can still access and download all of these chapters and information on the *Voice & Vision* companion website, under the tab “Celluloid Film System.” Even if you are not planning to shoot on film, there is great benefit in exploring the basic materials, tools,

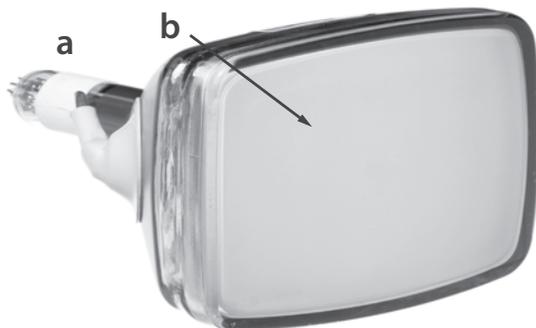


■ **Figure 8-2** Two film students shooting 16mm celluloid with the classic Arri-S film camera.

processes, and aesthetics of celluloid film; this knowledge will enhance your understanding of high-definition video shooting, workflow, and aesthetics. Sometimes, it’s helpful to know where you came from, to know where you are going (**Figure 8-2**).

VIDEO: AN ELECTRONIC MEDIUM

While film cameras and cinematography emerged from the world of still photography, the ancestor of modern video technology is radio. As early as the 1920s scientists were working on the developments that would lead to television and modern video. The biggest issue facing them was how to take a two-dimensional electronic image and turn it into a continuous signal so that it could be transmitted or broadcast. The answer developed by scientists, such as John Baird in Scotland and Vladimir Zworikin in the United States, was to “scan” the image, breaking it down into a series of lines of picture information that could be fed over a wire to a transmitter as a continuous electronic signal. The first scanners were mechanical, but scientists quickly realized that by using a ring of magnets they could control a beam of negatively charged electrons to quickly scan across a phosphor coated screen at the end of a **cathode ray tube** (left to right and top to bottom) to effectively “paint” a new image frame 30 times every second (**Figure 8-3**). This **scanning process** is still at the heart of video image capture and reproduction today (see page 187).



■ **Figure 8-3** Inside an old school TV set’s enclosure is a cathode ray tube which creates video images by emitting a beam of high energy electrons from the electron gun (a) which scan the phosphor coated screen (b) causing them to glow momentarily.

to “scan” the image, breaking it down into a series of lines of picture information that could be fed over a wire to a transmitter as a continuous electronic signal. The first scanners were mechanical, but scientists quickly realized that by using a ring of magnets they could control a beam of negatively charged electrons to quickly scan across a phosphor coated screen at the end of a **cathode ray tube** (left to right and top to bottom) to effectively “paint” a new image frame 30 times every second (**Figure 8-3**). This **scanning process** is still at the heart of video image capture and reproduction today (see page 187).

Analog versus Digital Video

For most of its history, video was an analog medium. **Analog video** (and audio) means that the creation, recording, playback, and distribution of the video/audio signal are accomplished on videotape via fluctuations in electronic voltage recorded on magnetic particles, which are, respectively, analogous to the

original light values of the scene and the acoustic waves of the audio. In 1941 a group of television engineers and government policy makers established the standards for creating and broadcasting analog black-and-white television in the United States. The **National Television Standards Committee (NTSC)** addressed various technical specifications for image reproduction and reception, ensuring compatibility between every television camera and TV set across the country and with those of any other nation that shared the NTSC system. NTSC standards regulated technical specifications such as frame rate, scanning resolutions, aspect ratio and so on. In the early 1950s the NTSC changed these standards slightly to accommodate the addition of color to the television signal. These NTSC standards essentially defined what we now refer to as **standard definition (SD)** video.

NTSC broadcast standards were devised in the analog video era; however, as we entered the 21st century video production was transformed by the digital revolution. **Digital video (DV)**² and audio involves creating, recording, and disseminating video and audio by transforming light values and acoustic energy into **binary code**, or a series of ones and zeros. There are numerous advantages to digital media over analog: including superior resolution, greater flexibility for creative manipulation, and the ability to make copies with no generational quality loss. In addition, the advent of digital video precipitated another revolution by delivering new **high-definition (HD)** formats in addition to transforming the old standard-definition (SD) video from analog to a digital. And so with the digital revolution came a reappraisal of broadcast standards. In 2009 the **ATSC (Advanced Television Systems Committee)** supplanted the NTSC and replaced the old analog standards to create the all-digital broadcast environment that you live with and work in today—one in which high-definition resolutions continuously increase and new formats proliferate regularly. We explore the ATSC broadcast standards in detail beginning on page 186.

Video Formats

While the basic film system has remained virtually unchanged in well over 100 years, the video system seems to be in a perpetual state of rapid evolution. New video formats are introduced almost yearly, and swift technological obsolescence is the rule rather than the exception. Lucky for us, with each technological generation the trend is toward broader and cheaper access to image quality that is sharper, richer, and increasingly responsive to the subtleties of light and shadow. A good example is the speedy expansion of high-definition video from a highly expensive and exclusively professional format to one that, in only a few years, has become available at all budget levels. Unfortunately, however, the world of video engineers, corporations, and government committees has not managed to coordinate its efforts to establish a single national video standard, let alone a worldwide standard. With enormous profits on the line, corporate rivals and nations are all racing to develop their own superior system in the hope that theirs will become the new standard. Current count reveals dozens of major digital video formats, many of them in high definition and most of which also offer multiple frame rates and aspect ratios. These days the world of video production can seem like a technological tar pit for emerging filmmakers and veterans alike.

To maintain some degree of organizational clarity, it is important to carefully consider this slippery word, “format.” In the world of video, format can mean a number of things, and these fall into four broad categories:

1. **Recording format:** Recording formats (also called **acquisition formats** and **capture formats**) determine the way a particular system—like a camera—samples, compresses, encodes, and records video. Current examples include AVCHD, XAVC, HDV, XDCAM EX, REDCODE, ARRIRAW. Older tape-based examples include DVC-Pro and DVcam. Recording formats are often proprietary and divide up roughly by manufacturer and their compression schemes are usually based on standard compression codecs (see page 212).

² In this book the term “digital video” (DV) encompasses both standard-definition (SD) and high-definition (HD) formats. Occasionally you will hear people use DV as a synonym for SD video.

2. **Audio/Video Codecs:** A **codec** (short for compressor/decompressor) is a video processing tool that reduces media file size to make the large amounts of information generated by digital video production easier to store and transmit. These are not technically formats (although they are often inaccurately referred to as formats), but they are so integral to the process of working with, within, and across formats (in recording, editing, display, and distribution) that a filmmaker must be able to identify them and understand their function. There are codecs designed for video capture, editing, and delivery—although these boundaries are shifting. For example, ProRes is an “intermediate codec” initially designed for editing, however hardware manufacturers are incorporating ProRes as a capture option in cameras. The most commonly used codecs, often referred to as *standard codecs*, are those approved by the Motion Picture Experts Group including MPEG-2, MPEG-4, H.264, ProRes, and DNxHD (see page 212).
3. **Media Formats:** The physical media on which video data are recorded are often referred to as a format. Historically, most video formats were taped based, but these have been largely replaced by file-based media which records on solid state memory. Popular media formats include SDHC/SDXL, CF, P2 and SxS cards (see page 204). Many of these media are compatible with multiple recording formats but some are manufacturer proprietary formats like P2 (Panasonic) and SxS (Sony).
4. **Display formats** are a set of specifications for how video is broadcast, received, and displayed. In the United States, they are codified in a set of nationally mandated digital television **broadcast standards** devised by the ATSC. Examples include 1080i and 720p (both HD formats), and 640 × 480 (an older, SD format) see later. In addition, there are a variety of formats used for internet streaming on services like Vimeo and YouTube, which are not subject to regulation. Finally, **Digital Cinema** has separate sets of format specifications, established by film studios under the Digital Cinema Initiative (DCI) which specifically address digital theatrical projection (see page 197).

In the United States there are a wide variety of acquisition, media and display formats, as well as dozens of audio and video codecs—and these are all constantly evolving. Obviously it would be folly to try to cover them all in detail. But in the world of digital video, knowing some technical information is imperative in order to make informed creative choices and to have a smooth technical process from preproduction to distribution. This chapter explores all four of these categories in a general way, to demystify the basic technology of video and to explain some of the terms, specifications, and concepts that are essential to you in your capacity as a filmmaker. Beyond the information in this chapter, you will find a list of related websites in the Web Resources section of the *Voice & Vision* companion website, which you can visit to find more details and stay up to date with the most recent changes, facts, and specifications.

■ BROADCAST STANDARDS

Technology doesn't stand still; instead, it evolves at an ever-growing pace. This is especially true in the area of bringing media to viewers.

In the past, video entertainment in the home was relatively simple, consisting of sitting in front of the TV to watch broadcasts when they were scheduled. Today, people want the capability to watch nearly anything they want, on any device, wherever they are—with content delivered over the air, over cable or satellite, via the Internet or locally stored. It is clear that the broadcast industry must evolve to accommodate this desire.

Rich Chernock, ATSC TG3 Chairman (From ATSC 3.0:
WHERE WE STAND, by Rich Chernock, ATSC Newsletter)

In the United States, **video standards** are devised and standardized by a consortium of engineers, telecommunications companies, and government policy makers called the

Advanced Television Systems Committee (ATSC). These standards ensure compatibility between image recording and display processes in the digital domain and across all nations that adopt the standard—including the United States, Mexico, Canada, South Korea, and other countries in Central America, the Caribbean, and the Asia Pacific region (we will look at other global systems on page 196).

Although ATSC broadcast standards incorporate volumes of arcane technical requirements, for our purposes **broadcast standards** refers to four essential technical elements of the video image: (1) scanning method, (2) frame rate, (3) aspect ratio, and (4) resolution. **Figure 8-4** lists the digital video format standards supported by the ATSC broadcast system. Most of these are **high-definition (HD)** formats and a few are **standard-definition (SD)**; and as you can see **Ultra High Definition (UHD)** is right around the corner.³ It is important to understand the ATSC standards because these standards are not just for broadcast display, they are also options for capturing video and are reflected in the shooting options available in your camera system.

ATSC Digital Television Standard Video Formats					
	Resolution		Aspect Ratio	Frame rate	
	Vertical lines	Horizontal pixels		Progressive	Interlaced
HD	1080	1920	16 : 9	24/23.976	30 (60i)
				30/29.97	29.97 (59.94i)
HD	720	1280	16 : 9	24/23.976	
				30/29.97	
				60/59.97	
SD	480	704	16 : 9 , 4 : 3	24/23.976	30 (60i)
				30/29.97	29.97 (59.94i)
				60/59.97	
SD	480	640	4 : 3	24/23.976	30 (60i)
				30/29.97	29.97 (59.94i)
				60/59.97	
ITU Ultra High Definition 4K Standard Video Formats					
UHD	3840	2160	16 : 9	24/23.976	
				30/29.97	
				60/59.97	

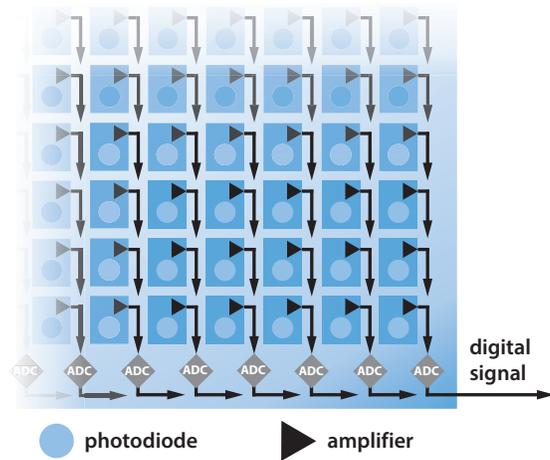
■ **Figure 8-4** The ATSC digital television standards regulate many technical aspects of the video signal. This chart lists those that are especially important to a filmmaker: resolution, aspect ratio, frame rates, and scanning method. Also included are the new ITU UHD 4K standards.

Scanning and Frame Rate

As I mentioned at the beginning of this chapter, film and video share the process of recording a scene as a series of still images (frames) and then replaying those images in rapid succession to create the illusion of motion. Generally speaking, digital video replays this sequence of still frames at a frame rate of **30 fps**⁴ (sometimes 60 fps in some progressive modes), but before we get into the issue of frame rates, let’s look closely a how those individual still images, or frames, are created. All digital video uses an electronic process known as **scanning**, and there are two types: **interlaced scanning (i)** and **progressive scanning (p)**. The scanning method relates to both the creation of the video image in the camera as well as the image display on a monitor.

Image Creation: Interlaced versus Progressive Scanning

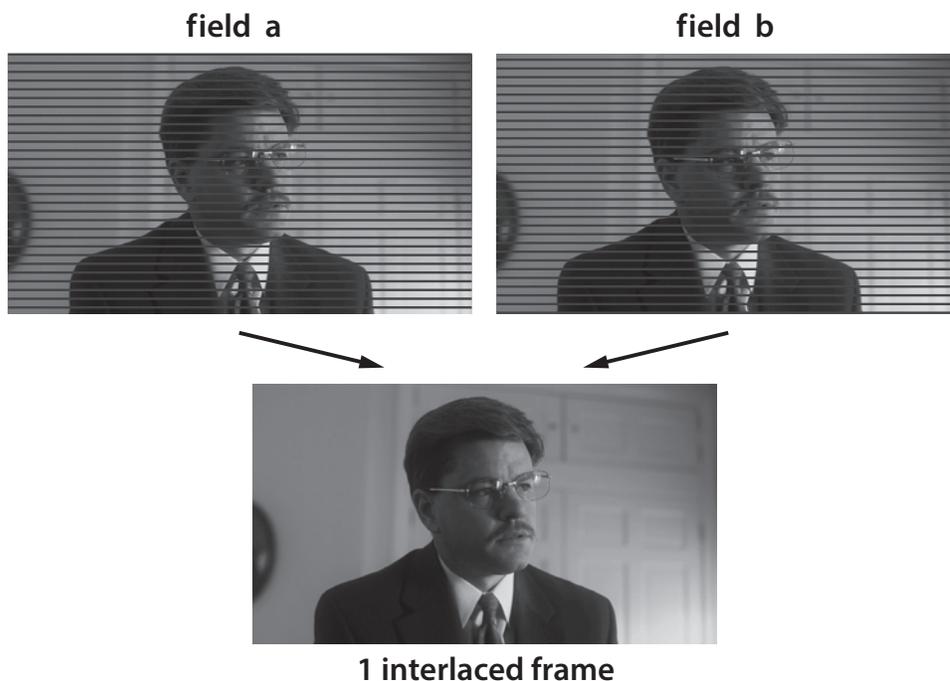
The video image begins with the lens gathering light from the scene and focusing it on the image plane of the camera’s **video sensor** (a.k.a. **imaging device**), meaning the surface of a CMOS or CCD sensor (see page 208). Video imagers are solid-state sensors composed of hundreds of thousands to *millions* of light-sensitive photodiodes called **pixels** (short for **picture elements**), which are aligned in tight rows (**Figure 8-5**). When these pixels, which are actually tiny capacitors, are struck by the incoming light, they build up an electronic charge that corresponds to the light intensity hitting *that* particular spot. So all at once, the image is created on the face of the sensor. That visual information then **outputs** (or **reads out**) the pixel specific voltage information in two different ways, depending on the scanning format you’ve chosen: interlaced or progressive.



■ **Figure 8-5** The CMOS sensor: individual pixels convert light energy into electronic brightness information at the photodiode (*circles*) and then amplify that signal (triangles) before reading the charge out to an analogue/digital converter (*ADC*) (one dedicated to each column). Horizontal rows of pixels are read out, from top to bottom, one at a time according to the scanning rate (see also page 208).

³ The UHD formats are scheduled to go into effect very soon after this book is published, which is why I have included them here.

⁴ Video frame rates can be expressed as frames per second or Hertz. So 30 fps can also be 30Hz. Also, see “More on Frame Rates” later for more details.



■ **Figure 8-6** Interlaced video. A single frame is created by scanning two alternate fields; first, the odd lines are scanned, from top to bottom, then the even lines are scanned, creating the second field.

In the case of **interlaced scanning**, the sensor first outputs the odd-numbered horizontal pixel lines (1, 3, 5, 7, etc.), one at a time, from the top to the bottom, creating a half-resolution image that is called a **field** of video. Then, the scan process returns to the top of the frame to output the even-numbered rows (2, 4, 6, etc.), from the top to the bottom, to fill in the rest of the image information with a second field of video. These two fields of video are interlaced to make up one full **frame** (Figure 8-6). This read out of video information happens 30 times every second, thus, the ATSC interlaced *frame* rate is **30 fps**, but it is often written as **60i** (“i” is for interlaced) meaning 60 *interlaced fields* of video information per second. So 30 fps and 60i are the same thing. Interlaced scanning was developed as the standard scanning method for the old NTSC video system because the rapid interlacing refreshes the image creating “flickerless” motion. It has remained in the ATSC standards both to ensure backward compatibility and as a way to deliver high-quality content at reduced signal bandwidth.

Progressive scanning differs from interlaced scanning in that one frame is not made up of two interlaced fields (odds lines, then even lines); instead, with progressive scanning the sensor reads out the full frame, all the horizontal lines in order (1, 2, 3, 4, 5, etc.), from top to bottom at a rate of 30 fps (or 60 fps as with the 720p format). There are no fields, just complete frames (Figure 8-7).



■ **Figure 8-7** Progressive scanning draws a complete, full frame of video, from top to bottom, with each pass.

Progressive scanning frame rates are 30p, 24p, and 60p (“p” for progressive). Although progressive scanning requires more bandwidth space than interlaced video at the same frame rate, the resolution of progressive scanning is visibly superior to interlaced scanning. However, some people maintain that interlaced scanning is superior for content that has a lot of fast motion, like sports.

Just keep in mind that although there are many options, most filmmakers today will shoot either 60p, 60i, or 24p (which we will discuss in detail later).

Image Display

The screen of a video monitor or display also consists of tightly packed, horizontal rows of pixels and during playback, the video display duplicates the exact same image values and scanning process (interlaced or progressive), line for line and frame for frame, in perfect synchronization with the scanning used to encode the image, only in reverse. Now, the digital information is converted back into electrical voltage, which is then translated into light values as the electrical voltage causes the rows of display pixels in a monitor to glow. In a **plasma display**, these pixels are colored fluorescent cells, and in an **LCD monitor** they are tiny LCD crystals (see **Fig. 9-12**).

One common problem occurs when you try to view an interlaced image on a progressive scan display (which includes computer monitors). The process of the progressive scanning pattern will present the two interlaced fields slightly offset, which is especially noticeable with objects in motion (or during camera movements), and this creates a **combing** artifact along edges in the image (**Figure 8-8**). In these cases, the interlaced scanned video should undergo a process known as “de-interlacing” before it is displayed on progressive scan monitors.

More on Frame Rates—29.97, 59.94, and 23.976

In the ATSC Video Format Standards table (see **Fig. 8-4**), you’ll notice that there are whole number frame rates supported, like 30 fps (60i), 60p, 30p, and 24p. However, there are also frame rates listed that are ever so slightly slower than their whole number counterparts, namely 59.94, 29.97, and 23.976. So what are these? These slowed-down frame rates (0.1% slower) are legacies of the old NTSC system, which remain with us to assure backward compatibility with the old SD format standards.

Here’s a little history. Before the advent of color TV, the original NTSC black-and-white video signal was a nice and neat 30 fps. In the early 1950s, NTSC developed the standards for color television and in an effort to make color television compatible with all preexisting monochrome receivers, NTSC superimposed the color component on top of the existing black-and-white signal along a subcarrier frequency (3.58MHz) rather than create a whole new, fully integrated signal. This ensured that even though a program was broadcast in



■ **Figure 8-8** When interlaced video is shown on progressing displays, a “combing” artifact occurs at the edges of moving objects caused by the displaced scan lines (notice that the stationary objects do not show any combing)

color, viewers who owned black-and-white TV sets could still receive the signal. However, this approach required a few sacrifices, the most important being literally slowing down the frame rate such that the 30 fps signal (60 integrated fields per second) was actually 29.97 fps (59.94 integrated fields per second). Therefore, when we are talking about video production purposes, the rate 60i (perhaps the most widely used) is actually 59.94 fields per second (29.97 frames per second). The 24 p frame rate is actually 23.976, to provide an easier conversion to the SD frame rates. (It should be noted that 30p is rarely used by filmmakers.)

Most video cameras in fact shoot in these slowed-down frame rates, even if the frame rate options menu lists the rounded numbers. Ultimately, what this means for filmmakers is that we have to anticipate how our movie will be distributed in order to choose a production frame rate that will cause us the fewest headaches in postproduction. This issue of moving from production format, to editing format, to distribution format is called **workflow**, and we discuss it in much more detail in Chapter 19. But for the purposes of this chapter, what is important to keep in mind is that if you intend your project to be screened via a standard-definition format (i.e., SD broadcast or DVDs), then at some point you will be working with these slightly slower frame rates.

24p Frame Rate: The Narrative Film Standard

The standard frame rate for broadcast video has long been 30 fps/60i, but the introduction of digital video technology ushered in an important new frame rate option, **24p**, which records motion at 24 progressively scanned frames per second. Sound familiar? 24 fps is the standard frame rate for celluloid film. The 24p mode was developed specifically to duplicate the look of motion picture film by recording each second of motion in 24 still frames rather than 30 frames per second. When combined with a 1/50th shutter speed (similar to a film camera shutter)⁵, 24p closely replicates the visual artifacts of film (particularly motion blur) and can give video a “film look.” At 1080 resolution, 24p can approximate the look of celluloid film, but at UHD resolutions like 2K and 4K, 24p video is considered to be the equal of any film stock (a major reason celluloid film is disappearing). Offered on everything from ultra high end D-Cinema cameras like the Arri Alexa, to mid-level cameras like

the Canon C-300, to DSLRs and even the iPhone, the 24p frame rate is a popular option on nearly every viable digital camera (**Figure 8-9**). Today 24p has essentially become the default frame rate for narrative filmmaking at all budget levels. Again, for broadcast applications, the 24p frame rate is actually 23.976, however, more and more cameras will shoot true 24 fps frame rate when the project is destined for digital theatrical projection (see page 197)



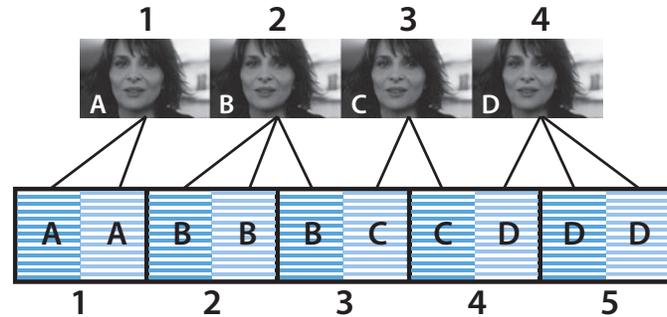
■ **Figure 8-9** Shooting at the 24p frame rate has become the standard for narrative filmmaking and is available on virtually every camera suitable for moviemaking; from the ultra high-end Arri Alexa XT used to shoot Iñárritu's *The Revenant* (2015, *top*), to the iPhone 5 smartphone used to shoot Baker's *Tangerine* (2015, *bottom*).

24p NTSC versus 24p native

If you plan to use 24p as part of your workflow, you must make the distinction between shooting 24p native (sometimes called **24pn**, n for native), or shooting 24p within a context of the 30 fps (60i) broadcast video standard. More and more digital cameras support true 24p video natively, but to remain in true 24p native mode all elements in the workflow must be compatible with the format from start to finish. For example, one must use a camera that shoots and outputs native 24p material footage, then edit that material with an editing system that accommodates the true 24p frame rate, and distribute the project on a 24p format like Blu-Ray or as a DCP (Digital Cinema Package) for D-Cinema theatrical distribution (see page 197).

⁵ The actual shutter speed of 1/48th of a second is usually rounded off to 1/50th for setting camera options and exposure calculations. Many digital cameras do not have a 1/48th option.

However, many cameras and displays only support the 60i (30 fps) standard, like DVDs and SD broadcast. If any piece of your workflow from start to finish supports only the NTSC standard then a conversion from 24p to 60i is required at some point. This conversion is very common and is accomplished through a process called **3:2 pulldown**, which converts material shot at 24 progressive frames per second into 60 interlaced fields per second (or 30 frames per second).⁶ Here is how it works. 24p renders each second of action with 24 full, progressively scanned, frames. During the conversion, each full frame is replicated as interlaced fields. We already know that an interlaced frame is made up of two alternating fields, however, the 3:2 conversion process replicates every other frame as *three* fields. Thus, from every two full frames of 24p video, the pulldown process creates five fields of video (2.5 frames). If we look at how the 3:2 process affects four frames of 24p video (**Figure 8-10**) we see how inserting an extra field to every other frame ends up producing five interlaced frames (ten fields) from only four original progressive frames. Following this pattern longer, after 24 frames of 24p video, we will have created an extra six interlaced frames, to arrive at 30 frames of video (60 fields) per second. The addition of these “extra” fields are imperceptible to a viewer, but it’s now compatible with the 30 fps display standard, and in the end the image still looks like 24p footage, with film-like artifacts.



■ **Figure 8-10** To reconcile the different frame rates between native 24p projects and 60i video display, the 3:2 pulldown process inserts an extra duplicate field to every other frame. This creates five interlaced frames (ten fields) from the original four progressive frames. After 24 frames of 24p video, we will have created an extra six interlaced frames, to arrive at 30 frames of video (60 fields) per second

Pulldown conversion is used whenever a 24p project workflow is destined for any 60i format, like DVD or broadcast, but it can be accomplished at four places along the workflow: (1) The DSP (digital signal processor) in a digital camera can convert 24p video capture for outputting and recording 60i. This is sometimes referred to as “recording 24p in a 60i wrapper.” (2) 24p footage can be converted using most editing software at either the ingestion stage or the output stage. (3) 24p material can be converted by a processor in a disc player or display monitor that only supports 60i. This is what happens, for example, when you watch a Blu-ray disc on a 60i compatible monitor.

Again, please remember that for SD and broadcast applications, the 24p frame rate is actually 23.976 and 30 fps is actually 29.97 fps (with 60i being 59.94 fields per second). These 0.1% slowed down rates provide an easier conversion to the broadcast standards.

in practice

■ SLOW AND FAST MOTION IN CAMERA

The ATSC standard frame rates for broadcast video display are 30 fps (60i) and 24 fps for native 24p production and these display frame rates are fixed, however many video cameras are built with options for shooting at a wide variety of frame rates. Why? Altering the acquisition frame rate in the camera allows a filmmaker to create slow motion or fast motion in camera. When we shoot at a frame rate faster than 30 fps (or 24p if that’s our format) we get **slow motion** when we play the footage back at

30 fps. The faster the camera’s frame rate, the slower the motion will appear during playback. A movement that takes one second in real time, like a glass shattering on the floor, will take four seconds on screen when shot at 120 fps and ten seconds if you shoot the glass breaking at 300 fps (**Figure 8-11**).

Conversely, altering the camera’s speed to frame rates less than 30 fps (or 24p if that’s our format) will create **fast motion** when played back at 30 fps. The slower the frame rate of the camera, the faster the motion will appear when projected. An action

⁶ There are other conversion processes such as “advanced pulldown” (24pA) but they work on the same basic principle. You’ll need to research your specific equipment and workflow to know what is best for your project.



■ **Figure 8-11** Shot with a Phantom HD camera running between 500 and 1000 fps, the slow motion IED explosion at the beginning of Bigelow's *The Hurt Locker* (2008) not only conveys the overwhelming force of the blast, but it replicates the neurological phenomenon of techpsychia, or the perceived slowing down of events during a rush of adrenaline

that takes one minute of screen time, like folding laundry, will take about 15 seconds if shot at 7 fps. The extreme end of fast motion technique is called

time lapse, which occurs when one is taking individual exposures at extremely slow intervals. Taking exposures at 1 frame per 30 seconds will record one hour of activity (60 min.) in only 120 frames. When played back at 30 fps, that hour will now happen in four seconds. With time lapse we can see movement and changes that occur gradually over many minutes or hours or even days, like storm clouds forming or a building being erected, in a matter of seconds.

It's true that slow and fast motion can be achieved in postproduction by changing a clip's rate of speed in your editing software, but this technique is never as smooth or detailed as using variable frame rates in camera when shooting your slow or fast motion, especially when the rate of motion shift is extreme. See page 68 for applied examples of slow-mo, fast-mo, and time lapse.



■ **Figure 8-12** A 4:3 image viewed on a 16:9 monitor is displayed with black or gray bars on the sides of the screen, a practice called "pillar-boxing."

Aspect Ratio

The aspect ratio of a video frame is the dimensional relationship between the height and the length of a frame of video. The ATSC format standard supports two aspect ratios natively, 16:9 and 4:3. All ATSC high-definition formats have an aspect ratio of 16:9 (also written as 1.78:1) and in terms of common industry practice (rather than government standards) 16:9 has become the most widespread aspect ratio for the majority of newly produced shows whether in HD or SD. The 4:3 (also written as 1.33:1) aspect ratio is another holdover from the old NTSC standards. Although a large quantity of material is still being broadcast in 4:3, practically all flat-screen video displays are manufactured to accommodate the 16:9 format. What this means is that vertical edges of the video display must be masked in a process called

pillar-boxing for broadcasts that are in 4:3 (**Figure 8-12**). Aspect ratios play a critical role in shot composition and you can read much more about this on page 50.

Resolution

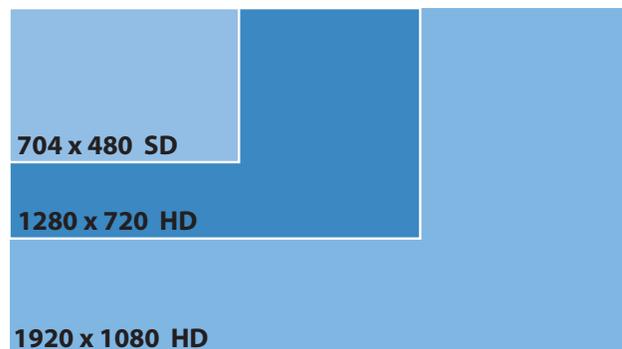
Whenever there is an evaluation of video image quality, you will hear the term "resolution." **Resolution** generally refers to the ability to reproduce visual detail: sharpness of line, subtlety and degrees of luminance, and accuracy of color. Video resolution is affected by many factors in addition to the format scanning system and pixel count; these include *lens quality* (Chapter 10), *sampling bit rates*, *chroma subsampling*, and *data compression* (all explained starting on page 211). In this section we're looking specifically at the **ATSC standards for format resolution**, which is determined primarily by the number of pixels—the more pixels one has to create the image, the more detail, smoothness of curve, and nuance of shade and color can be rendered. While the old SD signal is still supported in the ATSC broadcast specs, HD images represent a leap in picture quality and have truly become the new,



■ **Figure 8-13** The resolution of HD allows for richer colors, more information in shadow areas, and, as shown here, much finer detail reproduction. In this frame from Scott's *Gladiator* (2000), the individual hairs on Maximus' (Russell Crowe) fur cape are sharp in HD (*left*) but indistinct in SD (*right*).

baseline standard (**Figure 8-13**). We can determine the pixel resolution of a given format by multiplying the vertical lines by the horizontal pixels (**Figure 8-14**):

- **Standard definition** digital video, **704 × 480**, contains a little more than 338,000 pixels with which to render the image.
- **1080i & 1080p HD** provides for 2,073,600 pixels per frame (1920 × 1080), this represents a *much* greater resolution capacity and therefore more detailed visual information. It's no wonder that HD very quickly eclipsed SD video—it looks better, has more frame detail, and provides the filmmaker with visual control.
- **720p HD**, a slightly older and less common HD format that you will find as an option on many cameras has a pixel count of 921,600—half that of 1080 HD.



■ **Figure 8-14** The resolution can be roughly determined by multiplying the horizontal and vertical pixels. This illustration shows the relative resolution capabilities of ATSC formats based on pixel count.

HD Resolution and Scanning

In addition to pixel count, the format's scanning type (interlaced versus progressive) is also a factor in the resolution equation (see page 188). Let's look at a comparison between 1080i and 720p. It's true that 1080i has twice as many total pixels than 720p (2,073,600 pixels versus 921,600), but the fact that 1080i is an interlaced signal means that it creates a frame by making two fields, each lasting for 1/60th of a second. So, each field contains only half those lines. So in the final calculation 720p, with its progressively scanned full image in each frame, delivers somewhere around 56 million pixels per second, while 1080i utilizes around 62 million pixels per second. This means that 720p only offers slightly less resolution in the image than 1080i.⁷ This is why 720p was a very popular resolution option—up until the introduction of 1080p. 1080p is often referred to as **full HD** because it enjoys both the 2,073,600 pixel count *and* progressive scanning. Consequently, 720p is used much less as a shooting format these days.

Ultra High Definition Resolutions

As I write this third edition, the ATSC is finalizing the new standards for ATSC 2.0 and 3.0. Those new standards will likely support the **Ultra High Definition** (or **UHD**) **4K**—and

⁷ **720p**: 921,600 pxls/frame × 60 fps = 55,656,000 pxls/sec; **1080i**: 2,073,600 pxls/frame × 30 fps = 62,208,000 pxls/sec.

it'll probably be in use long before it's time for me to start work on the fourth edition. UHD 4K is a progressive scan broadcast and display standard that effectively *quadru- ples* the pixel resolution of HD 1080p to 3,840 × 2,160 (with the same 16:9 aspect ratio).⁸ UHD will also support a wide range of frame rates, 24p, 30p, 60p (and slowed down ver- sions), and other international frame rates as well (like 25p, 50p). In anticipation of the new standard, manufacturers are already selling compatible UHD flat screen displays and UHD Blu-ray players. With everything ready and in place for the introduction of UHD 4K, the only factor not yet developed is the UHD 4K content that truly takes advantage of the format's full resolution capacity. But this will surely come, and you will be in the vanguard.

Just one word of clarification is necessary, the term 4K might be familiar to you from cam- eras like the Black Magic, RED or Arri Alexa that shoot 4K Digital Cinema compatible video, but there is a difference between the Digital Cinema Initiative 4K format and the UHD 4K ATSC 3.0 standard and they should not be confused. Somehow, the term "4K" got attached to the new UHD standard, probably because of the similar (but not exactly the same) pixel count (see **Fig. 8-19**). It might have been clearer had the new format been referred to by its horizontal lines and scanning type like all the other formats and called UHD 2160p, but perhaps the marketing folks know better what will sell. I discuss the Digital Cinema Initiative and its 4K format in detail on page 197.

Color Encoding: Rec. 709 and Rec. 2020

There is one other important video specification that is not reflected in the ATSC standards chart, but is important to understand nonetheless, and that is the standard for how color is encoded into the image. The element of the video image that determines image bright- ness (shades of black and white) is called the **luminance** signal (also written as Y). The color component of the video signal is referred to as **chrominance** (also written as C, or chroma). Chrominance is made up of **hue**, which determines the tint of a particular color, and **saturation**, which determines the intensity of the colors. To achieve a color image, the video signal is divided into **the three primary colors of light: red, green, and blue (RGB)** and an accurate color blend is created through the additive process of mixing these three primary colors with the brightness information.

Video cameras use one of two methods for separating the red, green, and blue compo- nents of an image. A few cameras contain three separate sensors with each dedicated

to a respective color, while the more common, sin- gle large format sensor cameras split the incoming light into its color components with a red/green/blue Bayer Pattern filter, thus distributing specific color components to specific pixels (see pages 208–210). In flat-screen displays, each pixel is made up of three separate, individually controlled cells (or subpixels) for each color (R, G, B) and these cells glow according to voltage fluctuations during the scanning process (**Figure 8-15**).



■ **Figure 8-15** Just like camera sensors, color flat-screen displays (LCD or plasma) are made up of millions of pixels. Each individual pixel contains red, green, and blue subpixels (*outlined*). See the color insert.

The way the color and brightness values are inte- grated into the video signal is called **color encoding** and the organization and blending of color and bright- ness values (the standards that define how and how many colors are reproduced) is called **color space**, and these too must be consistent across the work- flow from shooting to display. The HDTV standard color space is called the **ITU Recommendation**

⁸ And there are plans underway to introduce UHD 8K (4320p) which would mean an image that has 16 times the pixels as 1080p!

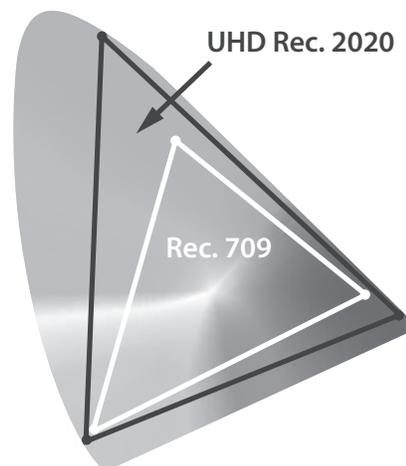
BT.709,⁹ or simply **Rec. 709** for short. When shooting in HD formats, the camera by default records and outputs Rec. 709 color. When viewing footage on a display monitor we must calibrate the monitor to the Rec. 709 standards to assure that what we see is what we're actually recording (see page 284). With UHD 4K the standard color space is referred to as **Rec. 2020** (short for **ITU-R Recommendation BT.2020**) and this standard greatly expands the color space over Rec. 709 (**Figure 8-16**). In other words, Rec. 2020 will reproduce many more colors and in a wider variety of contrasts and saturation.

When speaking of display monitors, the color space is fixed to one of these standards; however, when it comes to shooting footage, the standard color space is only a starting point. Depending on your equipment and your particular workflow and distribution model there are other color space recording options beyond Rec. 709 that are becoming increasingly popular with narrative filmmakers. We discuss other color space options in more detail in Chapter 9.

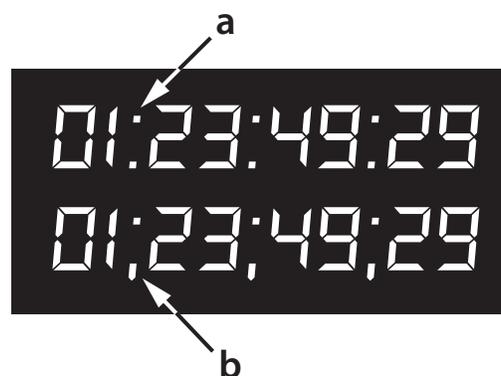
Timecode

Regardless of the frame rate you choose, every frame you shoot is assigned a specific and unique number called **timecode (TC)**. Recorded right along with the video data for each and every frame is an electronic number with four fields—hours:minutes:seconds:frames. This numbering system is vital to the workflow of every video project. We use timecode to quickly log, reference, or locate specific frames; to calculate the length of shots, scenes, and entire projects; to maintain audio and video synchronization; to ensure frame-accurate edits; to calculate trims and transitions in editing; and more. In short, timecode is the way we keep track of the frame-by-frame timing of every element, at every stage of a project. Virtually all video cameras record metadata timecode, although not all allow you to set it to a number that you want (which helps ID camera cards). Most cameras also offer a choice of two different timecode flavors: **drop-frame timecode** and **nondrop-frame timecode** (**Figure 8-17**). Why do we have two ways to count frames? Well, it goes back to that blasted 0.1% slowing down of the frame rate in NTSC video from 30 fps to 29.97 fps when color was introduced (page 189), and it's still with us. Grrrrrr.

Nondrop-frame timecode (NDF TC) is simple to understand but is less frequently used. NDF TC simply counts frames according to the original black-and-white video frame rate, assigning a new number to each video frame at a consistent rate of 30 fps. It seems simple, but it doesn't match real time and so is rarely used. As we discussed previously, the true frame rate of video is slightly slower: 29.97 fps. So simply allocating frame numbers to frames 1 to 30 to video that is actually running at 29.97 fps means that what we are calling one second (30 frames) is in real time one second and a fraction—because one second should have turned after 29.97. The result is that over time we end up accumulating slightly more frame numbers than actual frames. In fact, the difference between NDF TC counting time and true video running time is 1.8 frames per minute (**Figure 8-18**). That may not seem like much, but after one hour of video, NDF TC will have “counted” 108,000 frames. However, in true NTSC running time there are only 107,892 frames of video in an

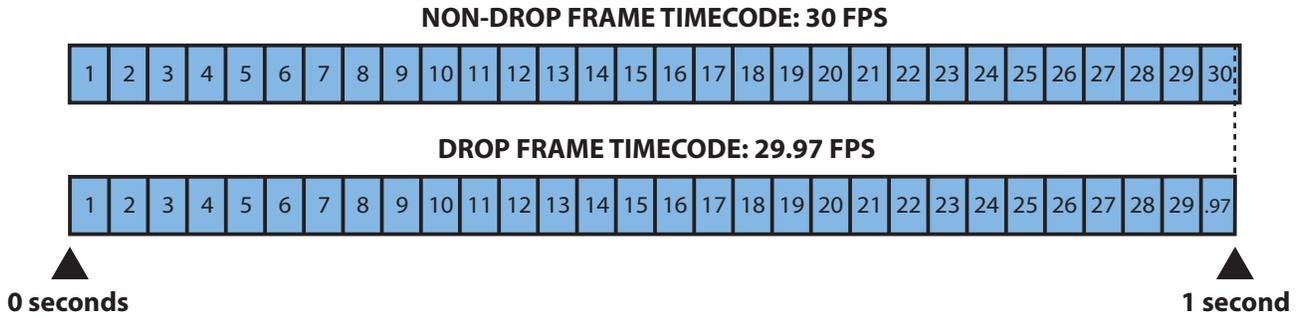


■ **Figure 8-16** Comparing the HD standard Rec. 709 color space (inner triangle) with the UHDTV Rec. 2020 color space (outer triangle) reveals the greatly expanded range of colors that the new system can reproduce. See the color insert.



■ **Figure 8-17** Timecode assigns a unique number to every video frame according to a format based on hours, minutes, seconds, and frames. Broadcast video uses only “drop frame” timecode, easily identified by its use of semicolons (b), because it is time accurate. Some applications still provide the option to use “nondrop-frame” timecode, which uses colons as separators (a).

⁹ The ITU Recommendation BT.709 was established by the International Telecommunications Union (of the United Nations), an organization that coordinates information and communication standards worldwide.



■ **Figure 8-18** After exactly one second, nondrop-frame timecode displays that 30 frames have been screened. In fact, NTSC video runs at 29.97 fps and not 30 fps. Drop-frame timecode accommodates for this discrepancy by selectively skipping numbers, not frames, so that the time displayed matches the actual time elapsed.

hour-long program.¹⁰ The discrepancy is 108 frames, or three seconds and 18 frames. So, the NDF TC display may read exactly one hour (01:00:00:00) but your video will in fact be shorter by three seconds and 18 frames (00:59:26:12). That may not seem like such a big deal, but in broadcast television, where programs and commercials must conform to frame-accurate timing, it is crucial to have a precise frame count.

Drop-frame timecode (DF TC) does not actually drop any video frames, but it does skip over some timecode numbers from time to time in order to adjust the frame count to accurately reflect the true 29.97 fps of SD video. To be precise, DF TC skips over the :00 and :01 frame numbers once every minute, except for the tenth minute. Here is how the TC numbers change at each minute of footage (except for every tenth minute): 00;09;26;28, 00;09;26;29, 00;09;27;02, 00;09;27;03. This method compensates for the slowed-down video frame rate and, in the end, is completely frame accurate. After an hour of DF TC counting, we will arrive at TC 01;00;00;00 for exactly one hour of video footage. Most video cameras default to DF TC, as this is what broadcasters require.

■ OTHER BROADCAST STANDARDS WORLDWIDE

As mentioned earlier, ATSC video standards ensure system compatibility in any country that uses it. Unfortunately, there is not a single global digital broadcast standard, there are four. Other digital television standards around the world are **DVB-T** (Digital Video Broadcasting-Terrestrial), which is used throughout western and eastern Europe, Russia, Australia, and many nations throughout Asia and Africa; **ISDB-T** (Integrated Services Digital Broadcasting-Terrestrial), used in Japan, Brazil, and most of South America; and **DTMB** (Digital Terrestrial Multimedia Broadcast), used by China and Hong Kong. Interestingly, all of these digital broadcast systems utilize the same video codec, H.262/MPEG-2, however, here is where similarities end.

Just as the current ATSC standards were devised for backward compatibility with the old NTSC standards and easy down-conversion from HD to SD formats, so too is DVB-T based on the widespread former European analog standards **PAL** (Phase Alternate Line) and **SECAM** (Séquential Couleur Avec Mémoire). The primary differences between these systems are frame rate and the number of horizontal lines. Both PAL and SECAM contain 625 horizontal lines (rather than NTSC's 525 lines) and they have a frame rate of 25 fps (rather than NTSC's 30 fps); also, the PAL and SECAM frame rates are exact and there are no "slowed-down" frame rates as there are NTSC compatible formats. Given these historic specifications, all the new DVB-T standards are based on 25 fps frame rates including 50i and 25p for HD transmissions—and you'll find these options on many video cameras today. However, unless you intend to broadcast exclusively in the European Union or other DVB-T countries, stick with the ATSC standards. If you are an American

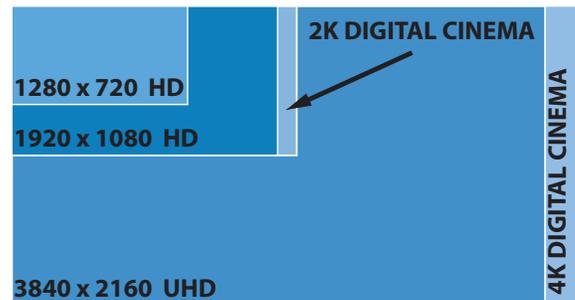
¹⁰ 430 frames/second × 60 seconds × 60 minutes = 108,000 frames, but in reality the counting should reflect 29.97 frames/second × 60 seconds × 60 minutes = 107,892 frames.

filmmaker who plans to submit your projects to European festivals, you'll need to ask what the format specifications are. You may have to transcode your project to a 25 fps compatible system—and that takes time.

■ DCI STANDARDS FOR THEATRICAL PROJECTION

In 2007 the seven major film studios (20th Century Fox, Universal, MGM, Paramount, Warner Bros., Sony, and Disney) came together in a joint venture called the **Digital Cinema Initiative (DCI)** to establish common technical specifications and quality standards for **Digital Cinema (D-Cinema)**, which is the digital theatrical presentation of 2D and 3D films.¹¹ These standards do not conform to the ATSC broadcast standards; rather, they exceed them. In less than ten years the number of commercial theaters equipped for D-Cinema projection went from a few hundred to near total conversion today. This rapid expansion was not entirely in response to issues of quality; rather it was largely driven by economics. It's in the best economic interest of studios, distribution companies, and theaters to handle hard drives and data rather than reels and reels of heavy and delicate celluloid film. For all practical intents and purposes, 35mm theatrical projection is now just an entry in the history books.

The DCI standards of primary concern for the filmmaker are projection resolution and delivery standards. Currently, the two most prevalent projection resolutions are **2K** (2048 × 1080 pixels) and **4K** (4096 × 2160 pixels), although, as always, there are rumblings of greater pixel counts in the future, including 8K! (**Figure 8-19**). The frame rate for digital cinema projection is 24p for both 2K and 4K (and also 48p for 2K projection). Also, the aspect ratios that are DCI acceptable include 1.85:1 (US standard theatrical projection), 2.39:1 (widescreen “scope” projection), and 1.78:1 (same as HDTV 16:9). The color space of D-Cinema, called **DCI-P3**, is also expanded from the standard Rec. 709. The wider color space of **DCI-P3** very closely resembles that of 35mm celluloid film, but interestingly the UHD color space Rec. 2020 is even broader (see **Fig. 8-16**). There are other technical factors involved in the DCI standards, including audio and video file types, compression codecs, and so forth (see page 450) and all of these specs and formats are used to produce the **Digital Cinema Package (DCP)**, which is the standardized method for mastering and storing a project on a hard drive to ensure compatibility with all DCI theater servers and projectors. The DCI standards are very complex and sufficiently rigorous to require a filmmaker to use a lab to create the DCP. Virtually any acquisition format can be transcoded to meet the DCI standards, but there is a range of ultra-advanced production cameras, shooting 2K, 4K, 5K ... even 8K! that are designed specifically for D-Cinema production and distribution (see page 224).



■ **Figure 8-19** A comparison of the relative resolution capabilities between 720 HD, 1080 HD, 2K, 4K UHD, and 4K D-Cinema formats based on pixel count.



■ CHOOSING YOUR SHOOTING FORMAT

Most mid to high level digital video cameras provide options to shoot in 60p, 60i, 24p, or 30p, in HD resolutions (720 and 1080) and some in SD; and more and more we're also seeing options for shooting 2K and 4K in affordable camcorders, DSLRs, and hybrid cameras. So how do you choose?

Resolution: Narrative filmmakers tend to shoot at the maximum resolution available in the camera and then down-convert to lower resolutions later if necessary, during the final program output. This allows for more precise image control during the shoot, and more output and distribution options. This workflow strategy also makes the project somewhat “future proof” by using resolutions that are less likely to

¹¹ Go to www.dcinovies.com for more information.

become obsolete quickly. That means if you have the ability and the data storage space to shoot 4K or 2K then go with that. If your camera (or budget) only allow for HD resolutions, then shoot at 1080p. After that, 720p and 1080i are very close in quality, but in general, you should remain with progressive scan formats. Finally, most shooters ignore any SD resolution options and I can see no advantage to shooting SD either unless you wish to capture a “low tech” aesthetic (e.g., shooting a scene from the perspective of an old surveillance camera, or trying to replicate a 1980’s TV show). Even here, this aesthetic can likely be reproduced in postproduction.

Frame Rate: Shoot 24p if you like the cinematic visual quality (i.e., “film look”) of this frame rate no matter how it’s distributed. Also, shoot 24p when you plan to finish and distribute on Blu-ray (1080, 24p) or the DCI D-Cinema theatrical format (2K, 4K 24p). Shoot 30p when the “film look” doesn’t interest you and you want more movement clarity than 24 frames per second gives you. 30p is also good for projects made exclusively for web streaming. Shoot 60p when you have projects with lots of fast movement (this frame rate is popular with sports producers) and if you plan to use some slow motion or freeze frame effects. However, if you plan on shooting extensive and extreme slow motion scenes,

you should make sure to use a camera that offers variable frame rates greater than 240 fps for those scenes. Most shooters these days avoid the interlaced options, and shoot 30p instead believing that converting 30p material to 60i for distribution looks better than material originating on 60i.

Aspect Ratio: Shoot everything in 16:9 (1.78:1) aspect ratio unless you have a very specific aesthetic reason for using 4:3 (1.33:1). And remember, you can always crop to any aspect ratio in postproduction. If you plan to distribute theatrically, you may want to finish with a widescreen 1.85:1 aspect ratio. For most mid-level cameras this means shooting at 16:9 while framing with 1.85:1 markers on your monitor. Then you will need to crop the image to 1.85:1 in postproduction. Very high end D-Cinema cameras allow you to customize the active image sensor area to shoot 1.85:1 in camera.

D-Cinema Workflow: D-Cinema is a complete shooting to distribution workflow, so if you plan to finish and distribute theatrically on the DCI D-Cinema format (and you have the memory space necessary to store vast media files) then you should shoot with a D-Cinema camera capable of shooting 2K or 4K at native 24p (see page 450 for details on D-Cinema workflow).

■ A FINAL NOTE ON VIDEO STANDARDS

As the quote from Rich Chernock at the start of this section alluded to, you can expect broadcast standards to remain in the state of constant evolution in order to keep up with advances in technology and changes in people’s media habits. As I write this, the ATSC 2.0 and ATSC 3.0 standards are being finalized, including support for UHD 4K broadcast, improved standards for internet and mobile streaming, interactivity, and perhaps even 3D broadcasting. And there is talk of even more changes down the road including a standard for UHD 8K broadcasting (!). While you don’t want to fall down the proverbial rabbit hole researching reams of arcane technical specs, it is nonetheless important when you start on any project to get a general sense for the current media landscape so that you can better prepare your workflow for the present, and maybe even “future proof” your work. Certainly, the *Voice & Vision* companion website will post the new ATSC standards when they are implemented, so stay tuned.

The Digital Video Camera

Historically, analog video cameras fell into neat categories. Professional cameras were big, expensive, well made, and produced high-quality video, whereas consumer cameras were small, very inexpensive, had an inferior image, but above all were easy to use. Then came digital video and everything changed—and so much the better for low-budget independent filmmakers. Today, you can find many cameras offering ultra-high-quality resolutions, exceptional lenses, and precise user control over exposure, color space, white balance, aspect ratios, and frame rates, as well as professional audio and video input/output connectors, for around \$4,000 or less! The quality-to-price relationship is so great that these cameras are not used strictly by students and shoestring budget filmmakers, many professionals and commercial production houses have adopted them as well. These high-quality, yet affordable, video cameras may be too complex for the average consumer, but they are excellent when a polished and controlled look is important, but a high-end, professional rig would be overkill in terms of physical size, complexity, and expense. In short, the line dividing professional-quality gear and nonprofessional access is fading—virtually anybody can create HD broadcast or even 4K projects on a budget. Sure, there will always be a line of ultra-high-end professional cameras so technologically advanced and tricked out that buying one requires a second mortgage (see page 224), just as there will always be a line of super cheap consumer cameras that do everything easily but nothing particularly well, but the range of cameras between those two poles are getting better and more affordable.

There are many different types of video cameras designed for different shooting situations and budgets, but before we get into specific camera categories, let's explore the fundamental components, functions, and technology of the digital video cameras in general (Figure 9-1).



■ **Figure 9-1** Both professional and mid-level video cameras, like this Panasonic AU-EVA1, have the following basic features: (a) camera body, (b) function control panel, (c) lens, (d) viewfinder and/or LCD viewscreen, (e) record media bay, (f) audio/video I/O ports, and (g) the media bay.

■ DIGITAL VIDEO CAMERA ESSENTIALS: EXTERIOR

The Body

Generally there are three types of camcorder bodies: shoulder-mount cameras, cameras ergonomically designed to be held in an operator's hands, and cameras that are essentially boxes (or designed for shooting still photos) that must be mounted on some form of camera support (Figure 9-2). Shoulder-mount camcorders tend to be found on the high-end professional range, where cameras are heavier. A shoulder-mount camera allows for very stable handheld shots, while the smaller cameras (like Hybrids or DSLRs) are more difficult to keep steady without a tripod or some form of handheld stabilizing rig (see Chapter 11). Shoulder-mount cameras are also more obvious than the smaller camcorders or DSLRs. They announce loudly, "Professional camera here! Making a movie!" Many filmmakers find that the unobtrusiveness and mobility of the smaller camera make them beneficial in certain situations for a sense of spontaneity, dynamic camera styles, or simply a degree of comfort. One type of camera body is not inherently better than the other, but the difference in size and weight does have an impact on what you are able to do with the camera and so should be considered in tandem with your visual approach.



■ **Figure 9-2** Some camera bodies are designed for handheld work, like shoulder-mount camcorders (*left*), while other camera body shapes require some form of camera support, like DSLRs which are awkward to hold and benefit from a tripod (*right*) or some form of camera rig.

After shooting the epilogue to his 1997 film *Taste of Cherry*, director Abbas Kiarostami was told that the lab had ruined this portion of the film. He could not reshoot because the most beautiful part of the spring season (essential for the story) had already passed and he couldn't wait a full year to get these images again. So to finish the movie, Kiarostami decided to use the footage from a small video camera that had been on the set shooting a "behind the scenes" documentary. The epilogue to *Taste of Cherry*, as is the case with most Kiarostami films, includes many nonactors. "What dramatically distinguished the performance of the video camera from that of the 35mm film camera was the reaction of the simple people who behaved so naturally and spontaneously in front of it. This is something I've always striven to achieve during my

30 year career." In trying to get natural performances from nonactors with large, bulky 35mm film cameras, Kiarostami eliminated as many distractions as possible by paring down his equipment and crew to the bare minimum. "However, when I said 'action,' there was action but it was artificial. . . . There is lighting, tracking, booms, and so on, all of these things keep them from giving a natural performance. . . . [People] know there is nothing natural on the other side of the camera, so why should they be?" But when Kiarostami started to use a small DV camera he discovered something different, "freedom." Nonactors responded with naturalness and spontaneity and Kiarostami was delivered from the large production crews and extra equipment necessary for a 35mm production. "This camera gives the filmmaker an opportunity for

in practice

experimenting without fear of losing the essential. It's a liberty for a filmmaker." Kiarostami made his next two films exclusively on small format DV. "It would have been impossible to shoot a film like *Ten*

without a digital [video] camera"¹ (Figure 9-3) (also see the "Smartphone Films" section on page 228).

¹ All quotes from the film *10 on Ten*, by Abbas Kiarostami, 2004.



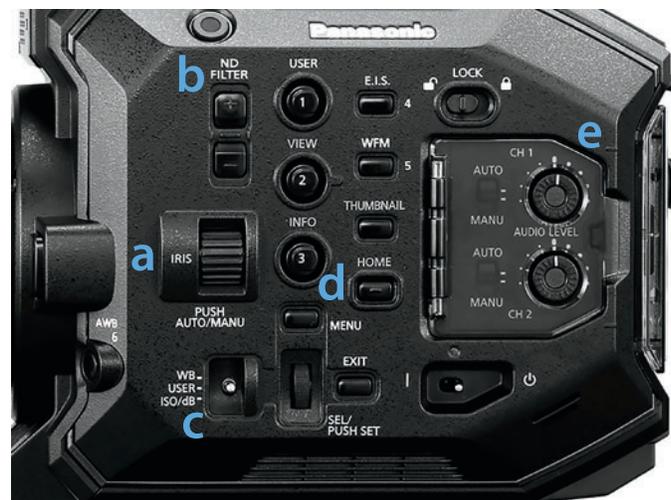
■ **Figure 9-3** Abbas Kiarostami achieved a high level of spontaneity and naturalness from his actors by using small, consumer-grade DV cameras in *Taste of Cherry* (left) and *Ten* (2002, right).

Function Buttons and Switches

All digital cameras have an array of camera settings, functions, and options embedded inside menus and sub-menus that are viewed on the LCD viewscreen. With shooting options rapidly multiplying, camera function menus are getting longer and more labyrinthine with each generation, and you can spend a lot of time navigating menus just to find the simplest of settings. Luckily, cameras designed specifically for filmmaking will place commonly used functions as switches, buttons, or wheels on the outside of the camera body. This is a great convenience which allows you to set common functions or access specific menu items quickly (Figure 9-4). We will explore specific settings and functions in detail in the "Camera Settings" section on page 218.

The Lens

The function of the lens is to gather the light reflecting off your scene and focus it onto the image sensor where it is recorded. In other words, everything visual goes through the lens, so quality is important. A poor-quality lens will give you a poor-quality image. Lucky for us, the dramatic improvement of video resolution and imaging devices has been paralleled by an evolution in lens optics in order to realize the new resolution potential. However, always keep in mind that lens quality is a major detail that separates consumer grade camcorders from cameras intended for professional applications. Very inexpensive consumer cameras (under \$1,000) that boast HD shooting resolutions of 1080p, often come with a single, unchangeable lens that is made with plastic or extremely



■ **Figure 9-4** The external functions panel on cameras designed for filmmaking often include: (a) aperture/iris control, (b) ND filters, (c) white balance and gain, (d) menu access, (e) manual audio level pots.



■ **Figure 9-5** This JVC digital camera has a lens mount for interchangeable lenses that include prime lenses or zoom lenses.

low-quality glass elements. Plastic lenses are lighter and cheaper, but they are less sharp and often result in an image of much lower resolution than the format is capable of producing.

Many mid-level and professional cameras (especially camcorders) come with a permanently integrated zoom lens, which means that the one lens offers a range of focal lengths (see the camcorder zoom lens in **Fig. 9-32**). This is often sufficient for many shooting situations. The zoom range of any specific lens is expressed in its magnification ability. The degree of magnification increases ten times over its full range with a

10× (or 10:1) lens, 16 times with a 16× lens, and 20 times with a 20× lens. The larger the magnification ratio, the greater the magnification power of the lens.

Zoom lenses can be extremely convenient, however the camera systems most commonly used for narrative filmmaking (hybrids, DSLRs, mirrorless, and D-Cinema) offer a mount that will allow for interchangeable lenses. This way, a filmmaker can use whichever lens is optimal for the shooting situation and film aesthetic: prime lenses, short zooms, or long zooms (**Figure 9-5**).

The basic optical functions and compositional attributes of lenses are so important to the creative dimension of filmmaking that I have devoted an entire chapter specifically to this topic (see Chapter 10).

Servo Zoom Control

Often accompanying the video zoom lens on many cameras (especially camcorders) is the **servo zoom control**, which enables you to glide through the zoom range, from wide angle to telephoto, with the touch of a button (**Figure 9-6**). The servo zoom mechanism is usually a “rocker switch,” but not all rocker switches are created equal and this is another area that separates the professional cameras from the cheapos. The speed of a good-quality servo zoom is pressure sensitive. The further you depress the mechanism, the faster the zoom, and the lighter you touch the button, the slower the zoom. This enables a camera operator not only to control the rate of a zoom, but also to taper it at the beginning and end. Consumer cameras tend to have only one zoom speed, which lurches on and clunks off when you start and stop.



■ **Figure 9-6** A servo zoom rocker-switch allows you to easily glide through the range of focal lengths available on the lens while shooting handheld.

It's important to note that there are two types of zooms, optical zooms and digital zooms, and they are not even remotely the same, even though the rocker switch controls them both. An **optical zoom** adjusts the central lens element to magnify or demagnify the scene being shot. Although the composition and perspective of the image changes, the resolution of the video image remains the same. The optical zoom on most DV cameras falls between the 10× magnification and 20× magnification range. A **digital zoom**, on the other hand, is essentially an in-camera digital effect in which the circuitry in the camera magnifies the captured video signal by selecting the central pixels and blowing them up (**Figure 9-7**). The loss of resolution quality with digital zooms is rapid, significant, and visible. Once the



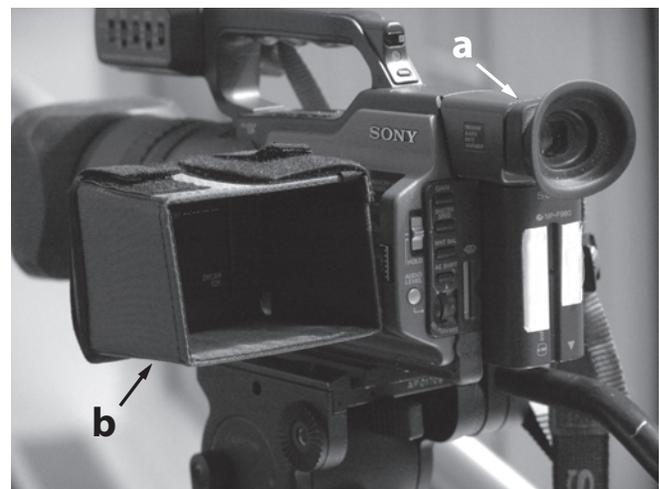
■ **Figure 9-7** A digital zoom magnifies a subject in the frame, but the resulting image (*right*) shows severe resolution compromises compared to the far end of the optical zoom range (*left*).

rocker switch reaches the telephoto limits of the optical zoom range, the digital zoom (very obviously) kicks in and individual pixels become visible while video noise rakes the image. Mid-level and professional cameras generally don't bother with digital zooms because of the extreme compromises to the image and most filmmakers would agree that the digital zoom should be avoided; however, I did have a student effectively use the extreme end of a digital zoom to create the sense that a surveillance camera was observing an illicit encounter between two people. So think of it as another visual tool in your creative toolbox, albeit seldom used.

Viewfinders and LCD Viewscreens

The **viewfinder** allows you a close and glare-free look at the video image. The viewfinder is a small monitor seen through an eyepiece that fits snugly against the operator's eye. Viewfinders are extremely helpful when shooting in bright situations where LCD screens would be difficult to see. There is a diopter adjustment on the viewfinder that focuses a lens on the tiny video screen; the adjustment should be set for the camera operator's eye as part of the camera setup procedure.

Most digital cameras also have an **LCD viewscreen** to monitor your video. These screens are not as accurate as the viewfinder because changes in the viewing angle can alter the color and brightness of the image, as does the amount of glare the LCD screen catches from the ambient light. When shooting outdoors, an **LCD monitor hood** is essential for keeping sun glare from washing out the screen (**Figure 9-8**). Viewscreens are invaluable as a composition aid when you want to shoot from angles or create camera moves that make using the viewfinder difficult; however, for evaluating the nuances of your image (exposure, focus, lighting, etc.), they are not an adequate substitute for a genuine external HD field monitor and should be used only when shooting with an external monitor is not possible (see page 284).



■ **Figure 9-8** Many cameras provide two basic monitoring options. A viewfinder (a) and an LCD monitor. In bright light situations the viewfinder often gives you a clearer look at your frame, or you can use a monitor hood (b) to keep light from washing out the LCD screen.



■ **Figure 9-9** File-based recording on solid-state memory cards offers many advantages and is now the standard. The Canon XF300, pictured here, has two CF card slots to allow for longer, continuous recording.

Media Bay

The **media bay** is where the video signal is written and stored on the **record media**. Historically speaking, a video signal was recorded on magnetic tape. However, as a shooting medium, the videotape cassette is now obsolete and media slots for **solid-state memory** cards are incorporated into every newly released camera.² Currently, there is no single memory card standard. Media bay slots for **Secure Digital (SD)**, **Compact Flash (CF)**, or **CFast** cards are commonly found in many cameras, however some cameras incorporate proprietary recording formats, like Panasonic's **P2 card** and Sony's **SxS card** (Figure 9-9).

HD video requires large amounts of storage space and speed, so memory cards are compared (and priced) by their **storage capacity** and their **write speed** (see box on this page). Some high-end D-Cinema cameras come with **solid state hard drive** “magazines” that offer substantially more storage. Yet even these cameras will additionally have memory card slots allowing you to record to different media simultaneously (i.e., high resolution onto the hard drive magazine and low-res proxies to memory cards for editing).

Solid-state memory cards are referred to as **file-based media**, because each camera take is saved as a discrete digital file. In the field, you can see thumbnail images of every scene you've recorded. And this footage is immediately available for ingesting into your editing system. Unlike videotape, one great benefit of memory cards is that they can be reused. Once a footage-filled card is backed up (twice) to portable hard drives in the field by the data wrangler, you can reformat and reuse them again and again (see page 415). Since the media bay on many cameras are built for two memory cards, backing up and reusing cards effectively allows you to shoot continuously without interruption.

in practice

Clearly, the camera you choose will dictate which memory card type you use. Some cameras are equipped for SD, some CF and others will incorporate a proprietary format like SxS or P2. However, it's important to keep in mind that not all memory cards are created equal and many are simply not capable of handling the large data rates and storage needs of digital video shooting.

All memory cards are rated by their storage capacity and write speed, so you must first determine what your particular shooting format (resolution, compression codec, frame rate) will require. Luckily, there are apps that help you figure these numbers out precisely (see *Data Rate* on page 215). While most camera manuals make memory card recommendations, it's still helpful to know how common memory cards are classified.

WRITE SPEED

Memory cards come in a variety of **write speed** ratings, which indicate how quickly they can write the video files being sent to them by the camera, so you must check the speed rating of every card you purchase and compare it to the data rate of the shooting format. And remember, *there is no such thing as a memory card that is too fast*.

SD card data rates are indicated by two different rating systems: a “**class**” rating for regular SD cards and a “**U**” system for **Ultra High Speed (UHS)** SD cards. The class rating indicates the *guaranteed minimum write speed performance* for that card in megabytes per second, and you will find it on every card. It's true that UHS cards can theoretically achieve maximum *data transfer* speeds up to 104 MB/sec. (also printed on the card in MB/s) but the *class rating* is

² Videotape still remains a useful medium for project mastering and archiving.

a much safer indicator of write speed performance (Figure 9-10 left).

- **Class 4** = 4 MB/sec. minimum (insufficient for HD video)
- **Class 6** = 6 MB/sec. minimum (barely sufficient for HD video)
- **Class 10** = 10 MB/sec. minimum (good for HD video)
- **U1** = 10 MB/sec. minimum (good for HD video)
- **U3** = 30 MB/sec. minimum (best for HD and 4K video)

Recently, the SD Association announced a new **Video Speed Class** rating system for a new generation of SD memory cards designed specifically for video shooting. The new rating also reflects the *guaranteed minimum performance level* and will range from 6 MB to 90 MB per second. The ratings V10 and V30 are meant for HD and UHD/4K capture respectively, while the fastest options, V60 and V90, will support up to 8K resolution as well as 3D and 360° (VR) video shooting.³ These cards were not commercially available as I was writing this edition, but they will surely be in your hands before I get around to the fourth edition.

CF cards use a different speed classification called the **Commercial × Rating**.⁴ The difficulty with × Rating numbers is that they reflect a card's *maximum read speed*, which is generally faster than a card's write speeds. So you should err on the side of excess speed when selecting a CF card. Commonly, CF card ratings suitable for HD video shooting begin at 120× (write

speeds between 15 and 18 MB/sec.), and you can go up from there. The fastest, professional CF cards use **UDMA (Ultra Direct Memory Access)** technology. The UDMA ratings range from 0 to 7 reflecting *maximum potential* data transfer speeds between 16.7 MB/sec. (UDMA 0) to 160 MB/sec. (UDMA 7). The CF UDMA 7 card is not cheap, but its speed has made it very popular with filmmakers (Figure 9-10 right).

- 120x = 18 MB/sec. (approx.) (minimum for HD video, insufficient for 4K)
- 133x = 20 MB/sec. (approx.) (good for HD video, insufficient for 4K)
- 140x = 21 MB/sec. (approx.) (good for HD video, insufficient for 4K)
- 150x = 23 MB/sec. (approx.) (good for HD video, insufficient for 4K)
- 160x = 24 MB/sec. (approx.) (good for HD and 4K shooting)
- UDMA 7 = 155 MB/sec. (approx.) (best for HD and 4K video)

A recent variant of the CF card is the **CFast 2.0** memory card which has an astonishing data *read* rate of 3600x or approximately 540 MB/sec. At these speeds, shooting 4K, RAW, 3D and 360° (VR) video is no problem.

■ STORAGE CAPACITY

Within each memory card format are a variety of storage capacities and SD card varieties can be particularly confusing:

- **Regular SD** up to 2 GB of data (not sufficient for video)
- **SDHC** (SD High Capacity) between 2 GB and 32 GB (barely sufficient for video)
- **SDXC** (SD Extra Capacity) between 32 GB to 2 TB (best for video)
- **CF** and **CFast** currently between 2 GB to 256 GB.

■ SSDs

As capture resolution and bitrate options on cameras increase, creating larger and larger files, many people find themselves moving toward capturing video on external **solid state drives (SSDs)**. While not every camera can accommodate this, an external drive can store much more information than a memory card can (into the multiple terabytes). External drives can also record at compression rates higher than regular memory cards can handle (like Apple's Pro-Res 422 format, or uncompressed 10-bit video, or RAW).



■ **Figure 9-10** Memory cards, whether SDXC (left) or Compact Flash (right) are always clearly labeled with all the critical specs like: (a) storage capacity, (b) data transfer speed, and (c) Class Rating.

³ SD Association press release, Feb. 25, 2016. www.sdcard.org.

⁴ Commercial × Rating is based on multiples of 150 KB/sec., which was the data rate of the original CD-ROMS.



■ **Figure 9-11** Common video ports found on cameras usually include an HD-SDI (a) and SDI output and video output for monitoring (b), a HDMI port (c), and USB ports (d).

Video, Audio, Data-In and Out

While you will find a variety of **in/out (I/O)** connectors on camcorders for digital video—primarily out of the camera to an external device—there are four that are most common. On professional and mid-level camcorders you’ll usually find connections for **HDMI** (High-Definition Multimedia Interface) and **USB (2.0 and 3.0)**. These cables send digital data from the camera to a field monitor or to your editing system for logging and transfer. Ultra-high-end professional cameras also come equipped with **SDI/HD-SDI output (Serial Digital Interface)**, which uses the tried and true, locking **BNC connector (Figure 9-11)**. This interface can output uncompressed video (SD or HD) to a high-capacity hard drive (HHD) or solid-state (SSD) video recorder for recording footage as you shoot (depending on your camera), thus simultaneously creating a backup or bypassing the onboard record media all together. This is different from a standard **video out port** (also a BNC jack) which sends a composite analog signal usually for monitoring purposes only. It is essential for narrative film production that your camera offer some form of HD video out feed that is compatible with an external HD monitor. As I mentioned earlier, the tiny viewfinder and LCD viewscreens built into cameras are fine for composing shots on the fly, but they are insufficient for truly evaluating the nuances of lighting, exposure, color, and composition.

An added bonus to using external field monitors is that many

of them are equipped with multiple media bays which expands your recording options and capacity (see “Using Field Monitors” on page 284).

Even though we’ve fully entered the digital era, many cameras still have the standard analog **composite video and audio** outputs for viewing footage on a regular NTSC monitor or transferring to an analog format. On consumer and mid-level cameras, these line signal connectors are usually the standard **RCA plug**. The RCA plug is also used for audio **line signal** I/O, but on professional gear the sturdier and more secure **XLR connector** is used for both line audio and microphone audio (see Chapter 15). Every camera has its own audio and video I/O configuration; always check your camcorder’s specific hardware.

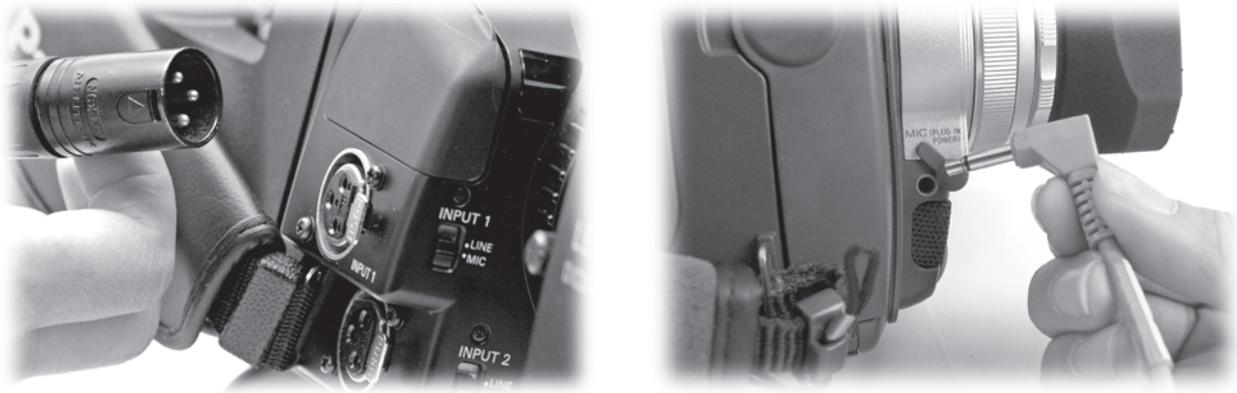
External Microphone Inputs

If you are shooting single system sound, you should know that many cameras (like DSLRs) are not equipped to record professional quality sound. This isn’t a huge obstacle because narrative film productions generally shoot double system sound. However, shooting single system is not unheard of. A critically important factor for single system sound filmmakers is the **external microphone input**.

All professional microphones use the three-pronged XLR connector. The advantages of this connector are a secure connection and balanced audio, which means that the cable is grounded and shielded from interference. Many consumer cameras and DSLRs, however, come with a $\frac{1}{8}$ ” mini plug connector for external microphone input. The primary shortcoming of this connector is its flimsiness. The mini plug easily breaks under the rigors of field production. The other shortcoming of the $\frac{1}{8}$ ” mini plug is that it is not a balanced audio connection and is highly susceptible to interference (**Figure 9-12**) (see Chapter 15).

DC Power

Video cameras run on DC power provided by **onboard batteries** or via an adaptor that transforms the AC power coming from the wall outlet into DC current. Despite the unlimited



■ **Figure 9-12** Cameras designed for film production usually come with XLR inputs for professional microphones (*left*), but consumer cameras and DSLRs often only have $\frac{1}{8}$ " connectors (*right*), which are prone to interference and offer poor quality.

in practice

■ COMMON AUDIO AND VIDEO CONNECTORS ON DV CAMERAS (FIGURE 9-13)

- a. $\frac{1}{8}$ " mini (line audio and microphone audio with adaptor)
- b. XLR (microphone audio and line audio if switchable)
- c. BNC (composite video [SDI] and uncompressed HD [HD-SDI])
- d. RCA (line audio and composite analog video)
- e. HDMI Type A (audio, video, and auxiliary data)
- f. HDMI Type C (audio, video, and auxiliary data)
- g. HDMI Type D (audio, video, and auxiliary data)
- h. Mini-B USB (audio, video, and auxiliary data)



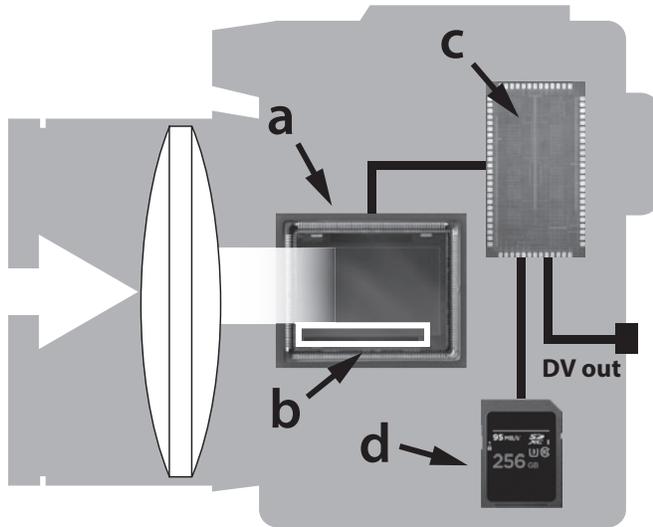
■ **Figure 9-13** Common connectors for video and audio production, and the types of signal they carry.



■ **Figure 9-14** Video cameras run on batteries available in a variety of sizes and power capacities.

power supply of an AC adaptor, most shooters only use batteries, preferring the freedom of not being tethered by a chord to the wall (**Figure 9-14**).

Modern batteries are typically lithium-ion, and they are rated in amp/hours. It is a very good idea to have a clear sense of how long the camera you are using can run on a particular



■ **Figure 9-15** The basic image path through a digital camera. Light enters the lens and creates an analog electronic exposure on the image sensor pixels (a), which is converted into a digital signal by an Analog/Digital Converter (b), and then sent to the Digital Signal Processor (c) for color encoding, compression, etc. The processed digital video signal is sent to the record media (d) and the DV-out ports for image display.



■ **Figure 9-16** You will find the camera image sensor, in this case a single CMOS sensor, directly behind the lens mount.

battery, and to have plenty of backup power. It's always a good idea to set up a **charging station** on location as part of your production protocol, and just keep rotating batteries from charger to camera and back to charger. It is worth mentioning that batteries don't hold their charge as long in extremes of heat and especially cold.

Finally, I just need to mention one detail that should be obvious but is all too often overlooked by novices; *Batteries need to be charged to work*—and it takes time to charge them. I have seen so many student shoots abandoned because no one remembered to charge the batteries, and it breaks my heart every time.

■ DIGITAL VIDEO CAMERA ESSENTIALS: INTERIOR

Video cameras essentially turn light into data. The major internal components that do this job are the image sensor, the analog-to-digital converter, and the digital signal processor. The best way to understand the interior workings of a basic video camera is to follow the progress of an image, which begins as light entering the lens and emerges as a stream of data recorded onto a memory card or hard drive (Figure 9-15).

The Image Sensor

Recording a video image begins with the lens gathering light from the scene and focusing it on the **image plane**. In video, this surface is the **image sensor** (also known as the **chip** or **imager**) (Figure 9-16). Each sensor is composed of hundreds of thousands to millions of tiny light-sensitive photodiodes, called **pixels** (short for **picture elements**) packed into discrete rows. When these pixels are struck by the incoming light, they register an electronic charge that corresponds to the light values (color, tone, intensity) hitting that particular spot on the sensor creating an **exposure**. In other words, the voltage that is created by the pixels is analogous to the light values in the scene before the camera, so at this point we have **analog** electronic information. The sensor then **reads-out** this electronic exposure, row by row, to an analog-to-digital converter (ADC; see page 211) which converts the electronic signal into digital data. Exactly how the sensor handles the electronic exposure and digital conversion is what distinguishes the two different sensor types that are commonly found in video cameras: the CMOS chip and the CCD chip.

The most common image sensor type found in today's video cameras is the **CMOS chip** (for complementary metal oxide semiconductor). In addition to housing a **micro lens** (over a Bayer color pattern layer; see page 210) to focus light onto the light-sensitive **photodiode**, every CMOS pixel also contains a sampling capacitor, an amplifying transistor, and all of the readout timing circuitry necessary for converting light energy into an amplified electronic signal (Figure 9-17). CMOS sensors use a **rolling shutter** approach to exposure and readout, which means that they *expose and read out* one horizontal row of pixels at a time (row by row, top to bottom, according to the system's scanning pattern) eventually creating

the complete frame. As each row of electronic information is read out, it is quickly digitized by an array of multiple ADCs on the chip itself; in high speed chips there is one ADC dedicated to each column of pixels. After the last pixel row in the frame is exposed and read out, the process to build the next frame, line by line, begins again from the top of the frame (see page 187 and **Fig. 8-5**).

The CMOS rolling shutter is fast and energy efficient, however, it is also responsible for several characteristic image artifacts, most famously the “jello” artifact (also called **skew**), which occurs when there is quick horizontal movement in the frame, especially fast panning. Given the slight time delay between the exposure/readout from one row to the next, it is possible for the top part of an image to be registered in one area of the frame, the middle scanned slightly later, and the bottom part registered even later still (**Figure 9-18**). The result is that during quick camera panning, vertical lines can appear slanted and complex movement produces a wobbly, jello undulation in objects that should be stationary. Given the regular improvements in CMOS technology for video, most of these artifacts are rarely evident with higher end cameras where the sensor was designed specifically for motion pictures rather than for still photography, however, they may still be seen with DSLRs and consumer grade cameras.

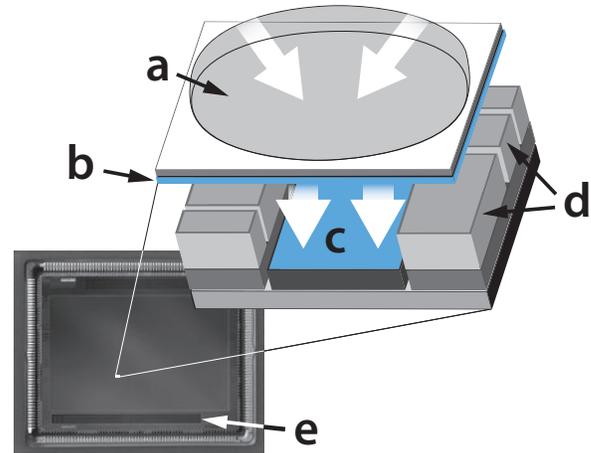
The **CCD chip** (or **charged coupled device**) handles exposures and readout differently. A CCD chip employs a **global shutter**, meaning all the pixels are exposed to light at the same moment and register a complete image in that instant. This complete image is held and read out row by row, top to bottom, according to the system’s scanning pattern. Then all the electronic (analog) information for the complete frame is sent to an amplifier, followed by a single, off chip, ADC for conversion to digital data. The CCD then registers another complete frame and repeats the process again and again at your chosen frame rate. Although CCDs are immune to the jello effect, they have their own peculiar artifacts, most notably the **vertical smear**, where bright points of light smear vertically across the image.

While CCD chips were once the ubiquitous video standard, we are seeing an overall shift to CMOS technology because it is an inherently digital device, while a CCD chip is essentially an analog device. This means that, despite the rolling shutter artifacts, a CMOS chip consumes less power than a CCD chip, and they read out and digitize much faster, which in turn allows for faster frame rates.

Color Separation

All sensor pixels register brightness values (light to dark), but they cannot register all color values simultaneously. In order for a camera to render a color image, the incoming light must be first broken up into its **three primary colors (red, green, and blue)** and then distributed to individual pixels for exposure. There are two different methods for doing this depending on whether your camera utilizes three sensor chips or one large sensor.

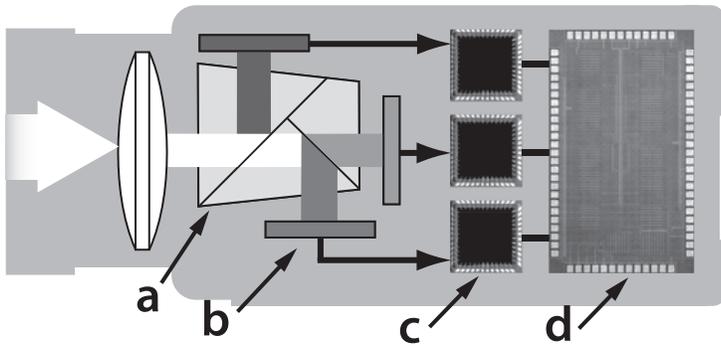
In **three-chip cameras** (3 CCD and 3MOS cameras) the incoming light from the lens first passes through a **dichroic prism block** located right behind the lens. The prism splits the image into the three primary colors (R, G, B) sending one color to each sensor to



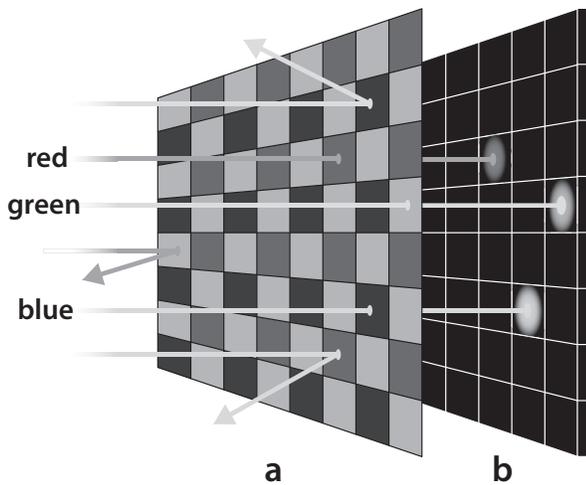
■ **Figure 9-17** The surface of a CMOS chip is coated with millions of pixels. Every single pixel contains a micro lens (a) over the Bayer color filter layer (b) that focuses filtered light onto a photodiode (c). Every pixel also has the transistor circuitry necessary to convert that light energy into an amplified electronic signal (d) which is sent to an on-chip analog-to-digital converter (e) to create the digital image readout.



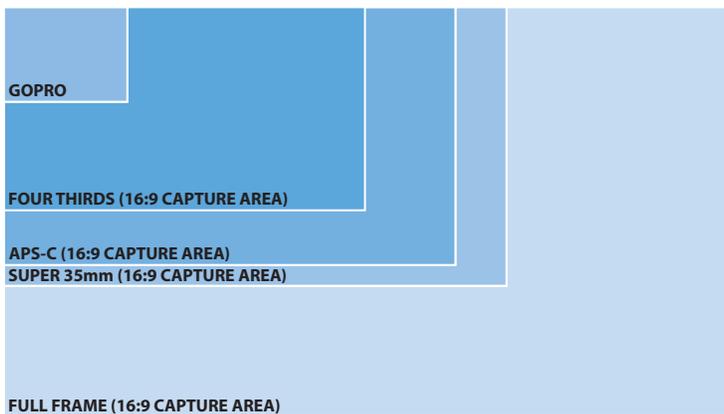
■ **Figure 9-18** Many artifacts of a CMOS global shutter, like skew, are caused by the slight time delay when scanning a full frame from top to bottom. Notice in this image that the Frisbee is still in the thrower’s hand in the top area of the frame, but the shadow on the ground shows that the Frisbee has been launched.



■ **Figure 9-19** A three-chip video camera divides the light into primary colors with a prism block (a), which are read by three sensors (b), their signal outputs are converted into digital data by dedicated off chip ADCs (c), and then processed by the DSP (d) which integrates the R, G, B signals. See the color insert.



■ **Figure 9-20** A Bayer Pattern Filter (a) separates the light falling onto a sensor into the three primary colors in a mosaic pattern. This assures that each pixel on the sensor registers only one color (b). The separated colors are later merged by the Digital Signal Processor in a process called demosaicing, to create the full color image. See the color insert.



■ **Figure 9-21** Image sensors come in a variety of sizes. Above is a comparison of the capture area of some common CMOS sizes for digital video.

produce a discrete video signal for each color. These three images—identical except for their color—are then later merged in the Digital Signal Processor (see later) to create the full color image (**Figure 9-19**). Three-chip cameras were once the professional norm, however this system requires the use of relatively small sized sensors (e.g. $\frac{1}{3}$ " , $\frac{1}{2}$ " , $\frac{2}{3}$ ") which proves limiting in other visual respects. This is one reason that large, single CMOS cameras are replacing the three-chip camcorder—but how do we separate light into its primary colors with a single sensor?

Large format, single CMOS chip cameras incorporate a Bayer Pattern Filter sandwiched between the microlens layer of the pixels and the photodiode/circuitry layer.⁵ The **Bayer Pattern Filter** is an array of red, green, and blue filters that ensures each pixel register only one primary color along with its brightness information. This divides the pixels across the sensor into a mosaic of red, green, and blue image components (**Figure 9-20**). These separated colors are later merged in the Digital Signal Processor (see later) in a process called **demosaicing** (or **de-Bayering**) to create the full color image. The demosaicing algorithm used to recombine the discrete colors of each pixel is complex, and relies on the interpolation of color information from each pixel with its neighboring pixels—and intrepid students can pursue further detail on this topic through their own research.

Sensor Size

Image sensors come in a variety of sizes. Some of the more common CMOS sizes for HD video are (from large to small): 35mm Full Frame (36 × 24mm), Super 35 (24.9 × 18.7mm), APS-C (23.5 × 15.6mm), and Micro Four Thirds (17.3 × 13mm). Many HD camcorders employ the even smaller $\frac{2}{3}$ " (9.6 × 5.4mm) or $\frac{1}{2}$ " (7 × 3.9mm) sensors. Extremely small video recording devices, like action cams or smartphones, have sensors that are smaller still; the GoPro Hero4, for example, has a $\frac{1}{2.3}$ " sensor (6.17 × 4.55mm) and the iPhone 6 uses a $\frac{1}{3}$ " sensor (4.8 × 3.6mm) (**Figure 9-21**).

So, you may be wondering what the difference is between, say, the Sony FS7 shooting UHD 4K with a large Super 35mm sensor and

⁵ FYI. The entire assembly of filter, microlens, pixel circuitry, and photodiode is sometimes referred to as a "photosite."

the GoPro Hero4 shooting UHD 4K with its tiny $1\frac{2}{3}$ " sensor. Same resolution right? Well, in the world of video sensors, size is important. While both sensors are capable of capturing video at 3840×2160 pixels resolution, the smaller sensor must pack those rows together so tightly that the pixels themselves are minuscule. The larger Super 35mm sensor enjoys more real estate to use larger pixels. This concept is known as **pixel density**. More room on the chip allows for larger pixels, which in turn allows each pixel to capture and process more light information for a better image. This means that larger sensors can deliver better performance in low-light situations, better color depth rendition, a wider dynamic range, and all with less video noise.

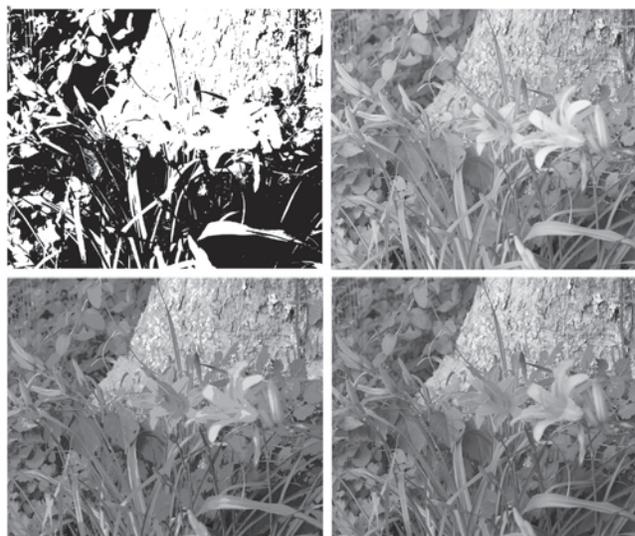
Sensor size also has a huge impact on lens perspective, crop factor, and depth of field, which are vitally important visual aesthetic attributes for the narrative filmmaker; I discuss these issues in detail beginning on page 234.

Analog-to-Digital Converter

As I mentioned earlier, the voltage readout from the pixel rows must be converted into digital data and this is done by the **analog-to-digital converter (ADC)**. A CCD sensor utilizes a single off-chip ADC and a CMOS sensor has an array of ADCs on-chip, but this conversion is inherent to both types of sensors. Let's take a closer look at what happens in this process because it has an important impact on the quality of the image that a camera system is capable of capturing.

The process of transforming analog information into digital data is called **quantizing** and requires the ADC to regularly **sample** the constantly flowing stream of voltage information from each pixel to ascribe discrete digital values (a series of 1s and 0s).⁶ The more times the ADC samples the analog information, the better the image reproduction will be. Video sample rates are typically about 50 million samples per second, but in spec terms, they are referred to by their bit depth. **Bit depth** (aka color depth) tells us the amount of visual detail that is sampled from each pixel to reproduce an image. The more bits, the larger the sample size (in bits/sample) and the smoother and deeper your color rendering and image detail will be. With insufficient bit depth you will see artifacts like **blocking** and **banding** where subtle distinctions between shades cannot be rendered. The current, baseline standard bit depth for video is **8-bit** which means that the system offers 2 to the power of 8 values for each primary color—red, green, and blue. 2^8 values equals 256 values per color channel, so that means $256 \text{ R} \times 256 \text{ G} \times 256 \text{ B}$ (16.7 million total possible colors). Beyond this, there are camera systems that are capable of 10-bit (2^{10} or 1,024 values for each color, which equals a billion + possible colors), 12-bit (4,096 values per color), or even 14-bit sampling depth (16,383 values per color, for many billions of total colors)—each one allows for more precise and complex rendering of colors, shades, and detail (**Figure 9-22**).

After conversion, the ADC outputs massive files of raw image data. **RAW video** (as it is called) is *all* of the digitized visual information direct from the sensor; these are files that have not yet gone through the complex processing necessary to convert it into a viewable video image. Some cameras will output RAW video to external



■ **Figure 9-22** Bit depth is an important aspect of digital image quality. A 2-bit black-and-white image (top-L); a 4-bit image with 16 values of gray (top-R); an 8-bit image with 256 values per color (bottom-L); and a 14-bit image with 16 thousand colors per channel (bottom-R). See the color insert.

⁶ Digital audio recording also requires ADCs to convert analog electronic signals into digital data. We look at the sound recorder ADC and sampling for audio on page 372.

hard drives as part of high-end workflows (see the box on page 216), but usually this data is sent to a processor for demosaicing and transcoding into a true video signal.

The Digital Signal Processor

Once the ADCs have sampled the analog signal from the image sensor and crunched the numbers, the raw digital video data is sent to the **digital signal processor (DSP)** to create the final, digital video image. The DSP is the most complex part of the entire system and works with algorithms specific to the camera's format (AVCHD, XDCAM HD, Sony XAVC, Canon XF, REDCODE, etc.). Primarily, the DSP combines the three sets of image information (RGB) from the ADCs, in a process known as **demosaicing**, and determines the brightness and color value of every pixel in every frame of video to create the full color image (along with incorporating the audio signal).

After combining the three color channels, we now have **uncompressed video**; it's a true video signal, but it contains an enormous amount of data; uncompressed 1080p HD video generates around 158 MB/sec—that's 556 gigabytes/hr. At that rate we would fill up a 64 GB memory card in about six minutes! Some cameras can output uncompressed video to external hard drives as part of an alternative workflow because it can be advantageous for certain postproduction processes (see box on page 216); but for most applications, this is simply too much data to move around and store on memory cards, especially considering that much of that data is not even necessary to create an exceptional image. So when processing raw video information, the DSP will also reduce the amount of data it sends to the record media by using highly complex, format-specific algorithms to reduce data in two ways, **compression** and **color depth sampling**, and both have a significant impact on image quality.

Compression and Codecs

The critical juggling act of all video formats is how to reduce the size of visual data while maintaining as much quality as possible. **Compression** is the method of reducing the amount of data by discarding visual detail that is either redundant or imperceptible to the human eye. If you compress too much, the image quality suffers, if you don't compress enough, the files are too big and too slow to work with. Compression schemes use several approaches to shrinking file size, and the amount of data remaining can be surprisingly small. For HD video, the uncompressed file can be as much as 20 times bigger than the compressed file. In other words, the picture information is reduced to just 5% of its original amount, yet the image still looks surprisingly good. How is this accomplished?

The data compression algorithms that perform these tasks are called **codecs** (for compressor/decompressor). There are multiple **standard codecs** in the world of digital video—like MPEG-2, MPEG-4, H.264, VC-3—with new ones being introduced regularly for video capture, editing, and delivery—like GoPro's VC-5 codec that was standardized in 2014. However, when we talk about video camera encoding (capture codecs), each manufacturer relies on a **proprietary codec** (i.e., branded codec). A proprietary codec is unique to the functioning of a particular camera format, however it is still based on, and compatible with, one of the standard codecs. Think of them as variants of the standard codecs, but optimized for the specific way a particular camera system captures and records video. For example, Panasonic's format, the AVC-Intra codec, is based on the H.264/MPEG-4 AVC standard (the codec used in Blu-ray). Sony uses the XDCam codec, based on MPEG-2 4:2:2, and RED camera system uses its own REDCODE codec, which is a variant of JPEG2000. To make matters even more confusing, Panasonic and Sony collaborated on the AVCHD format, which uses standard H.264/MPEG-4 compression (other camera manufacturers like JVC also use this technology). As you can imagine, there is constant negotiation with the most popular editing systems (i.e., Premiere Pro, Avid, and Final Cut Pro) to support these compression schemes, which, thankfully, they usually do (see pages 447–448).

Recording formats and their proprietary codecs are numerous and constantly changing, so rather than look at them specifically, we will look at the essential principles of compression,

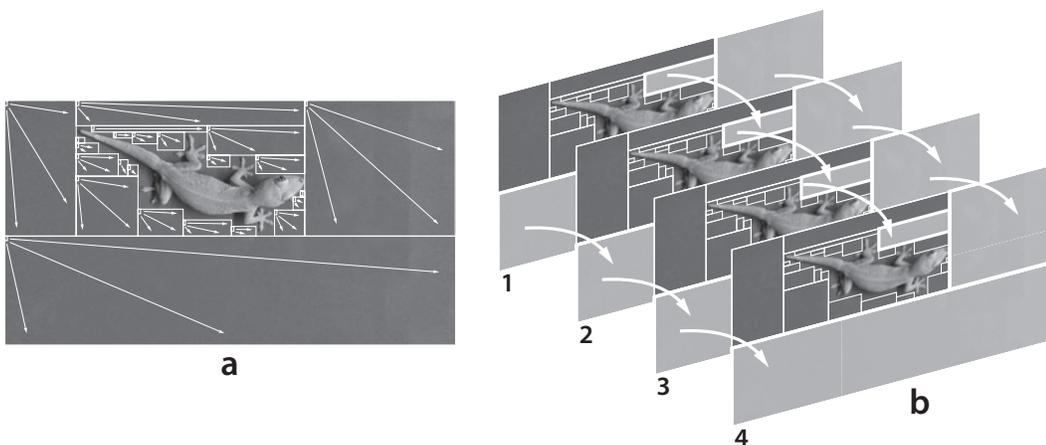
especially as they pertain to image quality. Understanding some basics about compression is important because it has a bearing on your workflow and what viewers will see on the screen.

Spatial and Temporal Compression

One priority for compression algorithms is to remove redundant information. **Redundant information** is the data for visual details that are identical and repeated, from pixel to pixel across a single frame, and from frame to frame. In video there is a lot of redundant color and brightness information. For example, say we have a shot of a yellow lizard crawling across a blue wall, and most of the image is much the same, a blue wall. The pixels along the path of the lizard change from blue to yellow as the lizard passes, but the rest of the frame remains exactly the same frame after frame—blue. In this shot a codec can remove redundant information within the frame and also between frames over time.

One level of compression, called **spatial compression**, happens within the individual frame (which is why it's also referred to as **intra-frame** compression). Within each frame, a codec will detect and create **spatial blocks** in areas that have identical color values—like the blue wall. Rather than record a unique value for every single pixel in those areas, the codec will record one value which will be shared throughout that block and toss the rest of the data away; greatly reducing visual data. Then, for viewing, when the codec **decompresses** the image it distributes that one value throughout the spatial block where the color values are identical (**Figure 9-23 left**).

Temporal compression is another level of compression that happens over time, from frame to frame to frame (which is why it's also referred to as **inter-frame** compression). Most of the lizard frame doesn't change at all over time, and it would take a great deal of unnecessary space to re-record all of the common and repeated luminance and chrominance values for every pixel in every frame of video running at 30 fps. If we shot our blue wall and yellow lizard in 1080 HD video (1920 × 1080) we would need to re-record the same numeric value for “blue” 2,073,600 times for every frame (minus the few yellow lizard pixels). The codec, instead, reduces all of this common information to a smaller file size by recording the numeric value for “blue” once and then indicating that those same pixels in each subsequent frame (except for the lizard pixels) is “just like that first one.” In other words, the codec saves only the information that has changed from one frame to the next, and tosses the rest of the data out. Later, when we play back



■ **Figure 9-23** Spatial compression (*left*) identifies blocks within a frame that contain identical color information and will record only one pixel's color value to share across the block while tossing out the redundant visual data. Temporal compression (*right*) will record the color values of the first frame in a shot, and will then duplicate that data across subsequent frames in areas that do not change, allowing the codec to eliminate redundant information that is repeated frame, after frame, after frame. See the color insert.

that image, the codec **decompresses** that information and reconstructs the image by duplicating the data of the first frame for the unchanged areas of subsequent frames (the blue wall that never changes) (**Figure 9-23 right**). Spatial and temporal compression can work so well that the compressed image is very hard to tell from the uncompressed source image.

VBR and CBR

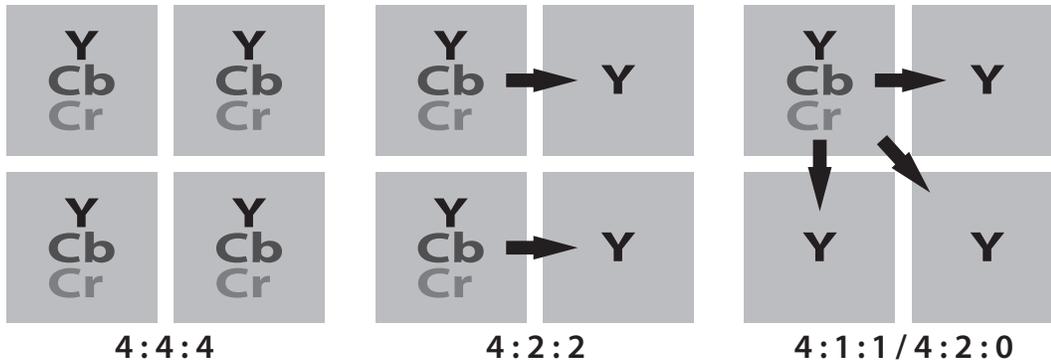
Another key distinction among compression schemes is VBR versus CBR. Many compression types, including MPEG-2, are **variable bit rate (VBR)**. VBR codecs compress less when there is more movement or color shifting from frame to frame than when the image is more static; less compression for the moving lizard and more compression for the static blue wall. Others, like Apple ProRes 422, are **constant bit rate (CBR)**, meaning that they compress the image the same amount regardless of the content. VBR works very well for shooting and display, but it creates problems for editing systems because they prefer CBR data. Some edit systems can handle variable bit rate data better than others, but don't be surprised if you end up needing to transcode your VBR footage to a format more suitable for editing.

Chroma Subsampling

The video image has two components: **luminance** is the element that determines brightness (shades of black and white), and **chrominance** (or **chroma**) is the color component of the video signal. Chrominance is made up of **hue** (tint of a particular color) and **saturation** (the intensity of the color). An accurate color blend is created by mixing the chrominance information for the three primary colors (R, G, B) with the brightness information. Every single pixel on the sensor contains information for both color and brightness and as you may recall from our discussion on bit depth earlier, the sensor is sending data for millions or even billions of possible colors and shades to the DSP. But the truth is, much of this visual information cannot even be perceived by the human eye. So why move and store visual data if people can't even see it? Chroma subsampling is one way compression algorithms save space by eliminating color data that may not even be perceptible.

Chroma subsampling is a DSP function that determines how much color information is actually sampled and saved in order to reduce video file size. Chroma sampling is accomplished by looking at and averaging out the luminance and chrominance of blocks of four pixels at a time, rather than every single pixel. Given that the human eye is capable of perceiving very subtle variations in brightness shades but relatively fewer shifts in color tonalities, codecs sample the complete luminance information in all four pixels, but it will save much less chroma information (depending on the sampling level). Chroma subsampling levels are expressed as a ratio of luminance sampling (Y)–to blue sampling (Cb)–to red sampling (Cr). The information for green is not sampled because it can be interpolated given the data for luminance, blue, and red.

The most common chroma sampling ratios you'll see are 4:4:4, 4:2:2, 4:1:1, and 4:2:0. A full sample is represented with the integer 4, so a color sampling ratio of **4:4:4** indicates that all luminance data, all blue, and all red colors are sampled equally and fully. In fact, 4:4:4 means that no compression is happening—uncompressed color. You'll see 4:4:4 used in high-end 4K production cameras. More common for HD video is the sampling ratio **4:2:2** which means that all the luminance information is being sampled in every pixel, but only the color component for two pixels in the block of four are being sampled. Even though a significant amount of chroma information is discarded, 4:2:2 still creates a very sharp and nuanced video image. The chroma sampling ratio of **4:1:1** reduces file size even more substantially. 4:1:1 means that all four pixels are sampled for luminance, but the chrominance information of only one pixel is sampled for the entire block (**Figure 9-24**). The resulting image, even after losing three-quarters of the color information, is still surprisingly good. Finally, you will also see the subsampling ratio of **4:2:0**. This is very similar to 4:1:1 in that chroma information is sampled only once per four pixels, but it uses a very complex, line-by-line alternating sample pattern that improves the image quality over 4:1:1.

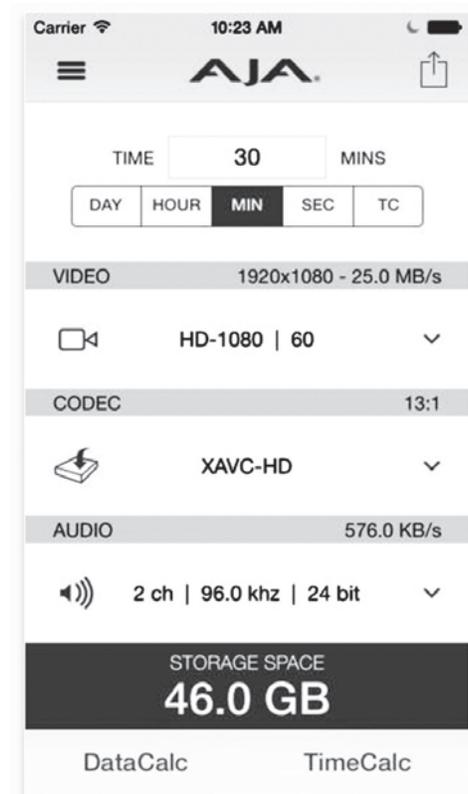


■ **Figure 9-24** Chroma subsampling compression reduces data by sampling blue (Cb) and red (Cr) information in only two pixels (4:2:2) or only one pixel (4:1:1) and sharing that information across the block of four pixels. Luminance information (Y) for every pixel is always sampled. 4:4:4 indicates that the color information is not being compressed.

The chroma subsampling scheme you use depends, of course, on the capabilities of your camera and the amount of storage space you have. In general, narrative filmmakers try to capture as much color detail as possible because this will give you flexibility for color grading and effects in postproduction. If you plan on any digital effects, especially green screen key effects (see page 458) then you should try to shoot 4:4:4 if possible and no less than 4:2:2. This is because convincing key effects rely on a very sharp and precise line of distinction between the key color (green screen) and the non-key areas of the frame. With lower sampling rates this “key edge” can become murky with interpolated pixel colors. That said, for regular live action HD projects 4:2:2 is perfectly fine. And while 4:1:1 and 4:2:0 save storage space and work well for projects destined for online streaming, if you plan to project, broadcast, or display your project on hi-res monitors, it’s best not to use these ratios.

Data Rate

As you can see, in the process of capturing a video image, there’s a lot of data moving around—being generated, converted, sampled, compressed, and recorded. And one critical measure of that visual information that you’ll need to remain aware of is the data rate. **Data rate** (aka **bit rate**) represents the processing, movement, and recording flow of digital information from the DSP to the record bay. Data rate is expressed as a bit rate per second, or more accurately, as Megabits per second (Mbps). This, of course, is one indication of quality—the more data flow per second means more visual information per second will be recorded, and therefore higher quality. Data rate also determines the required write speed for your record media and the amount of storage space you’ll need for your project (in production and post-production). Data rates are determined by a number of factors including your shooting format of HD, UHD, D-Cinema; the resolution (720, 1080, 2K, 4K); the frame rate (60i, 24p, 60p); and the specific compression factors of the codec (DVCPRO-HD, XDCAM-HD, AVCHD, H.264, ProRes 422, RAW, and so on). It’s a very good thing that **data rate calculators** that include virtually every shooting format and codec available are easy to find for free. Some free data calculators can be used online⁷ and others are apps that can be download (**Figure 9-25**). Data rate calculators give you a good idea of the minimum necessary write speed performance for your memory cards, and how big the files you accumulate will be, so that you can make the best choice for your budget and workflow. And, one word of caution, don’t get bit rate (data rate) mixed up with bit depth (page 211); they are quite different.



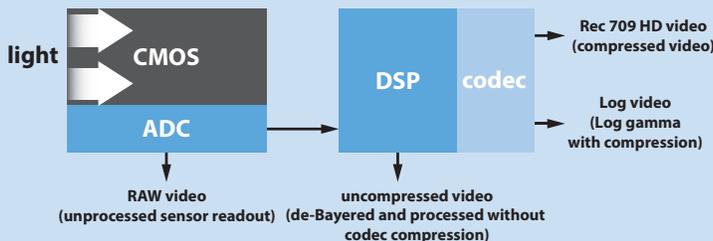
■ **Figure 9-25** Media data rate calculators, like this free one for iPhone from AJA Systems, are a handy tool for calculating memory card and data storage needs.

⁷ Digital Rebellion offers an online data rate calculator at www.digitalrebellion.com/webapps/videocalc

■ RAW, UNCOMPRESSED, AND LOG: WHAT'S THE DIFFERENCE?

Over the last few years there has been a lot of discussion about RAW, uncompressed, and Log video workflows; unfortunately, because many folks use the terms “RAW” and “uncompressed” very loosely, there has been a lot of confusion as well. Hopefully, we can get a clearer picture if we look at the essential properties for each format one at a time.

In this chapter we've looked in detail at how a standard HD video image is formed: (1) light reflects off a scene and enters the lens and; (2) strikes the sensor pixels creating an analog signal which is then; (3) converted into digital information by the ADC and is then; (4) processed into a video signal by the DSP, which integrates color signals, applies codecs to sample color information, incorporates camera settings (e.g., frame rate, white balance, gamma, ISO, etc.) and compresses the image file size and finally; (5) the video signal is sent out for monitoring and recording. But some cameras offer significant workflow alternatives that include RAW, uncompressed, or Log recording (Figure 9-26). Keep in mind that not all cameras have these options so you'll need to check the capabilities of your available gear.



■ **Figure 9-26** RAW, uncompressed, and Log footage are output from the camera at different stages. RAW footage comes directly from the ADC and is not yet a fully formed video signal, uncompressed video is output from the DSP but has not undergone any codec compression, and Log footage emerges from the DSP as a complete and compressed video signal, but with a flat gamma profile.

RAW Video

RAW video footage is *all* the image data recorded directly from the image sensor; after digital conversion but before it has been processed and compressed by the DSP. What is recorded is the raw Bayer pattern data readout, even before demosaicing, therefore the files are not viewable as-is, you must use conversion software in postproduction (like Arriraw converter, Rawanizer, Rawmagic and so on) to transcode the RAW data into video in order to view it and edit with it. What you have with RAW footage, how-

ever, is *all* the color and exposure information (4:4:4) and resolution detail before compression, chroma subsampling, and video processing. Depending on the camera manufacturer, RAW video files can be recorded totally uncompressed, or they may have a small degree of compression applied to help manage file sizes somewhat—but remember, with the RAW format we're talking about (un)compressed raw data, not (un)compressed video. The principle benefits of RAW files are that they can be converted into a wide range of compressed and/or uncompressed formats (like DPX) and they can encompass a variety of expanded or customized color schemes since camera settings like white balance and gamma response have not yet been “baked in” to the image. All this extra information makes RAW files extremely malleable for visual effects, exposure correction, and color grading. However, without compression, you encounter a massive recording data rate and end up with gigantic video files that contain loads of unnecessary data that must be moved and stored, so the RAW workflow invariably requires recording to very fast, large capacity external drives and creating smaller, compressed, **proxy files** (compressed video files that are replicas of the original uncompressed footage) for editing.⁸ RAW video is a standard workflow at the ultra-high-end of production, but for many student and independent applications it is unnecessarily cumbersome.

Uncompressed Video

Uncompressed video is a signal that has been through the DSP process of interpolating the image data into a genuine video signal (including demosaicing, frame rate, and other camera settings) but is outputted *before* it goes through the compression process. Cameras that offer an uncompressed video output option will usually send it out via an HDMI or SDI connector. Uncompressed video is used for the same reasons as RAW footage, for its extreme flexibility in postproduction color grading and visual effects. And like RAW footage, the data rate and files are extremely large, so one must invariably use an external record drive for media storage and create smaller proxy files for efficient editing. However, uncompressed video is true video so it is viewable without transcoding.

⁸ Proxy files commonly employ the compression codecs Apple ProRes or DNxHR (Avid). Some ultra-high-end cameras, like the Sony F55, will simultaneously record 4K RAW to external hard drives and compressed proxies to memory cards.

Log Video

Log video (short for **logarithmic encoded gamma**) is technically a very different animal from RAW and uncompressed, but it is often confused with the other two because the objective is the same—to produce footage that has greater latitude for postproduction color grading and exposure manipulation than standard HD footage. While Log video basically serves the same purpose as RAW and uncompressed, it achieves it with a greatly reduced data rate and much smaller files. Log video goes through the video process fairly normally: from the sensor, to the ADC, to the DSP for the video processing and compression. However, it's the color encoding process that distinguishes the Log video format. As we discussed on page 194, standard HD video is encoded and recorded in the REC 709 color space (gamma). This gamma setting limits both luminance (dynamic range) and chrominance in order to produce an acceptably faithful image when viewed on a standard HD display. However, all video sensors are capable of rendering much more visual information than represented by REC 709, and **Log gamma encoding** is designed to record as much of the available color and luminance response of the sensor as possible, especially in the highlights and shadows. The benefits to shooting Log over standard HD are similar to RAW. The Log format results in greater exposure latitude for the cinematographer, and generates footage that has much more visual flexibility for color grading, allowing the filmmaker to dial in very precise looks (contrast, color hue, and saturation and so on). However, by having gone through codec compression the Log format data rate and file size are greatly reduced, compared to RAW and uncompressed video. The downside to Log is that recording the broadest possible range of color and exposure values actually produces an initial image that has a “flat color profile” meaning that it appears dull and gray—but this is not your final image. The Log format workflow *requires* that you do extensive color grading in postproduction to achieve an acceptable image, or that you apply a small piece of software called a LUT to the image (Figure 9-27). A **LUT** (short for



■ **Figure 9-27** The flat gamma profile of the Log format makes the original footage appear dull and gray (*bottom*) but with color grading, or the application of a LUT, the Log format will yield improved color opportunities over standard HD Rec. 709. See the color Insert.

Look-Up Table) is simply a collection of customized color calibration instructions that are downloaded into your camera or field monitor (and editing software), and applied to the footage so that you can see a more accurate representation of the image. A LUT simply modifies the look of the image, it does not change what is being recorded. Basic LUTs are often built into hardware (cameras and monitors) or you can download specialized LUTs that emulate specific film emulsions or distinct visual looks, or you can generate LUTs of your own by shooting test footage and saving your color grading settings into a LUT before production begins. We discuss this process in much more detail in Chapters 14 and 24.

Keep in mind, there are a number of different Log formats that are proprietary to the camera manufacturer. There is S-Log (Sony), V-Log (Panasonic), Canon Log, REDLog, and Log-C (Arri), but the principle is the same even if each has a slightly different technical approach. Shooting in the Log format is a very popular option for independent filmmakers and once you become familiar with this workflow, you'll find that it can be an extremely powerful creative visual tool.⁹

⁹ It is also possible to have uncompressed Log (depending on the camera) but this is fairly unusual and not necessary for most student and short film applications.

CAMERA SETTINGS

The contemporary HD digital camera (even the DSLR incarnations) can offer a bewildering number of image and format settings, and scanning through the details in a camera manual often adds to the sense of being overwhelmed by options. In this section I'll highlight some of the essential camera settings you'll need to locate and control to assure that you produce the images your film requires both technically and aesthetically.

Many camera settings, functions, and options are found embedded inside menus and sub-menus that are viewed on the LCD viewscreen. DSLR cameras in particular are notorious for requiring users to navigate multi-layered menus to access even basic settings. Inevitably, you must consult your camera's manual to find out how to navigate your camera's menus and control the functions you require on your shoot, and you should do this *long* before you get on the set. With shooting options rapidly multiplying, camera function menus are getting longer and more labyrinthine with each generation, so this is critical pre-production research. Cameras intended specifically for filmmaking will place commonly used functions as switches, buttons, or wheels on the outside of the camera body for convenience.

The most important camera settings that you'll need to access and set manually break down into two categories: *format settings* and *image control settings*. It's not the purpose of this chapter to explain every setting and their many options in detail, but I have indicated where in this book you can find more information.

Format Settings

Format settings are located in a camera's set-up menu and they include all of the basic components of your core image acquisition format including *resolution* (HD, UHD, 2K, or 4K); *aspect ratio* (4:3, 16:9, or 1.85:1) and *frame rate* (60i, 30p, 60p, or 24p). These settings are absolutely critical because they represent the foundation for your project's technical workflow and it is quite rare that they change over the course of a single project (see Chapter 8 for details). The one setting in this cluster that might change on occasion, particularly for special effects, is the frame rate setting. Faster frame rates will create slow motion and slower frame rates will create fast motion (see box on page 191). Beyond this, the format settings usually remain consistent. Students using collective equipment must pay particular attention to re-setting the camera's recording format as one never knows what the group before may have chosen and left active.

Image Control Settings

Image control settings are used to alter the look of the video image. Some of these are of the set-it-and-forget-it variety, while others change frequently over the course of a project. The settings that change frequently are often found on the body of the camera as buttons or switches for the sake of convenience (**Figure 9-28**).

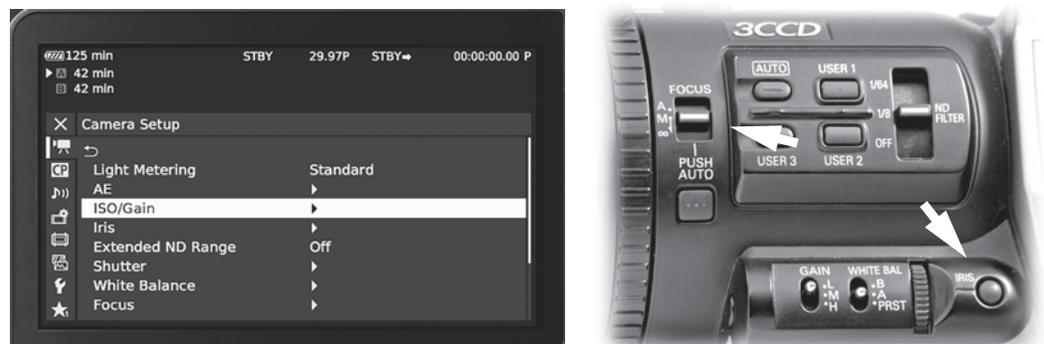


Figure 9-28 Some video camera functions are embedded inside menus accessible on the LCD screen (*left*), while other, more commonly used features (like the manual overrides for focus and iris) are found on the camera's body (*right*).

- White Balance:** For your sensor to reproduce colors accurately, you must take care to **white balance** your camera each time you change location or lighting conditions. White balancing means adjusting the sensor's color circuitry to match the color temperature of the light source. On nearly every video camera there are two easily accessible color temperature presets, one for daylight color temperature (5,600 K) and one for tungsten light (3,200 K). In addition, many cameras provide a way to manually set your white balance, which is more accurate than a factory preset (Figure 9-29). Unfortunately, many DSLRs do not have an easy way to white balance, and you will likely have to enter the camera function menu system to access a manual white balance control. Refer to page 293 for details on color temperature and white balancing procedures.



Figure 9-29 All video cameras have a way to balance the image sensor to a variety of color temperatures. For manual white balancing you must first switch off the auto white balance function (a). A user can manually set color temperature balance for each scene (b) or recall daylight and tungsten presets (c).

- Gain and ISO:** **Gain** is a setting that determines the degree of the electronic amplification of the video signal coming from the image sensor. Many cameras offer three preset gain settings: **0dB** for no gain, **9dB** for medium gain, and **18dB** for high gain. The 0dB setting represents the native sensitivity of the CMOS or CCD chip, and the more gain you employ, the more you increase its sensitivity light—or more precisely, the more you electronically boost the output of the sensor. Gain can be a helpful tool for shooting in low-light situations, but as an exposure control, gain is a very blunt instrument that comes with severe consequences. Increasing gain indeed brightens the image but it also boosts electronic aberrations that compromise resolution, introduce video noise, and reveal unwanted artifacts. Cameras with small image sensors are particularly sensitive to the adverse effects of gain and image quality. Cameras with large format sensors, like full frame (35mm), can handle gain much better because of their larger and more responsive pixels. However, on these cameras, like DSLR and professional camcorders, the three-stage gain settings are often replaced with something much more refined, ISO settings.

ISO settings are essentially the same as gain, but reflect the old ISO film speed ratings and thereby offer smaller and more precise increments for boosting the video signal. A camera can have dozens of different settings between ISO 100 (low gain) and 10,000+ (high gain). However, as with any type of video gain, adding a high level will result in a noisy image no matter your sensor size. Every camera has a **native ISO** setting, which is the true sensitivity of the image sensor (every other setting is an electronic boosting or reducing of its true sensitivity). Most cameras designed for film production have a native ISO that falls between 650 and 1,200, and often you'll see in settings menus that the native ISO is indicated by a pair of brackets, like this **[850]** to determine the precise setting. It's usually recommended that you shoot at the camera's native ISO for best and consistent results, and only change ISO when circumstances call for it—like unavoidably low-light locations (see Chapter 12 for more on ISO and exposure).

- ND Filters:** Another option for controlling exposure is the **neutral density (ND)** filter. This is simply a gray filter that cuts the amount of light passing through the lens when shooting in over bright situations. The advantage of using an ND filter is that it allows you to alter exposure without changing your f-stop, something you might want to do to maintain a narrow depth of field, for example. ND filters are mounted internally but employed with an external switch. However, DSLRs require that you mount an external filter in front of the lens. For more on ND filters, see Chapter 13.
- Shutter Speed:** **Shutter speed** determines the amount of time a video sensor is exposed to light for each frame. The standard exposure time is half that of the frame rate. So for 30 fps video the shutter speed is 1/60th of a second and for 24p video it is 1/48th of a second. Unless you have a good reason for changing your shutter

speed, it's best to simply check it and leave it alone. However, in the dreaded auto mode, many cameras (especially DSLRs) will compensate for added light by changing the shutter speed to shorter amounts of time like 1/100th or even 1/1000th of a second. The problem with this is that the camera will appear to “stop” motion, giving moving objects and people a jerky look as they cross the screen. While this may be useful in certain applications, such as creating smooth slow motion effects, in general it is undesirable, as the blur of moving objects filmed at 1/60th or 1/48th of a second appears much more natural to the human eye.

- **Picture Settings and Gamma Presets:** All HD cameras shoot and record standard HD Rec. 709 video by default, but this doesn't mean we're stuck with this rather generic representation of color, luminance, and contrast. Embedded in **picture menus** (or **scene menus**) are adjustment options for color space, dynamic range, knee, color matrix, saturation and so on. This allows you to customize the look of the image and save your various adjustments as a **custom scene file** (or **custom profile**) for use throughout a project's production period. The picture adjustments in this type of scene file are “baked in” to the image, meaning they are a fully integrated and permanent part of the recorded image. But beware; it requires someone who really knows what they're doing to mess with stuff like video knee or color matrix. In general, it's best to leave the custom adjustments alone and use the camera scene file presets if you want something other than standard HD. **Preset scene files** (also called **picture profiles**, or **look files**) are factory generated alternative gamma settings that change the look of the image through tweaks to sensor color and brightness response. Most cameras offers a variety of picture profile presets, but the ones that are of special importance for the narrative filmmaker are the *cine gamma* and the *log gamma* presets. **Cine gamma** (or **cinema preset**, **cine styles**, etc.) alters the sensor's response (measure by a gamma curve) by pushing the exposure range and color response beyond Rec. 709 so that it more resembles the image response of celluloid film. This means the sensor can “see” further into very bright areas and very dark areas of the image before color and visual detail drop off. Just like custom picture adjustments, the “film look” of this type of preset is permanently “baked in” the recorded image. The Log gamma preset is quite different. As we discussed on page 216, **Log gamma** records as much of the available chroma and luminance response of the sensor as possible. Because no specific “look” settings are “baked in,” Log video records an image that is very gray and essentially unusable as-is. However, by capturing all color and brightness values coming from the sensor, this mode gives you the maximum potential and flexibility for customizing the film's look in postproduction (see page 572 for working with Log in postproduction).

Take Control!

One very important measure of a camera's capability to function as an expressive tool for the visual storyteller is the capacity for **manual control** of certain critical functions, namely focus, exposure, gain, and white balance (and audio record levels if you're shooting single system sound). Video cameras are developed by engineers and business people, not artists, and the **auto functions** on a video camera are designed to give the user easily obtained, generally acceptable results. Point-and-shoot simplicity is great for shooting a birthday party home movie, and it sometimes can be useful in a fast and unpredictable documentary situation; but if you are telling a story with images, something that you want to show to an audience, to move people, to communicate ideas and emotions, you need to be able to control all the elements that are part of your expressive and aesthetic palette. Focus, exposure, color, and sound are central creative elements in filmmaking and each offers a range of expressive possibilities. To leave these creative decisions up to a machine is to give away your voice. All professional video cameras allow for manual control of all of these functions by the camera operator. The better the camera, the more precise and detailed that control will be. Cameras that do not allow the filmmaker to set focus, exposure, or white balance (usually cheap consumer cameras) severely limit us in terms of craft and are therefore less useful. All professional and most mid-level camcorders give us the

option of **auto functions** or **manual override** for these critical functions, and you should immediately learn how to take control of your own image by turning off the auto functions in favor of manually controlling your shots (see **Fig. 9-28 right** and **Fig. 9-29**). We will look closer at how to manually control focus, exposure, white balance, color space, and audio in the appropriate chapter: Lenses in Chapter 10, exposure and lighting in Chapters 12, 13, and 14, and audio recording in Chapter 16.

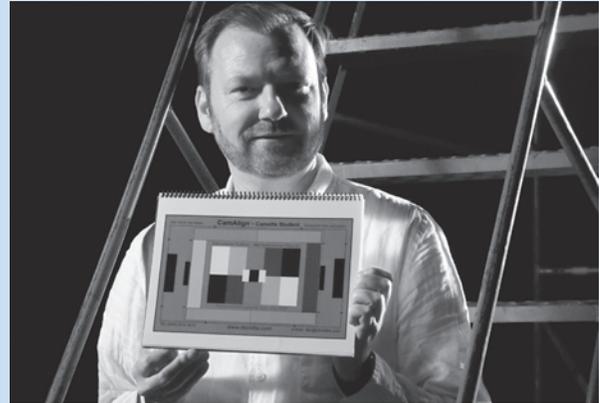
in practice

■ A BASIC CAMERA PREP CHECKLIST

This camera prep list includes only the most common steps for getting your gear ready for a shooting day. Specific projects may require other prep details not listed here.

The most important thing to remember is to take your time prepping gear; be thorough; don't get distracted. Setting up your equipment properly will save you lots of time on the set.

1. Check that the camera package is complete and that every part of it is clean and functions properly; this includes the tripod and fluid head (or other support), matte box, follow focus, lenses, filters, monitor, charger, and so on.
2. Batteries should be fully charged before arriving on the set. Also establish an on-set battery charging station.
3. Mount the camera on the tripod (w/matte box, battery, monitor, and lens).
4. Turn the camera on and insert your record media.
5. Enter your camera settings:
 - Resolution (page 192)
 - Bit rate (page 215)
 - Frame rate (page 273)
 - Aspect ratio (page 192)
 - Shutter speed (page 273)
 - ISO/Gain (page 272)
 - Picture profile/gamma (page 330)
6. White balance the camera (page 293).
7. Calibrate the external monitor (instructions in the companion website, see Chapter 12)
8. Shoot a few seconds of a color chart with flesh tones at the head of every card (roll) for reference. This must be done in neutral light before any filtration or light gels are added (**Figure 9-30**).
9. Double check data backup protocol with data wrangler (page 415).
10. Fill out camera log information (page 407).
11. With every take: (1) check your aperture/f-stop; (2) check your focus.



■ **Figure 9-30** To speed up the color correction process in postproduction it's recommended that you shoot a color chart with flesh tones at the head of every card for reference. See the color Insert.

These settings are often fixed for an entire project, meaning they don't change from scene to scene, so it's a good idea to save them as a custom preset to make setup each day faster.

■ DIGITAL VIDEO CAMERAS TODAY

The Camcorder

Today, digital video cameras come in a wide variety of shapes, sizes, and configurations, but for a long time the standard form of the video camera for location field production was the camcorder, and it still remains a common option. A **camcorder** is an all-in-one production powerhouse; the camera, the picture, and audio recording mechanisms, a viewfinder style monitor, and an all-purpose wide-to-telephoto zoom lens are all integrated into one unit. Focusing can be done with one hand while the other hand operates a **servo**



■ **Figure 9-31** There are many great camcorders on the market that can create professional quality images. Sony, Canon, JVC, and Panasonic all offer relatively affordable, high-quality camcorders, like the Panasonic DVX200 4K pictured above.

zoom rocker switch to quickly reframe shots—even exposure changes can be accomplished by the same operator—and all this can be done on the fly without the operator pulling their eye away from the viewfinder. In addition, camcorders often include either a basic built in on-board microphone, or a mic. holder to which you can attach a microphone.

All camcorders shoot HD video formats extremely well and some even offer 2K and 4K resolutions, and they come in many sizes, from large shoulder-mounted units to small palm-held cameras. The larger, professional camcorders are exceptionally fast, flexible, and have a sturdy camera design and are primarily intended for electronic news gathering (ENG) and observational documentary shooting that generally have crews of two or three people and require quick adjustments in framing and exposure to follow spontaneous

action. ENG and documentary productions are also often shot using single system sound (something that narrative filmmaking rarely does). For a long time camcorders offered the very best video quality available, and because of this many great and important narrative films have been shot on camcorders over the years (in both SD and HD resolutions). Today, however, there are other camera options that are more specifically suited to the narrative production process. Most narrative film shooting situations don't actually need many of the features a camcorder offers, like rocker zoom switches and on-board microphones. In addition, many HD camcorders employ small $\frac{2}{3}$ " or even $\frac{1}{2}$ " sensors. Coupled with non-interchangeable lenses, the small sensor size can represent big challenges and limitations to the visual pallet of a narrative filmmaker, especially as it relates to depth of field and visual perspective control (see Chapter 10 for more detail). Nonetheless, there are indeed quite a few mid-level and high-end camcorders on the market with which you can produce great work (**Figure 9-31**).

DSLRs and Mirrorless Cameras

That “movie mode” hidden in the menu system of your new DSLR? It’s not just a novelty feature. It’s nothing short of a revolutionary, democratizing, disruptive moviemaking technology, as important as the invention of color film, 16mm, or HDTV.

Ryan Coo (From *The DSLR Cinematography Guide*)

The DSLR

One of the most important developments in independent narrative filmmaking over the last decade has been the emergence of the **digital single lens reflex (DSLR)** camera as a filmmaking tool (**Figure 9-32 left**). While the ability to shoot moving images with what was essentially a still camera was a feature intended for the consumer market, filmmakers seized on DSLRs and used them to create narrative films on very low budgets. High-end DSLR cameras (like Canon's EOS series or Nikon's D series) are designed with a large CMOS sensor (see page 208), which takes high-resolution images, notably superior to those from previous generations of video cameras. In “movie-mode,” the single CMOS sensor can capture and record 1080p video at 24, 25, and 30 fps.

A number of factors have made DSLR cinematography a very popular choice for low-budget film production: (1) an increase in SD and CF card storage capacity, and a drop in their price; (2) the fact that you can use an entire range of high-quality interchangeable lenses; (3) the large sensor and “big glass” make these cameras highly light sensitive, which increases the ability to shoot in low-light situations and to have control over depth of field (see page 248); (4) substantially lower cost; and (5) the lightweight and compact body size, which can be helpful in situations where a large camera might impede mobility.



■ **Figure 9-32** Certain DSLR cameras, like the Canon EOS 5D (*left*) and mirrorless photo cameras, like the Lumix GH4 (*right*) offer movie modes that create extraordinary video images. They are a very popular low-budget alternative, but their awkward size requires that they be mounted on a rig or tripod.

However, these cameras are designed primarily for still photography so there are downsides to DSLR video shooting. (1) The shape and size of a DSLR camera, while perfect for still photography, is awkward for creating smooth camera moves, pulling focus during a shot, and monitoring (especially when shooting handheld), so most users will find that some sort of stabilizing rig and external monitor is necessary when shooting without a tripod. Often DSLR shoulder-mount rigs can be more expensive than the camera itself (see page 257). (2) Shooting hours of motion picture footage can trigger overheating problems, which may result in grainy footage or even camera shutdown. (3) Many common shooting controls and options are often deeply buried in preference menus and sub-menus making routine tasks very awkward. (4) The large CMOS chip with its rolling shutter makes it susceptible to the skew and “jello” motion artifacts when you move the camera quickly (or when objects move quickly across the frame) (see page 209). Many DSLR advocates will suggest that one simply avoid quick pans or fast motion in the frame, which is a dubious recommendation to be sure. (5) Finally, the common DSLR codec (H.264), although supported by most NLE systems, nonetheless requires transcoding to a format like ProRes or DNxHD for a smoother postproduction workflow (see page 449). However, despite these limitations, scores of filmmakers are making great use of this highly affordable camera option.

If you are planning to use a DSLR, you should be aware that there are two main formats based on sensor size. One, called **APS-C**, is loosely based on an older film format and measures 22mm × 15mm. The second is called **full frame (35mm)** and is about 35mm × 24mm. They will both offer excellent results in terms of resolution, but there are significant crop factor differences that one must take into account (see page 234). Also, the larger sensor format is often more sensitive to light, which is a plus for low-light shooting situations, however the big sensor also inherently tends toward an extremely shallow depth of field. If this is not the “look” you had in mind for your film, you can find yourself struggling to deepen the focus range in your shots.

Mirrorless Shutter Cameras

DSLRs are **reflex cameras**, which means that they have a drop-down mirror that allows for through-the-lens viewing when shooting stills, something that is unnecessary for film production. Another group of cameras that is increasing greatly in popularity is the **mirrorless shutter camera**. Lacking the drop-down mirror that DSLRs use for viewing, they can be notably smaller and lighter. Their small bodies are reminiscent of amateur point-and-shoot still cameras, yet they can house large format CMOS sensors capable of very high-resolution HD video and even 4K. Often mirrorless cameras have no capacity for recording audio, which makes them lighter, but this doesn’t hinder narrative filmmaking, which generally uses double system sound. Like DSLRs, however, many common shooting options and functions are deeply embedded in menus, which can be awkward and



■ **Figure 9-33** Combining the best qualities of DSLRs (large sensor and interchangeable lenses) with the advantages of the camcorder (cinema prioritized functions), the hybrid camera, like this Canon C100, has become an extremely popular choice for high-quality, low-budget narrative film production.

slow you down. Nonetheless, if you want a lot of resolution in a very small, affordable package, a mirrorless shutter camera can be a very good option (**Figure 9-32 right**).

Hybrid Large Sensor Cameras

Responding to the popularity of DSLR cameras, yet maintaining the convenience and advantages of the camcorder, camera manufacturers have developed the **hybrid large sensor camera**, which is a very popular choice for high-quality, low-budget narrative film production. Like DSLRs, hybrid cameras come with large format CMOS sensors (35mm or Super 35mm) and accommodate a range of high-quality interchangeable lenses. This combination provides a filmmaker with a similar visual pallet to 35mm celluloid film cameras in terms of resolution, light sensitivity, lens perspective, and depth of field control, but in a much smaller package and at a fraction of the cost. In addition, many hybrid camera systems will accept lens adaptors that allow you to use ultra-high-quality cine lenses from elite lens manufacturers like Zeiss, Cooke, or Schneider. However, like camcorders, hybrid cameras are built specifically for motion picture production, not still photography, and they take those camera functions most commonly used during a film shoot out of the options menus and place them conveniently onto the body of the camera as switches or buttons. Also, like camcorders they provide superior battery life, better record media and output options and

professional XLR microphone inputs should you wish to record single system sound (an option that is practically impossible on DSLRs). Hybrid cameras like the very popular Canon C-100 allow shooting in any of the HD standard formats and frame rates, and some, like the Sony FXW-PS5 and the Canon C-300 Mark II, can shoot 2K and 4K resolutions (but cost more). Hybrid camera compression codecs are commonly MPEG-4 AVC/H.264 or MPEG2 Long GoP depending on the brand (both have 4:2:2 color subsampling). Most hybrids also offer cine gamma and Log gamma shooting presets, and occasionally RAW video outputs (**Figure 9-33**, also see **Fig. 9-1**).

Action Cams

One type of specialty camera that has become a popular addition to the cinematography arsenal of narrative filmmakers is the **action cam** (or **minicam**). While rarely a primary camera on a film set, these small, inexpensive, and agile cameras (with tiny sensors, fixed wide-angle lenses, and no viewfinder) shoot 1080p HD video and can be mounted anywhere, from skateboards, to helmets, to car bumpers, to small aerial drones. Although action cams are commonly used for specialty shots involving action or angles that would be impossible for larger cameras to achieve, the “GoPro aesthetic” is becoming increasingly popular and Ilya Naishuller’s action film *Hardcore Henry* (2015) exploits the action cam’s extreme mobility by using it to create a wall-to-wall first-person subjective POV feature film (**Figure 9-34**).

The Ultra High End: D-Cinema, UHD, and Beyond

Ultra-high-end cameras are those designed principally for professional film production aimed at large screen theatrical release or Ultra High Definition broadcast. These cameras shoot in the two 4K formats: the DCI D-Cinema format (4096 × 2160) and UHD (3840 × 2160) and they usually also shoot 2K (2048 × 1080). Naturally, they can also shoot standard HD and include a Log gamma setting. Cameras at this level are also future-proofing themselves by offering resolutions up to 6K and even 8K! Additionally, these cameras always provide for RAW data output (see page 216) because at this elite level of production, workflows that include shooting RAW are common. Because of this, each manufacturer has created a proprietary RAW format (usually 10 bit or 12 bit and 4:4:4 chroma subsampling) and special customizable LUT file capabilities (or **look file**) for doing rough color grading



■ **Figure 9-34** The tiny action cam’s mobility (*left*) allows it to be placed in areas too tight for conventional cameras, or attached to bikes, skateboards, or people, as was the case with the subjective POV film *Hardcore Henry* (2016, *right*).

in the field (done by the DIT) or bringing pre-saved customized looks onto the set (developed by the post-pro colorist based on preproduction tests). For workflows involving RAW data output, these ultra-high-end cameras will also simultaneously record smaller HD proxy files for editing (ProRes or DNxHR). In addition to all of these elite specs, the large CMOS sensors in these cameras (35mm and super 35mm) are developed with what is described as “advanced proprietary color science and image processing” that allows for noise-free video at ISO settings well beyond 800. All of these factors add up to a camera that offers the highest resolution and widest dynamic range on the market, capable of exposure latitudes, scene detail, and color values that meet or exceed 35mm celluloid film. These factors also add up to cameras that fall into the \$40,000+ price range for just a basic package. The ultra-high-end category includes the Arri Alexa, the RED Epic, the Sony Cine Alta, and the Panasonic VariCam 35 (**Figure 9-35**).



■ **Figure 9-35** One of the most popular ultra-high-end D-Cinema cameras for commercial and independent filmmakers is the Arri Alexa (pictured).

How Much Camera Do You Actually Need?

Comparing camera specs and chasing down ultra-high-quality gear can sometimes (often) be counterproductive for the creative filmmaker. In many ways it’s easier to research production gear than it is to, say, re-write your screenplay, and this sort of wild goose chase can become a huge distraction from the essential creative work that truly makes a film great. Many times I have seen young filmmakers hire cinematographers simply because they own a RED or Arri Alexa camera, and not infrequently these D.P.s reveal themselves on the set to be visually uninspired or worse, uncooperative, bossy, or simply bad shooters. If you’re a student or low-budget independent filmmaker, choose your D.P. for their creativity, the visual styles they can bring to the film, and their ability to connect to your project and collaborate on making the film great. Any day of the week, I would select a truly creative and innovative D.P. with a DSLR or HD camcorder over an arrogant, unimaginative hack with an Arri Alexa.

When it comes down to it, if you disregard the 6K and 8K shooting capacity, the RAW formats, and the “proprietary color science” and only consider the technology that a low-budget filmmaker actually requires to deliver a high production value, professional product, for theatrical projection or HD broadcast (i.e., Cine Gamma HD, Log video, 2K or 4K, 4:2:2 chroma sub-sampling), you’ll see that the essential specs between the ultra-high-end cameras and much less expensive cameras look very similar—that’s because they are. At the basic spec level, the difference between the ultra-high-end and mid-level cameras—like Blackmagic Design URSA 4K, Sony FDR-AX1, and Canon C-300 Mark II, or even very inexpensive cameras like the Lumix GH4 or Sony Alpha a6300—are not in any way a



■ **Figure 9-36** There are digital cameras at all price points that can deliver professional quality video. Lena Dunham's breakthrough feature *Tiny Furniture* (2010, *top*) was shot on a Canon 7D DSLR; Abdellatif Kechiche's Palme d'Or winning film *Blue Is the Warmest Color* (2013, *middle*) was made using the Canon C-300 hybrid camera; and Amma Asante's lavish period film *Belle* (2013, *bottom*) was photographed using the high-end Sony Cine Alta F65.

determining factor between a beautifully shot narrative film and a poorly shot one (**Figure 9-36**). Always remember, one of the great benefits to being a low-budget filmmaker in the 21st century is that mid-priced cameras can produce amazing images that can easily hold their own in side-by-side comparisons with the ultra-high-end gear—if the filmmaker knows how to use them. You do not need to waste time and money chasing the highest camera technology on the planet, when perfectly sufficient gear is well within your grasp (and your budget).

The Future

If you've read the chapter up to this point, you probably understand that the truest thing one can say about digital video is that it's constantly evolving, improving, and changing. Do not expect things to ever settle down to some sort of manageable stasis. If you've finished your script and are ready to start shooting, just jump in, use whatever technology is available to you at the time, and make your movie. Don't wait for "the next great thing" because there will always be another "next great thing" around the corner. Your production technology *will be exceeded* in a few years. So what? You will have your movie and you will be ready to make your next one with the new formats—like maybe one of the ones described in the accompanying box.

RECENT DEVELOPMENTS IN DIGITAL SHOOTING

3D Filmmaking

When the previous edition of this book was published back in 2011, 3D filmmaking was the revolutionary technology sweeping the film world, and potentially pointing to the future of cinema. The mega-million-dollar 3D production of *Avatar* had recently been released and it fueled much speculation that "2D" or "flat" filmmaking was on its way out. Consumer-level 3D camcorders and 3D capable TV monitors quickly emerged (**Figure 9-37 top**). But the 3D revolution didn't quite materialize as many predicted. I myself do not know a single person who bought a 3D capable TV, let alone a 3D camcorder. The 3D format (which is definitely not new) did not make conventional filmmaking obsolete, instead 3D settled into a very lucrative niche market: the 3D commer-

cial blockbuster (e.g., *Wonder Woman*, *Kong: Skull Island*, *Star Wars: The Last Jedi*, *War for the Planet of the Apes*, *Jumanji*, *Welcome to the Jungle*, all 2017). For sure, the offerings have greatly expanded from the previous incarnations of 3D throughout history, and it's also true that a number of independent filmmakers dabbled in and explored the form, including Werner Herzog with *Cave of Forgotten Dreams* (2010), Wim Wenders with *Pina* (2011), Jean Luc Godard with *Adieu Au Langage* (2014), and Ang Lee's *Billy Lynn's Long Halftime Walk* (2016) (**Figure 9-37 bottom**)—but none of these filmmakers made any commitment to the format and most have gone back to "conventional" filmmaking. However, if you look at the ATSC format specifications in the previous chapter, new 3D broadcast standards are definitely in the works for the next generation, so there may be a revolution after all . . . *unless* that revolution turns out to be VR!

VR Filmmaking

As I write this edition, **Virtual Reality (VR)** is the buzzword on everyone's lips. VR offers complete immersion in a 360° visual world. While the advantages of this new virtual environment are immediately clear for the gaming world which has long been familiar with 360° virtual environments, the fictional narrative film community is still experimenting and developing a new visual language to take advantage of this expanded storytelling canvas. Many people refer to VR filmmaking as the “wild west”—a frontier where a filmmaker can re-invent the rules of narrative cinema.

The image acquisition rig for VR shooting is some form of a multi-camera array that uses four to twelve cameras to cover nearly a 360° spherical space (save for the rig mount area). Nokia OZO, Go Pro, and NextVR make high-end VR camera systems, but many pioneers are creating their own VR rigs by building custom 360° mounts for multiple-action cameras. These 360° images are displayed through VR headsets (also called an HMD for head mounted device) that immerse the viewer into the virtual world, and allows them to choose and shift their spatial perspective by tilting or swiveling their heads in any direction. Oculus Rift, Samsung Gear VR, and HTC Vive are the most common high-end VR headsets and they'll set you back a few hundred dollars, but it's not difficult to find plain (and cheap) cardboard frames that hold a smartphone in front of two simple lenses for under 20 bucks.

Between the image acquisition and display is the software that stitches together the multiple camera

streams into a seamless, 360° spherical environment and provides the interactivity necessary to allow the viewer to change, at will, where in the space they are looking. Currently, Vidoestitch VR and Kolor Autopano are popular, but new software applications are being introduced every month. The trend with VR technology is similar to all digital film technologies; once prohibitively expensive for an average filmmaker to work with, the gear for VR productions is getting cheaper, better, and more accessible—and quickly (**Figure 9-38**).

Clearly, the technology for VR has arrived; however, it's no secret that content is seriously lagging behind the hype and the technology. There just isn't much to watch yet—particularly narrative content. Sure you can swim with whales, and walk with dinosaurs, and explore Mars in VR, but good stories in a VR environment are rare—and that represents the mother lode for this particular gold rush.

While VR filmmaking offers a significantly fresh and expanded terrain for a storyteller, it also has many challenges and limitations. Narrative filmmakers have devised a storytelling language that controls audience perspective, information, and emotions through a frame (camera angles, mise-en-scène, and so on) that is defined by the filmmaker. So how do we craft an emotionally engaging story in a space where the viewer decides where to look and when to shift their perspective? How can we control character or story POV? Should we even try? Add to these conceptual questions the technical limitations; VR testing has revealed that eye fatigue and motion sickness are very real consequences of overexposure to the virtual



■ **Figure 9-37** The future of 3D filmmaking beyond the blockbuster is still in question despite the marketing of 3D camcorders like this Sony PMW-TD 300 3D (*left*) and the explorations of prominent filmmakers like Jean Luc Godard, shown here on the set of *Adieu Au Langage* with a double DSLR 3D rig (*right*).



■ **Figure 9-38** Virtual Reality is the newest frontier for narrative filmmakers, and the required VR headsets (*left*) and 360° camera rigs (*right*) are getting more accessible and affordable every month.

world, this is why VR content is generally limited to 30 minutes (some believe that eight minutes is the maximum for a comfortable VR experience). And abundance of caution has prompted Oculus Rift to restrict VR for children younger than 13 and others in the industry are following suit.

Despite the limitations, there is currently a lot of excitement around the future of VR filmmaking; mainstream Hollywood directors are exploring the new form, like Justin Lin (*Star Trek Beyond*, *Fast and Furious*) who created the short VR film “Help”; and big-budget projects are quickly emerging, like presenting the entire *Lion King* Broadway production as a VR experience; and independent filmmaking institutions are actively cultivating VR filmmaking talent, like the Sundance Institute’s “New Frontiers” lab and residency program that supports and distributes the work of VR artists (www.sundance.org/vr). All of this activity points to an emerging form that may indeed have some legs. Perhaps the next edition of *Voice & Vision* will include several chapters devoted to VR filmmaking, or perhaps it’ll remain in a little sidebar box on fringe formats like this one, it’s kinda up to you all.

Smartphone Films

Throughout the history of filmmaking there has always been those highly motivated and innovative filmmakers who dive in and make movies with the most inexpensive and easily accessible technology available. The core idea is usually twofold: first, to never allow the lack of money to get in the way of creating films; and second, to put the technology’s low-tech aesthetics (often well below “professional industry” standards) to creative and effective use. Rather than attempt to duplicate Hollywood production values on the cheap (a dubious ambition to be

sure) these filmmakers used the limitations of their medium as storytelling opportunities by perfectly matching their story with the technical aesthetic. When expensive 35mm celluloid film was the industry standard, many wonderful, groundbreaking, and award-winning feature films were created on 16mm black-and-white film with ultra-basic cameras and lenses, and tiny crews. Wim Wenders’ *Alice in the Cities* (1974), Jim Jarmush’s *Stranger Than Paradise* (1985), Spike Lee’s *She’s Gotta Have It* (1986), and Darren Aronofsky’s *Pi* (1998) are only a few prominent examples. In the early era of digital video, inventive filmmakers were producing important and moving films with small, consumer grade, NTSC standard definition cameras, an impulse epitomized by the members of the Danish Dogme 95 collective. This low-tech, minimal artifice movement produced highly influential films like Thomas Vinterberg’s *The Celebration* (1998) and Harmony Korine’s *Julian Donkey Boy* (1999). Now in the high-definition and UHD video era the smartphone is emerging as this generation’s readily accessible, inexpensive, highly mobile production tool. Everyone has a smartphone, every smartphone has a camera—*boom*—a filmmaking phenomenon. Beautifully conceived smartphone films that perfectly match the phone’s energetic, immediate, accessible, low-res aesthetic with the appropriate story are multiplying. Given the contemporary media environment, most smartphone films are shorts destined for online streaming, but we’re starting to see a few intelligent, innovative, and emotionally powerful feature films produced exclusively with smartphones—and these films are finding their way into theaters and winning serious awards.

Sean Baker’s *Tangerine* (2015) is a perfect example of capitalizing on the smartphone’s unique visual characteristics and mobility to enhance the tone of



■ **Figure 9-39** Sean Baker shooting his feature film *Tangerine* on an iPhone 5 attached to a stabilizer. Note also the anamorphic lens attachment on the upper left of the phone.

his gritty, naturalistic, hard-luck story of a transgendered prostitute searching the streets of West Hollywood for her pimp who has cheated on her. Shot on the iPhone 5, on a budget of around \$100,000, *Tangerine*'s marriage of narrative tone with low-tech format aesthetic is perfect; the film has an immediacy that feels nearly documentary-like (**Figure 9-39**). However, the unobtrusiveness of shooting a film with smartphones also proved to have great logistical benefits as well. Here is how the film's cinematographer Radium Cheung remembers it:

The decision to shoot with a couple of mobile phones turned out to be one of the greatest assets to the film. It probably has to do with the mobility of it. When you walk down the street and there is a film crew, no matter how small it is [...] there are people with microphones, there is a cameraman with a camera on his shoulder. Naturally, it would attract attention; you stop for a second to just take

a look. Versus if you saw some guys on the street with a couple of phones shooting. You probably wouldn't pay attention. That really helped us a lot in "Tangerine."

We had permits and all of that [...] but we had no manpower to lock down the street, to block the pedestrian traffic during the take like you would normally do [...] so we just let passersby walk by. Luckily, with our tiny little set up, people just walked through. They really didn't care. [...] Without that distraction we were really able to get the best performance out, the most authentic, the rawest performance out of the actors.

(From "How the DP Behind Sundance Hit 'Tangerine' Created a Cinematic Look with an iPhone," by P. Bernstein, *Indiewire.com*, 2015)

Clearly shooting 4K RAW with an Arri Alexa would have been more than overkill, it would have been cumbersome and inappropriate.

Not only are smartphone films quickly multiplying (shorts and features) but "cinephone" film festivals are also proliferating around the globe. In addition, add-on production tools and apps are being regularly introduced to improve capture speeds, lens quality, camera movement, and so on. For example, many smartphone films, including *Tangerine*, utilize a lens attachment to change focal length and aspect ratios, and FiLMiC Pro has become a very popular smartphone film production app because it allows the operator to manually control the camera's focus, aperture, white balance, and capture bit rate (all of which are normally determined automatically by the phone).



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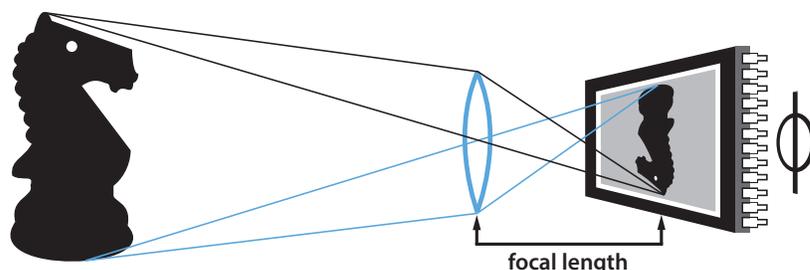
The Camera Lens

It is often said that that “the lens is the eye of the camera.” This is true, in that light enters through and is controlled by the lens, and ultimately this light registers an image. However, there are many things that the human eye and human psychology of perception do automatically, which, on a lens, must be accomplished manually. Framing, focusing, and exposure are activities we rarely consciously think about with respect to our own eyes, but a lens requires us to deliberately set each of these functions; and with each we are presented with a range of possibilities that ultimately represent the creative potential of any lens and its contribution to the aesthetic palette of a filmmaker. Always keep in mind that when setting lens functions, there is often no absolute “right” choice; rather, you must find the appropriate settings for what you want to communicate. On every single shot, you get to decide, from a wide range of possibilities, the framing and visual perspective within the frame, how near or close things appear, how bright or dark your scene and subjects are, and what is or isn’t in focus. Knowing how lenses work will help you choose the right lens and the best settings to create expressive images. It is helpful to remember that the lens is much more than just the eye of the camera: it becomes the eyes of your audience.

■ BASIC LENS OPTICS

Whether you are shooting with a smartphone, a DSLR camera, or a high-end 4K D-Cinema rig, the basic construction and function of camera lenses are the same. Broadly speaking, lenses are a series of polished glass sections called **lens elements**. These elements are held parallel to each other in a light-tight housing called the **lens barrel**, or **housing**. The type, placement, and number of glass elements vary widely from lens to lens depending on their function, quality, and perspective attributes. But in all cases, the *principle function of a lens* is to gather the light reflecting off a three-dimensional scene and, through a process called **optical refraction**, bend and direct the light precisely onto the camera’s **sensor plane**, thus creating a two-dimensional image of the scene. The sensor plane of a video camera (also called the **focal plane** and **image plane**) is the **faceplate** of the image sensor (CMOS or CCD). The image registered on the sensor is both reversed and flipped (**Figure 10-1**). Many video cameras have an external marking on the body of the camera (like this ϕ) that indicates precisely where the sensor plane is located (**Figure 10-2**).

There are many lenses to choose from, so understanding lenses in general will help you pick the right one to create the image you want. There are three critical aspects to every lens that you must understand if you are to gain control over the aesthetic and story-telling impact of your images: **Focus**, **focal length**, and **aperture**.



■ **Figure 10-1** Simple image formation by a lens. A lens gathers incoming light and focuses it on the image plane (the sensor). At the optical center, the image is not only flipped, but also reversed.



■ **Figure 10-2** The image plane symbol marking on Canon C-100 (circled).



■ **Figure 10-3** The focal length of a lens is etched directly on the lens, often near the front element, as with this 50mm Cooke prime lens.

■ FOCAL LENGTH

The **focal length** of a lens determines the degree of **magnification** (enlarging) or **de-magnification** (shrinking) of the scene being shot. Different lenses offer different focal lengths. Focal length is determined by the distance between the **optical center** of the lens (the point at which the image flips) and the sensor plane, ϕ , when the lens is focused at infinity (**Fig. 10-1**). This distance is usually measured in millimeters (15mm, 75mm, 150mm, etc.). The focal length of a lens is always clearly etched somewhere on the lens itself, often near the front element (**Figure 10-3**). In addition to affecting the magnification of the scene, focal length determines the lens' **angle of view (AOV)**, which means how much of the scene a given lens takes in horizontally (x-axis) and vertically (y-axis). The angle of view of a specific focal length lens doesn't change.

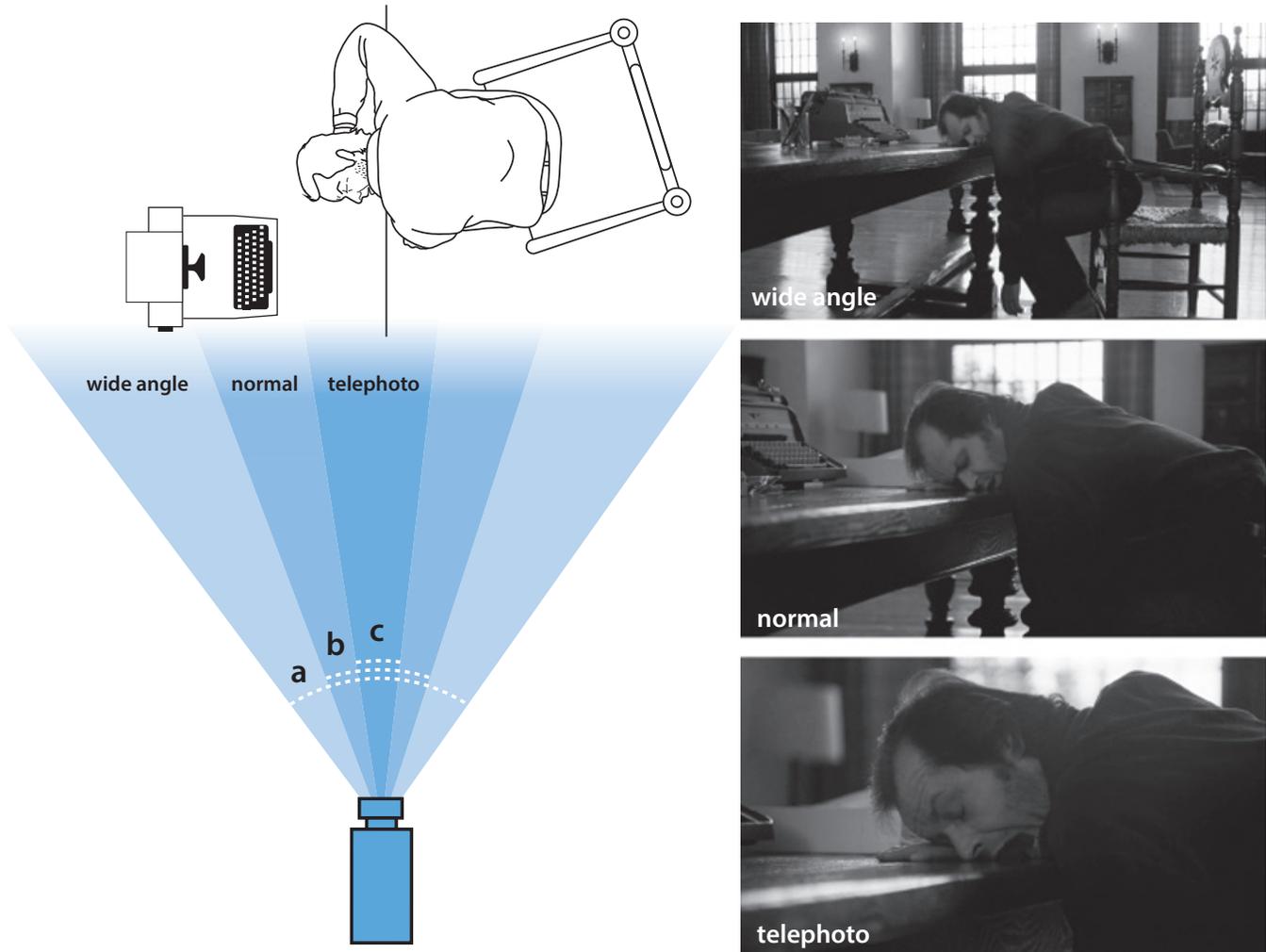
The longer the focal length of a lens, the more the subject is magnified, appearing larger and closer to the camera; also the angle of view becomes narrower. Conversely, the shorter the focal length, the smaller the subject appears and the farther away objects appear; also the angle of view becomes wider. There are three broad focal length classifications for lenses: **wide angle** (short lenses), **normal** (medium lenses), and **telephoto** (long lenses) (**Figure 10-4**).

A **normal lens** approximates the same perspective and image size that the human eye would see if one were to stand in the same spot as the camera (not including peripheral vision). Although this sounds like a fairly nonscientific description of a normal lens, human visual perspective is indeed the intended reference point. The actual focal length of a normal lens, however, is not the same across all shooting formats because it is primarily determined by the size of the active imaging area of the camera's sensor. The normal lens focal length for a specific format is approximately the same as the diagonal of the sensor (active image area only). For example, the active imaging area of most Super 35mm sensors (like in the Canon C-300) measures somewhere around 24mm–30mm, so the normal lens for this format would be around 25mm. On the other hand, some HD camcorders come with a small $\frac{2}{3}$ " sensor which measures 11mm diagonally and therefore have a normal lens also measuring around 11mm.¹ As you can see, the larger the area of the imaging device, the longer the normal lens focal length is and vice versa. A camera's sensor size has a significant impact on lens perspective and focus and I explain these issues in more detail on pages 234 and 252 respectively.

Many cinematographers consider "normal" to be a range of focal lengths that create a fairly normal perspective, rather than a single focal length strictly determined by the format diagonal. For example, many D.P.s would consider 25mm–45mm a normal lens range for the Super 35mm sensor format, and many shooters using the APS-C sensor (with a 26.7mm diagonal) consider 25mm–35mm the "normal" range. However, beyond the "normal" range, shorter or longer, we get into the territory of wide-angle and telephoto lenses.

Wide-angle lenses are those with focal lengths shorter than normal lenses, which is why they are also referred to as **short lenses**. Wide-angle lenses reduce the size of the image and broaden the angle of view, allowing us to see more of the scene compared to the format's normal lens. The shorter the focal length, the broader the perspective and the more extreme the demagnification of the scene will be. Wide-angle lenses are often used when shooting broad landscape vistas and establishing shots. An extreme wide-angle lens, with an angle of view greater than 180°(!), is called a **fisheye lens**.

¹ Go to Abel Cine's helpful online field of view comparator to determine the diagonal measurement for a wide variety of formats: www.abelcine.com/fov



■ **Figure 10-4** This zoom shot from Kubrick’s *The Shining* (1980) illustrates how focal length effects the magnification of the subject and the angle of view. Wide-angle focal length (*top*) de-magnifies the image and has wide angle of view (a), a normal focal length approximates the perspective of the human eye (*center*), and telephoto (*bottom*) magnifies the subject and has a narrower angle of view (c).

A **telephoto lens** has a focal length that is longer than a normal lens, which is why they are also referred to as **long lenses**. The longer the focal length, the more the lens magnifies and enlarges the subject in the frame and increasingly narrows the angle of view.

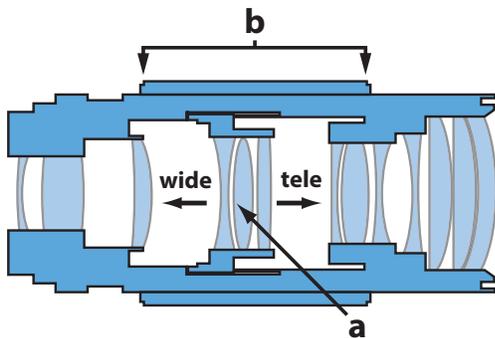
Prime and Zoom Lenses

A lens that has one fixed focal length (e.g., a 50mm lens) is called a **prime lens** (or **fixed lens**). Prime lenses are common in narrative production, but require cameras with an interchangeable lens system (see **Fig. 9-5**). Many cinematographers favor prime lenses because their simple design allows them to be made with few glass elements, which means that they deliver maximum clarity and there is less chance for loss of light or lens aberrations (see “Lens Speed” section). They are also lighter than zoom lenses, which makes for easier hand holding. However, with prime lenses, you need to physically change the lens every time you want a new focal length, which also means that you’ll need to carry with you all the lenses you’ll need for the variety of shots you envision (**Figure 10-5**).

Zoom lenses, which are also referred to as **variable focal length lenses**, offer precisely that—a continuous range of focal lengths in one lens housing (e.g., 12mm–120mm).



■ **Figure 10-5** First A.C. Zach Moore changes prime lenses on a camera (*top*). When using prime lenses, you need to bring various focal lengths to accommodate the shooting strategy. The bottom image shows Sony's Cinealta Prime lens system.



■ **Figure 10-6** A zoom lens changes focal length by shifting the position of the internal optical center elements (a) by adjusting the zoom ring (b) (*top*). Some cameras have a servo zoom motor controlled by a rocker switch (c) that lets you glide from one focal length to another (*bottom*).

Zoom lenses are constructed with a combination of fixed and movable lens elements. The movable glass slides forward and backward to physically shift the optical center and therefore change the focal length of the lens. **Zooming in** means adjusting the optical center away from the sensor plane and therefore increasing the magnification power of the lens (telephoto), and **zooming out** means adjusting the optical center back toward the sensor plane, causing the image to become more wide angle. Zooming is accomplished with the adjustable **zoom ring**, calibrated in millimeters, which allows the filmmaker to manually set the desired focal length. Some video cameras utilize a servo zoom motor controlled by a rocker switch that lets you glide from one focal length to another smoothly during a shot (**Figure 10-6**).

Different zoom lenses offer a different range of focal lengths, and this range is stated as a ratio—usually etched somewhere on the lens itself. A 12:1 zoom lens (also stated 12X) is one that increases the focal length 12 times over its full range, and a 10:1 (10X) has a focal length range that increases ten times. However, the specific range can vary; a 10:1 zoom lens could go from 10mm to 100mm or from 12mm to 120mm. The millimeter range is found on the zoom ring itself.

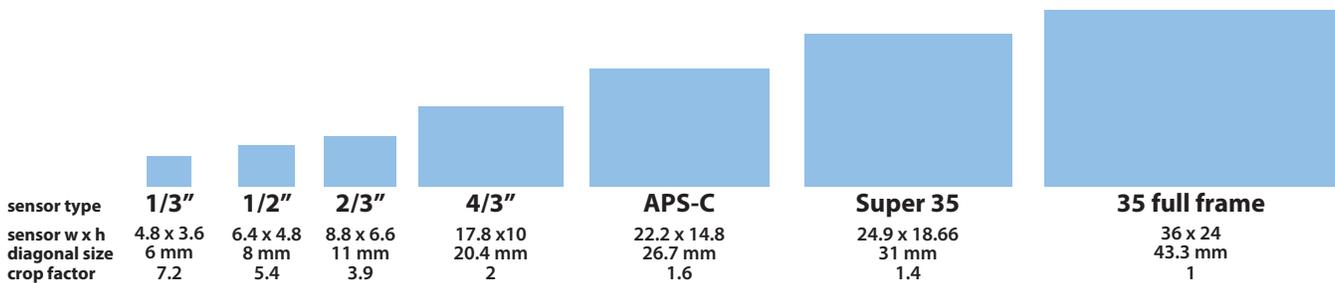
Zoom lenses are wonderfully convenient, as they can offer a wide range of focal lengths in one lens; sometimes everything you need for a simple project. However, there can be trade-offs for this convenience. It requires many more glass elements to make a zoom lens as compared to a prime lens, so zoom lenses are prone to light loss (see “Lens Speed” section) and optical aberrations. Nevertheless, current research and development trends are producing high-quality zoom lenses that are being used by cinematographers who shoot HD, UHD, and D-Cinema formats for theatrical distribution.

Crop Factor: Focal Length and Sensor Size

There is one critical variable that is part of the focal length/angle of view equation, and that is the size of your format's sensor. As we discussed in the “normal lens” section earlier, the focal length of a lens alone is not an absolute indicator of image size or angle of view. Yes, a wide-angle lens will always have a shorter focal length than a normal lens and a telephoto lens will always be longer than normal. But, the actual focal length measurement (in mm) that indicates a wide-angle, normal, or telephoto lens varies in relation to the size of the camera's sensor. Consider the frames in **Figure 10-7**. In terms of field of view and magnification (slightly telephoto), the shots are nearly identical. However, they were shot with two different camera formats utilizing different sensor sizes; therefore the actual lens focal length for each image was quite different. The left image was shot using a Canon T3i DSLR, which has an APS-C sensor measuring 22.2mm × 14.8mm (26.7mm diagonal). And the lens focal length was 60mm. The image on the right was taken



■ **Figure 10-7** The effect of focal length varies according to sensor size. The image on the left was shot with an APS-C sensor (26.7mm diagonal) and a 60mm lens, while the image on the right was shot with a much smaller 1/3" sensor (6mm diagonal) and a 12mm lens. Interestingly, in terms of perspective and field of view, they are almost identical.



■ **Figure 10-8** This chart shows the sensor sizes for a variety of digital cameras and the corresponding crop factors in relation to the full 35mm frame.

using a Sony HXRNX5U, with the considerably smaller 1/3" sensor measuring 4.6mm x 3.7mm (6mm diagonal), and the lens focal length for this image was 12mm (about five times shorter than the other).

Because of their ubiquity in both still and moving image photography, the focal lengths of 35mm cameras have come to be used as the reference point to determine this relationship between focal length and the various sensor sizes. This is known as the **crop factor**. On a 35mm film camera, for example, a normal lens has a 50mm focal length. If you use a camera such as a DSLR with an APS-C chip, which is approximately 22mm wide, you have a crop factor of about 1.6. This means that the same 50mm lens will behave like an 80mm lens would on the 35mm camera. In other words, your 50mm lens is now a telephoto on the APS-C camera. On the 1/3" chip camera, the crop factor is 7.2. So a 50mm lens, a normal lens for 35mm full frame, would be the equivalent of a 350mm lens. Extremely telephoto! When you look at the specifications for a video camera, you will notice that the focal length is often expressed as an equivalent in terms of a 35mm camera.

All this means that it is very important to know what sensor size your camera has, and what the crop factor will be, before making assumptions about what type of magnification and field of view a particular focal length will deliver (**Figure 10-8**). One very useful tool is a crop factor calculator, such as Abel Cine's Field of View tool (www.abelcine.com).

Lens Perspective

Perspective is one of the most important considerations when we think about framing and composition. Perspective is essentially a combination of the angle of view, in terms of both the **horizontal dimension (x-axis)** and the **vertical dimension** of the frame (**y-axis**), and the depth relationship (near versus far) between objects. This **depth dimension** is

■ ANGLE OF VIEW VS. FIELD OF VIEW

When it comes to discussions of lenses and perspective, there is a lot of confusion about the terms angle of view and field of view, with many people using them interchangeably. Angle of view and field of view are very similar, however there is a distinction between these terms.

Angle of view (AOV) is an optical parameter for a specific lens focal length. It defines the “seeing range” of a lens (x-axis and z-axis) in terms of degrees. Short focal lengths will give you a broader angle of view and long focal lengths will give you a narrower angle of view. The exact angle of view is determined by the lens focal length and the sensor size. Angle of view never changes for a given lens and sensor size (see “Crop Factor” section earlier).

Field of view (FOV) is simply what your camera actually sees of a scene horizontally and vertically—

essentially what you see in a viewfinder. The field of view is determined by a combination of angle of view (focal length and sensor size) *and* the placement of the camera (closer or further from a subject). Naturally, your field of view will be altered if you change the focal length of your lens, as you can see in **Fig. 10-4**. However, given the same focal length and sensor size, you can also change your field of view by moving your camera closer to or further away from your subject, even though your angle of view does not change. We explore this idea in detail in the “X-axis and Y-axis Field of View” section later.

This distinction essentially defines the difference between a zoom shot and a dolly shot. A zoom shot is accomplished by altering the focal length of a lens during a take (zoom in or zoom out), which concomitantly alters the angle of view (and thus the field of view as well). A dolly shot is accomplished by physically moving the camera (closer or further away) which changes the field of view through camera to subject proximity without altering the lens’ angle of view.

the **z-axis**, and because a film image is two dimensional, the sense of depth is an illusion created by the composition of the frame. We have already discussed creating deep frames and flat frames through *mise-en-scène* in Chapter 3 (in the “Shot Composition and the Graphic Qualities of the Frame” section), but how does lens choice affect visual perspective?

When we set up a shot, we often first consider the size of the framing (e.g., long shot, medium shot, close-up), which determines the size of the subject in the frame. How we achieve that specific framing can be accomplished with any number of different lenses. For example, we can frame a medium close-up with either a wide-angle lens or a telephoto lens and these shots will look very different (**Figure 10-9**). Lens choice has a profound effect on all the perspective dimensions in the frame and ultimately the meaning and “feel” of the final image, and as such it can be one of the most significant creative decisions that a director and D.P. can make.



■ **Figure 10-9** Lens selection can have a dramatic effect on the look of your image. Both of these shots from Aronofsky’s *Requiem for a Dream* are medium close-ups; however, the left frame was shot with a normal lens and the right frame was shot using an extreme wide-angle lens.

X-axis and Y-axis Field of View

There are two ways to affect the size of a subject in the frame and the frame's field of view. The first is to change the camera-to-subject distance—moving the camera itself closer or farther from the subject. The other is to alter the magnification and the angle of view of the scene by changing the focal length of the lens you use. There are significant compositional differences between these two options.

When you change only the camera-to-subject distance, and not the lens, the subject indeed gets larger or smaller but the lens' angle of view doesn't change so differences in the image's field of view are visible, but not extreme. However, leaving the camera stationary and changing focal length (longer or shorter) to change the size of the subject in the frame also alters the field of view quite radically, narrower or wider.

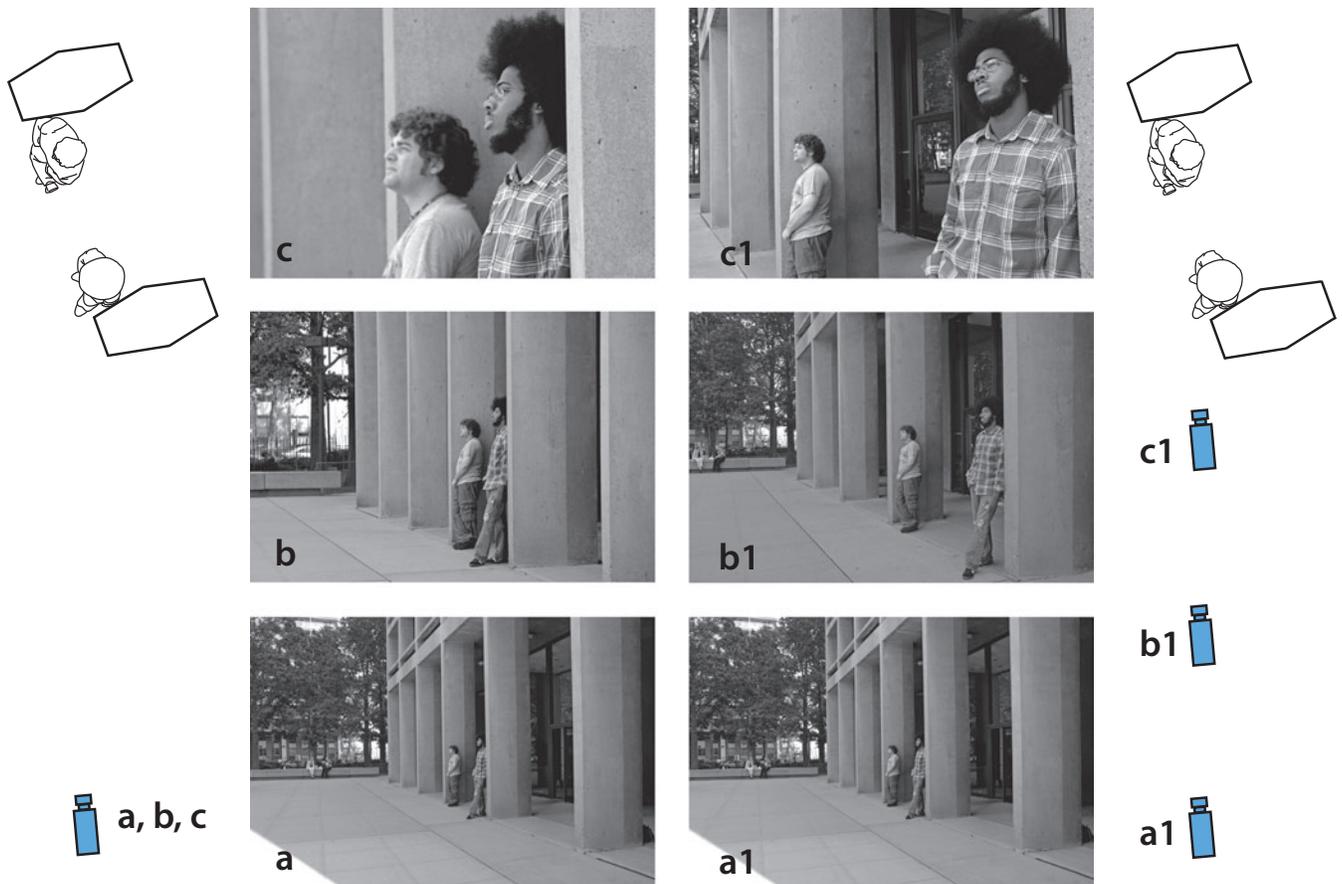
Compare the two long shot examples from **Figure 10-10 (frames b and b1)**. The two subjects in both shots are nearly identical in size, and the horizontal center of both frames is the same (no left to right adjustment); however, the shot taken with the wide-angle lens and camera moved closer (**shot b1**) includes the two women talking (at the left of the frame), and the shot taken by leaving the camera stationary and using a longer focal length (with a narrower angle of view) (**shot b**) has decreased the field of view so much that it excludes the women. Notice also the difference in the visual information above and below the subjects. You have also, no doubt, noticed that the distance between the two young men seems different. This takes us to the depth dimension.

Z-axis and Depth

The other perspective dimension that is important to consider is that of the perception of depth, or relative distances of objects along the z-axis. A normal lens replicates the same perception of depth that our eyes see. For example, if we use a normal lens to frame a subject in a medium shot with another object 5 feet behind, that object will indeed seem like it is 5 feet behind the subject in the shot.

Wide-angle lenses tend to exaggerate the depth along the z-axis, especially when close to the subject. The space between objects appears to be greater because of the relative distances between the camera and the objects along the z-axis. For example, look at the three images taken with a wide-angle lens and moving the camera, **Figure 10-10 (frames a1, b1, and c1)**. The two subjects are, in reality, about six feet apart and the z-axis perspective in shot **a1** doesn't seem exaggerated; but as we move closer with the wide-angle lens (**b1** and **c1**), the distance between them seems to grow wider and wider. This is because the distance between the subjects, relative to the distance of the camera to the foreground subject, becomes greater. Put another way, the distance between the camera and foreground subject is much shorter than the distance between that subject and the background objects (background guy and other pillars). In shot **c1**, the camera is only about a foot and a half away from the guy in the foreground, making the distance between the subjects four times greater, causing these objects to appear far from each other. The more wide angle our lens, the more it will exaggerate depth in this way. Wide-angle lenses are often used to exaggerate, for example, the space between a person (near foreground) and a destination (background), to stress the idea that they have a long way ahead of them before reaching their destination.

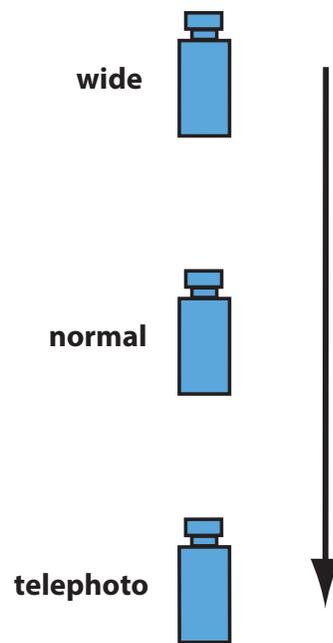
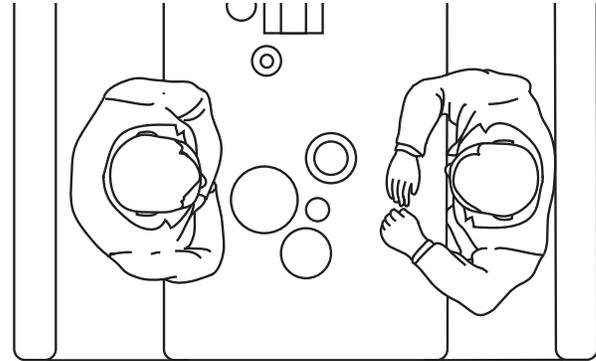
Many people like to say that shooting with a telephoto lens compresses z-axis space—but this isn't entirely true. Take a look at the **shots a, b, and c** in **Figure 10-10** as we increase the magnification (the focal length) of the scene from the stationary camera from wide to normal to telephoto. You'll notice that the sense of depth between the subjects doesn't really change all that much, that's because the position of the camera hasn't changed, only the lens magnification and angle of view. However, now compare **long shots b and b1**, and **medium shots c and c1**. This comparison clearly reveals how the tandem of focal length and camera to subject distance affects the perception of foreground to background depth in the frame. Telephoto lenses compress space along the z-axis only because we



 **Figure 10-10** Changing focal length versus moving the camera to achieve a specific shot size has a significant impact on the field of view and the perspective of the image. The *left* column shows three frames from a stationary camera: wide angle (a); normal (b); telephoto (c). The *right* column shows three frames all taken with a wide-angle lens and moving the camera. (See this as a high-resolution interactive example online.)

generally are forced to move the camera further away from the subjects to achieve the framing we're after. So we can say that **spatial compression** is a result of a high degree of magnification coupled with a farther camera-to-subject distance. Conversely, **spatial expansion** is the result of a wide-angle lens coupled with the need to move the camera closer to our subject to achieve our desired framing. We have all seen shots of a character walking among the crowds on a city sidewalk. It looks as though there is no space at all between all these people; the crowd looks like it's packed so dense that it seems they are practically walking on top of each other. This is accomplished with a very long lens, shooting from a long distance, with the depth compression effect suggesting a feeling of claustrophobia and congestion.

Now take a look again at the *Requiem for a Dream* shots in **Fig. 10-9**. The shot sizes are the same, but the *right* image was taken with a wide-angle lens from very close to the actor's face, while the left image was taken with a normal lens, further away. Another good example is the famous dolly/zoom from Martin Scorsese's *Goodfellas* (1990) which perfectly illustrates this lens phenomenon in one single shot (**Figure 10-11**). A **dolly/zoom shot** involves changing the camera-to-subject distance with a dolly while simultaneously changing the focal length to maintain the exact same framing. In the case of the *Goodfellas* diner scene, the dolly was pulled away from the subjects while the lens was zoomed in (increasingly telephoto) to maintain the same subject size. The result is that the background loses some of its horizontal and vertical field of view (notice the cars and buildings) and it also appears to be drawing closer and closer to the subjects.



■ **Figure 10-11** This single shot from *Goodfellas* used a dolly move and a zoom lens to simultaneously pull back from and zoom in to a conversation between Jimmy (Robert De Niro) and Henry (Ray Liotta). This technique effectively keeps the subjects the same size in the frame but creates substantial spatial distortion in the background, which, in this case, vividly reflects Henry’s unsettled mental state.

in practice

Understanding how the perception of depth can be manipulated with lenses is certainly vital to creating dynamic compositions, but one must also understand the narrative context of the scene or shot in order to utilize their expressive potential in appropriate ways.

Terry Gilliam is known for being a “short lens director” for his frequent use of wide-angle lenses, which is part of his directorial thumbprint. In general he is keen on showcasing as much of the location and art direction as possible, and wide lenses are the best

option for this, given their wide field of view and deep focus capabilities. However, sometimes Gilliam will pull out an extra wide-angle lens to infuse a scene with a very particular emotion. In *The Fisher King* (1991) (photographed by Roger Pratt), the protagonist Jack Lucas, in an effort to heal his comatose friend Parry, attempts to steal what Parry believes to be the true “holy grail.” In fact, the object is merely a worthless trophy cup in a rich person’s house. In the scene in which Jack, who is clearly not an experienced thief, must climb a rope to get onto the roof of the rich man’s “castle,” Gilliam uses an extreme

wide-angle lens from above and below to exaggerate the sense of height and depth and therefore the sense of mortal danger. These shots convey a strong sense of vertigo, which Jack himself must be feeling—since it looks like it is a long, long way to the pavement should he fall.

Similarly in Steven Zaillian's *Searching for Bobby Fischer* (1993) (cinematography by Conrad Hall), during the climactic scene in which the protagonist Josh faces a fearsome opponent in a children's chess tournament, a wide-angle lens is used to exaggerate the space that Josh must walk in order to reach the chess table. The wide angle of view also reveals a gauntlet of other players watching his progress to the head table. His apprehension and nervousness in the scene is conveyed by the wide-angle lens because it feels to the viewer (as it must to him) that this is the longest walk of his life (**Figure 10-12**).

On the other end of the scale are telephoto lenses, which are used to collapse space. Ramin Bahrani calls *Man Push Cart* (2005) a “long lens film,” meaning that it was shot primarily with telephoto lenses. *Man Push Cart* is the story of Ahmad, a Pakistani immigrant in New York City who is trying to start a new life for himself and his son. His main hope for survival is the tiny food cart that he rents. By shooting with a telephoto lens, Bahrani and cinematographer Michael Simmonds were able to create an overall sense of the packed and claustrophobic environment of New York City. The telephoto lens is used to particularly harrowing advantage in the scenes in which Ahmad pulls his food cart along the roadside to get to his spot early in the morning. The dangers of his morning routine are viscerally communicated in these scenes, which are shot with a telephoto lens from some distance, greatly compressing the space between Ahmad and the huge trucks that seem to be bearing down on him from all sides.



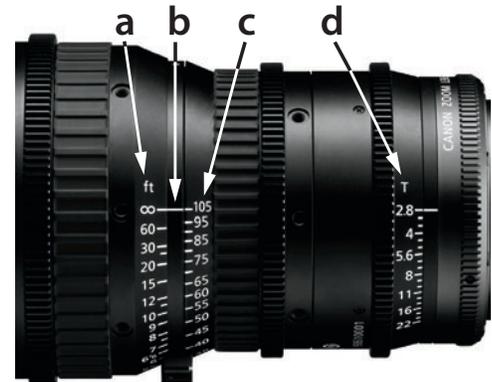
■ **Figure 10-12** Perspective can be manipulated for dramatic effect by carefully selecting the focal length of your lens. Wide-angle lens shots from Gilliam's *The Fisher King* (top left) and Zaillian's *Searching for Bobby Fischer* (top right) and two shots taken with a telephoto lens from Bahrani's *Man Push Cart* (bottom).

■ FOCUS

We all have an intuitive sense for what focus is. Images that appear fuzzy and indistinct are “out of focus” and images that are sharply defined and clear are “in focus.” But to be more precise about it, **focus** can be generally defined as when the rays of light reflecting off the subject converge to form a sharply defined image on the sensor plane; and by “sharply defined,” we theoretically mean, when a point of light reflecting off the subject is rendered as a point of light on the sensor. The **focus ring** on a lens brings a subject into focus by very precisely moving the front element of the lens forward and backward in relation to the sensor plane ϕ , which is why the focus ring is always found at the front of the lens.

When you turn the focus ring you are adjusting what is called the **focus point**, or **plane of critical focus**—that is, the precise distance to a region in front of the camera, from the sensor, that will be in sharp focus. If you set the focus ring for 10 feet, objects 10 feet away from the sensor plane will be rendered sharply, and if you set the focus ring to 25 feet, objects 25 feet away from the sensor plane will be in focus, and so on. Turning the focus ring moves the focus point along the z-axis, away from or closer to the camera.

The range of distances that you find on the focus ring scale will be from the closest to the farthest an object can be and still be brought into focus. This range usually falls between a few feet on the close end and infinity (represented on the focus ring with the symbol ∞) at the far end. The focus distances are etched on the focus ring and setting focus is done by turning the focus ring until the distance you want is lined up against the stationary **witness mark**, which is a line etched into a non-movable part of the lens barrel (Figure 10-13). The focus scale is often written in both feet and meters, so be careful not to mix up these scales. While there are some lenses that allow a camera to focus on objects within a few inches (called **Macro lenses**) most camera lenses will not focus on a subject closer than 3 feet or so. I should also note here that focus has another dimension called *depth of field*, which will be covered starting on page 248.



■ **Figure 10-13** Lens markings: the focusing ring on a lens has a series of distances engraved in feet or meters (a), which are aligned to a witness mark (b). Zoom lenses have their focal length settings in millimeters etched into the zoom ring (c) and align to the same witness mark. And the aperture ring can be found closer to the lens mount and engraved with f-stop or T-stop scale (d).

Selective Focus

Cinematographers have many visual tools to allow them to create narratively and emotionally meaningful images. Along with lighting, color, and composition, focus itself is one of a filmmaker’s most potent expressive tools. **Selective focus** is the art of using focus to guide the eye of the viewer toward critical areas of the frame. This can involve pinning focus to a fixed area of the frame to which you want to draw the audience’s attention, or it can mean shifting focus from one area to another area during a take (like from foreground to background) or it can involve shrinking or deepening the area that appears to be in focus through the manipulation of *depth of field* (see page 248). And, of course, thinking about selective focus leads one to consider the expressive benefits of having certain elements in the frame intentionally out of focus. Always remember that the visual dimension of *focus* is not just a generic technical routine to make your subject sharp—learning to control focus is an essential step for a filmmaker to achieve real visual eloquence.

in practice

Is there a creative and expressive dimension to focus? Absolutely. Selective focus is the art of deciding precisely what in the frame should be in sharp focus and what should not be in focus, and this can have a huge impact on the narrative content and emotional power

of your shots. This scene from the Coen Brothers’ film *No Country for Old Men* (2007) (Figure 10-14 left) shows Anton Chigurh (background) after he has been apprehended by a west Texas sheriff’s deputy (foreground). This is only the second scene in the



■ **Figure 10-14** Focus is carefully controlled to first conceal and then reveal the disturbing features of killer Anton Chigurh (Xavier Bardem) at just the right moment in the Coens’ *No Country for Old Men*.

film and the Coens have been careful not to show us Anton's face yet, so the precise placement of focus on the deputy, who is simply making a phone call, effectively keeps Anton a mystery—though we *can* see enough of him to know he's maneuvering his handcuffs from behind his back to his front and approaching the unaware deputy. Even though we do not know who this character is yet, the choice to obscure his face by keeping him out of focus during this action builds enormous tension, foreboding, and malevolence, so we are not entirely surprised that Anton throttles the deputy with the handcuffs the moment he hangs up the phone. It is not until Anton is well on his way to strangling the deputy to death that we get the first, sharp focus look at the face of Anton Chigurh—the face of a psychopathic killer (Figure 10-14 right).

In Tomas Alfredson's film *Let the Right One In* (2008), focus point placement is carefully controlled throughout the film to put us in the main character's point of view (Figure 10-15). In this scene, Oskar (foreground with back to us) is in class and is answering a question correctly and quite precociously. Oskar is clearly the central character here, but notice that the sharp focus is placed on the two boys to the left and right of Oskar, as they glare at him. These boys are school bullies who tease Oskar mercilessly. By maintaining the focus on Oskar's tormentors (we never see Oskar's face in this scene), this shot effectively places us in Oskar's point of view; even though he's speaking to the man at the front of the classroom, his mental focus is on the bullies because he knows he has called attention to himself and will now likely be punished for it.

The shot from Jessica Hausner's *Amour Fou* (2014) (Figure 10-16) occurs during the film's climax where the protagonist Henriette and her poet/lover Heinrich have gone into the woods to fulfill a romantic suicide pact. As Heinrich positions himself



■ **Figure 10-15** In this scene from Alfredson's *Let the Right One In*, maintaining sharp focus exclusively on Oskar's tormentors places us in Oskar's (Kåre Hedebrant) point of view.



■ **Figure 10-16** The focus in this shot from Hausner's *Amour Fou* creates tremendous tension at the film's climax by keeping the emphasis on our main character's pensive state, while obscuring the physical actions behind her.

behind Henriette and draws his gun, the camera remains sharply focused on Henriette and intentionally allows Heinrich to fall very far out of focus. Hausner and cinematographer Martin Gschlacht could have easily selected to keep Heinrich in focus or even to have them both in focus, but the intention of the shot is to keep the narrative emphasis on the protagonist's psychology and visually emphasize the dramatic question: Will she or won't she actually go through with it? Additionally, the out of focus actions behind her also pose a question: Is Heinrich even capable of doing this successfully? And just as planned, this selective focus strategy fills the climactic moment with nearly unbearable tension.

Methods for Finding Focus

When shooting video we can see the actual image that is being registered on the sensor either through the viewfinder, the LCD screen, or better yet, through a larger HD field monitor, so focusing is often done by eye. However, given the extreme resolution capabilities of HD video and the fact that many narrative projects find their way to big screen projection at some point, precise focusing is essential, and focusing by eye, especially using small LCD flip screens or viewfinders, may not be accurate enough. For this reason, you should try to use a large external HD monitor when possible and always use the **focus assist**



■ **Figure 10-17** To aid with critical focus, many video cameras offer a focus assist function, which magnifies a portion of the scene (*right*).

function that many cameras these days provide. When switched on, focus assist enlarges a small portion of the image to help find critical focus more easily (**Figure 10-17**).

On a traditional celluloid film shoot, we do not see the actual image being registered on the film, so celluloid film shoots routinely measure the distance from the sensor plane ϕ to the subject with a tape measure and then set the lens to this precise distance. Physically measuring every shot has become so automatic on professional film shoots that you will commonly see this procedure performed on sets with HD and D-Cinema video cameras.

Focusing a Zoom Lens

A quick and efficient way of finding focus when using a zoom lens has come to us from the world of Verité documentary production and it uses the telephoto range of the zoom lens as a sort of focus assist. First zoom all the way into the subject you want to have in focus (for example, the eyes of your talent). Adjust your focus until the image is sharp. Now zoom out and find the final frame for your shot. The subject will now be in sharp focus. This technique is called **presetting focus** and it's especially useful when you are shooting on the fly and needing to zoom in and out for reframing during a single take—as in many documentary situations. On page 247 I describe a common alternate procedure for quickly setting focus that involves using a camera's auto focus function (if your camera has it) in a limited way.

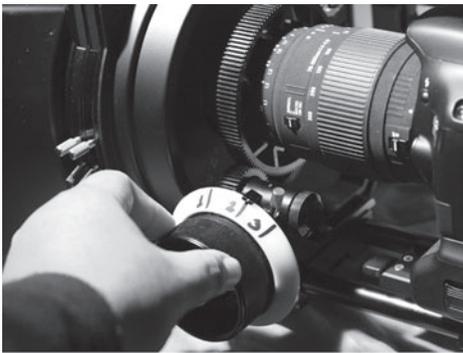
Pulling Focus

Usually, focus is something you set and leave for the duration of a shot, provided that neither the subject nor camera moves and changes the camera-to-subject distance. In these cases, you may need to adjust your focus setting during a take in order to change the plane of critical focus while the camera is running. This is called **pulling focus** and it is common practice in film production. The person who does the actual adjustments to the focus ring is the **1st A.C.** (also called the **focus puller**).

There are two kinds of focus pulling. **Rack focus** means shifting the plane of critical focus between two static subjects along the z-axis. For example, in the shot from Tim Burton's 1994 film *Ed Wood* (**Figure 10-18**), the focus begins on the background subject Dolores, Ed's girlfriend, as she looks through her closet. When she wonders out loud where her lost angora sweater is, a precisely timed rack focus shifts the visual emphasis to the foreground, and to Ed's knowing reaction, providing a humorous punch line for the scene because we know he has been secretly wearing his girlfriend's clothes. In these cases, you must find each focus point ahead of time and mark them—either on the focus ring of the lens with paper tape or on a follow focus system ring if you have one (**Figure 10-19**); this allows you to rack focus smoothly and precisely without hunting for focus.



■ **Figure 10-18** A perfectly timed rack focus provides humorous punctuation to this scene between Ed (Johnny Depp) and his girlfriend Dolores (Sarah Jessica Parker) in Burton's *Ed Wood*.



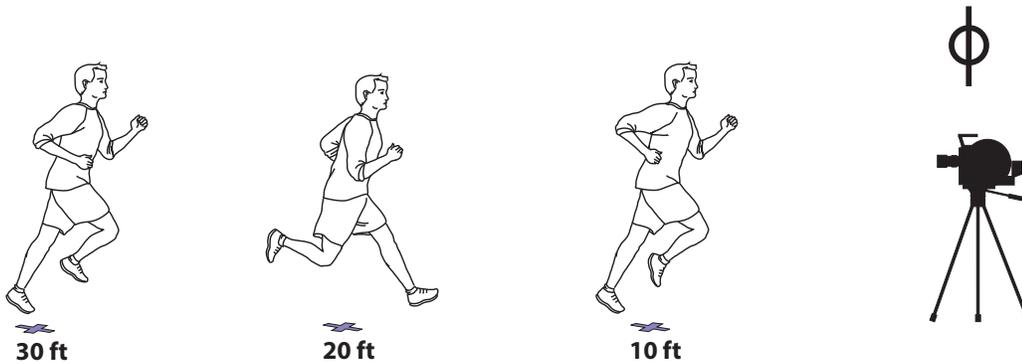
■ **Figure 10-19** A follow focus device (*top*) allows you to mark predetermined focus points for easy focus pulling. If you don't have this device, using paper tape on the barrel of a lens (*bottom*) can accomplish the same thing.

Another type of focus pulling is called **follow focus**. Follow focus is used in two cases. The first is when your subject is moving along the z-axis either closer to or farther away from the camera, and you must adjust the plane of critical focus to follow your subject's progress. For example, let's say we have a shot in which a subject begins 30 feet away from the camera, then moves to 20 feet away, and finally comes to a rest 10 feet from the sensor plane. The second case is when the camera itself moves closer or further from a static subject, as with a dolly-in or dolly-out move. In both cases we need to set marks for the focus puller, and for the actor too if they are the one moving. **Setting marks** means that we place precise markers on the ground for the actor (or the moving camera) to hit during the course of the movement. You can use tape if the ground is not seen in the shot, but if it is seen, then you should use something that will not be too obvious, like leaves or twigs. In any case, these marks are set at precise distances that correspond to the focus puller's markings on the follow focus system (or focus ring). Then, during the take, the focus puller keeps the subject in focus by smoothly following them with the plane of critical focus—hitting the same feet markings when the subject reaches each mark. Follow focus should be done in one smooth movement, not in choppy adjustments, and can require a few rehearsals to get just right (Figure 10-20). Go to the companion website for video examples of rack and follow focus.

■ APERTURE

Nestled inside a professional film production lens is a diaphragm made up of flat, metal blades that overlap in such a way that they create an opening that is nearly circular. This diaphragm is called the lens **iris** and the opening it creates is called the **aperture**. The light reflecting off your scene, and gathered by the lens, must pass through the aperture before it is registered on the sensor. The iris is an adjustable mechanism allowing the user to precisely control the size of the aperture opening and therefore the amount of light allowed to pass through the lens. This is done with the **aperture ring (or f-stop ring, T-stop ring)**. By adjusting the aperture ring, the iris either opens to allow more light or closes to allow less light to reach the sensor. Broadly speaking, the purpose of the iris is to control the amount of light striking the sensor so that we may control the exposure of the image; meaning the relative brightness or darkness of the scene being photographed.

The size of the aperture opening is calibrated to a scale called the **f-stop scale**, which is either etched into the aperture ring (on professional lenses in particular) or displayed in the viewfinder. The f-stop scale typically includes the settings: **f/1.4, f/2, f/2.8, f/4, f/5.6,**



■ **Figure 10-20** Follow focus involves the marking and timing of a subject's movement toward or away from the camera. Here, a camera assistant will shift the focusing ring as the runner hits pre-measured marks on the ground.

f/8, f/11, f/16, f/22. At first, f-stops can be a little confusing because the larger the f-stop number, the smaller the aperture opening is. Conversely, the smaller the f-stop number, the larger the aperture opening is. So a setting of f/2 lets in much more light than f/16 (**Figure 10-21**). Expanding the aperture (smaller f-stop numbers) is called “**opening up**,” and reducing the size of the aperture (bigger f-stop numbers) is called “**closing down**” or “**stopping down**.”

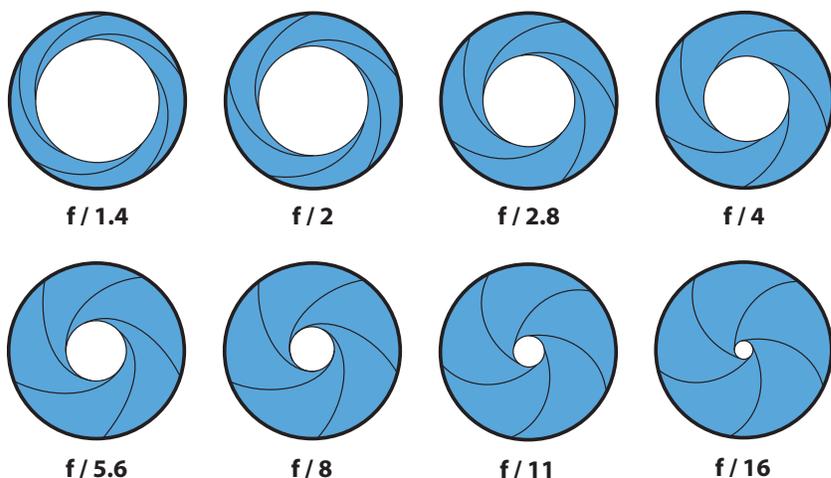
Each number on the scale is called a **stop**. So, we say there is 1 stop between f/4 and f/5.6 and 2 stops between f/4 and f/2. The difference of 1 stop has the effect of doubling or halving the amount of light allowed to pass. Opening up 1 stop from f/5.6 to f/4 allows in twice as much light. Closing the aperture from f/8 to f/11 cuts the light in half. And keep in mind that each stop, open or closed, doubles or halves the previous number, so that if we open up 1 stop we double the light ($\times 2$); if we open up another stop it is doubled again 2×2 (four times more light); if we open up a third stop we get $2 \times 2 \times 2$ (eight times more light), and so on.

As you can imagine, this range of f-stops gives you a huge amount of control over the actual amount of light hitting the camera's image sensor. A lens with f-stops from f/1.4 to f/16, in fact, offers a range in light levels of some 512 times higher or lower.

Be aware that accessing the aperture control can vary with different cameras. If you have a DSLR with a manual lens or if you are using cine-lenses on a camera designed for serious filmmaking, you turn an aperture ring that is etched with the f-stop or T-stop scale. However, many mid-level and low-end camcorders will have iris control on a lens ring or a wheel on the body that have no numbers and the f-stop setting will only be displayed in the viewfinder or LCD viewscreen (**Figure 10-22**).

F-stops and T-stops

The f-stop scale is devised through a mathematical formula. This formula, however, assumes a lens with perfect optics; meaning that 100% of the light is transmitted through the lens without any light loss. In essence, f-stops are a theoretical number because no lens has absolutely perfect optics. This can present an inaccuracy in exposure because many lenses lose a bit of light, some as



■ **Figure 10-21** The f-stop scale: as the f-stop number grows larger, the aperture opening grows smaller, and vice versa.



■ **Figure 10-22** Most film and video lenses designed for film production have engraved aperture f-stops (*left*); however, some lower-end camcorders will only show f-stops on the LCD viewscreen (*right*).

much as 1 full stop! To remedy this, many lenses show T-stops instead of, or in addition to, f-stops. **T-stops** (short for **transmission stops**) are f-stops that have been adjusted to take into account the amount of light that is lost by that particular lens—the scale itself is identical (**T/2**, **T/2.8**, **T/4**, **T/5.6**, **T/8**, **T/11**, **T/16**, **T/22**). In other words, T-stops are simply more accurate f-stops. While we refer to aperture in terms of f-stops, and light meters will give you f-stop readings, if your lens has “T-stops” etched on the aperture ring, simply use them instead (see **Fig. 10-13 d**).

Aperture and Exposure Control

The iris is actually a simple device, but it plays an enormous role in film production. Aperture is one of the four central factors that determines the **exposure** of a scene; meaning the relative brightness and darkness of a scene rendered by a video sensor. The other factors are: time (shutter speed), scene illumination (lighting), and sensitivity of the sensor (ISO). Of these four exposure variables, the aperture is by far the easiest to manipulate.

The simplest application of the iris is to control the amount of light exposing the sensor so that we achieve a generally “acceptable” image. Allow too much light through the

lens and we will have a washed out, **overexposed** image; block too much light and we will have a dark, **underexposed** image. This is why it is easy to believe that there is one “right” exposure for a scene, but this is not the case. The interrelationship between the illumination intensities of a given scene and the selection of your f-stop is a central factor in determining the look, tone, mood, and visual content of each and every shot. For any given scene, there may be a range of f-stops that will give us an “acceptable” image, but each setting option can inflect the image in various ways (**Figure 10-23**). With more than one option, the decision always boils down to the questions: What do you want to communicate with this shot in terms of mood, style, and meaning, and which f-stop will create the image that best expresses your ideas? In fact, understanding apertures and exposures is so essential to the filmmaker’s creative palette that I have dedicated two chapters later in the book to this topic (see Chapters 12 and 14).



■ **Figure 10-23** This stunning image from Pawlikowski’s *Ida* (2013) (cinematography by Ryszard Lanczewski) shows the impact of choosing exposures carefully and creatively. Rather than exposing for the character’s face, the aperture is set to expose the curtains behind her correctly, making her almost, but not quite, a silhouette. Yet the metallic religious amulet she wears around her neck remains reflective and bright.

Lens Speed

The ability of a lens to gather light is determined by the largest possible f-stop of that particular lens. We refer to this ability as **lens speed**. A **fast lens** can open up to allow

more light than a **slow lens**. The larger the maximum aperture can be, the faster the lens is. A lens with a maximum aperture of $f/1.4$ is a very fast lens and can register a readable image with very little light. So, why are some lenses faster than others? What limits the ability of a lens to gather light are the optics—the number and quality of the glass elements. For this reason, wide-angle lenses are generally faster than telephoto lenses (fewer elements) and zoom lenses tend to be much slower, as their construction requires many more elements. A lens speed of only $f/3.5$ is not uncommon for a zoom lens. The maximum f-stop number is usually etched into the front of the lens barrel and can sometimes fall between the usual numbers found on the f-stop scale.

Automatic versus Manual Lens Functions

Many video cameras provide an automatic setting option for both focus and aperture. As I mention throughout this book, it is preferable to turn off all automatic functions. **Manual settings** ensure that the filmmaker is in control of all variables and therefore in control of how their film looks. Remember, choosing your focus and your f-stop are creative and aesthetic choices: Why would we want to hand those important visual decisions to an impassive machine with no aesthetic judgment at all?

Two significant problems with the **auto focus** function are that it favors objects in the center of the frame—which might not be appropriate for the composition you want—and it tends to shift focus during a shot when anything moves across the foreground of the frame. Auto focus is also easily confused by images with multiple planes along the z-axis. For example, shooting a character who is 10 feet behind a chain-link fence can make an auto focus mechanism go crazy, shifting arbitrarily from the fence to the character and back to the fence, hunting for focus (**Figure 10-24**).

Auto focus can, however, be used for quickly setting focus when using a zoom lens. The procedure, which is automatic for experienced camera operators shooting documentaries or other handheld scenes, goes like this:

1. Put the camera in auto mode (or simply press the AF button)
2. Zoom in to what you want to be in focus and allow the auto focus to choose its setting
3. Flip back into manual mode, pull back and compose your frame. The camera will now hold your focus point. Also, if a car should pass through in the foreground, your camera will not try to adjust the focus setting.

The same advice goes for the **auto iris** function (also called **auto exposure**). A video camera's **through the lens meter (TTL)** is usually center averaging, which means it favors the center of the frame and takes an average meter reading to achieve a basically *acceptable*



■ **Figure 10-24** Video cameras set to auto focus have trouble deciding where to focus in situations with multiple planes. Switching to manual focusing solves this problem, letting the users set the focus according to their needs.



■ **Figure 10-25** Auto iris functions often give priority to the center of the frame. As a result, if the subject is placed off-center, the camera's light meter will not read it properly. In this example, the sunlit traffic in the background is exposed properly, but our subject is underexposed.

image (instead of an *expressive* one). And, just like auto focus, the auto exposure mechanism of a video camera can easily be fooled. First, if your subject isn't in the center of the frame, the center averaging meter can easily choose an unacceptable exposure. Also, extreme background luminance (very bright or very dark) often cause the averaging meter to compensate in extreme ways making subjects in the foreground way over or under exposed (**Figure 10-25**). Finally, and most frustratingly, any temporary shift in brightness can cause the auto iris to bluntly adjust in the middle of a shot. For example, say we're shooting a subject in a dark shirt, standing in a shady area, and during the shot a passerby in a bright white T-shirt crosses in front of him. The in-camera meter will detect the bright object and trigger the auto iris to quickly close down, to maintain that "average" exposure (**Figure 10-26**). When the passerby leaves the frame the auto iris will respond and open up again. The same spasmodic iris opening and closing phenomenon also happens if we pan across a scene with various light and dark areas.

Generally, when we're shooting a narrative film we're working with the **manual aperture override** (also called **manual exposure**) function on your camera. However, there are some uses for the auto iris function, and we will discuss this issue in much more detail in Chapter 12.

■ DEPTH OF FIELD

As we discussed in the section on focus, the point at which the lens focus is actually set, and there can be only one setting for a given situation, is called the **focus point** (or plane of critical focus). However, when we look at an actual video image, we notice that there is always an area, both in front of and behind this plane of focus, that also *appears* to be in focus (**Figure 10-27**). This range of apparent focus along the z-axis is called the **depth of field (DOF)**. The relative depth or shallowness of this area is not fixed. It can be as shallow as a few inches or as deep as infinity (!) depending on a number of variables. Also, what is especially important is that, to a certain extent, this range can be controlled. As with every other controllable variable associated with the lens, depth of field



■ **Figure 10-26** The sudden appearance of a bright object in the frame will trigger the auto iris function to adjust the exposure in midshot to compensate, only to change it again after the object leaves the frame.

can and should be manipulated in order to serve the content and visual style of your movie (see **Fig. 3-12** in Chapter 3).

Creating a frame with a **shallow depth of field** makes your subject stand out from the environment and gain prominence in the frame, because objects both in front of and behind the subject are out of focus and indistinct. Adopting a **deep depth of field** increases the amount of information we see along the z-axis and therefore you gain environmental detail that can inflect the mood of the scene and the narrative content. Learning to control depth of field and use it creatively is a big step toward harnessing the aesthetic power of a lens for your needs (**Figure 10-28**). There is a practical dimension to DOF as well. If, for example, you have a lot of character movement away from and toward the camera, you might think about using a deep depth of field to keep your subject in focus without having to resort to complex focus pulling.

Controlling Depth of Field

The primary factor in determining depth of field is the size of the **sensor format**. The smaller the format, the deeper the depth of field tends to be, and the larger the format, the easier it is to achieve a shallow DOF. It is difficult to get a shallow depth of field with a camcorder that has a $\frac{1}{3}$ " sensor; on the other hand, a DSLR or hybrid camera with a super 35mm sensor easily creates shallow DOF—but you may struggle somewhat to achieve a deep focus effect. However, as one of the DOF controllable variables, sensor format is not especially flexible because camera systems are usually chosen for reasons other than depth of field potential. Students especially wind up using whatever camera is available on loan from the department. Thankfully, there are three other variables that determine the actual range of DOF over which we have more control:

- *The aperture opening.* The larger the aperture opening (smaller f-stop numbers), the shallower the DOF will be, and the smaller the aperture opening (larger f-stop numbers), the deeper the DOF will be. That is why scenes shot in very low-light situations have such a shallow depth of field that we sometimes can see an eye in focus, but the ear, just a few inches back, is out of focus (as in **Fig. 10-28**). Conversely, scenes shot in brightly lit environments can have a DOF so deep that it appears that everything in the background, as far as we can see, is in focus.
- *The focal length of the lens.* The longer the focal length of the lens, the shallower the DOF will be, and the shorter our lens, the deeper our depth of field will be. Wide-angle lenses create deeper depth of field than telephoto lenses.



■ **Figure 10-27** Depth of field is the range of apparent focus in front of and behind the actual focus distance. This allows multiple subjects along the z-axis range to appear in focus, as in this shot from the Coen Brothers' *The Big Lebowski* (1998) where the coffee can (*foreground*), Walter (*mid-ground*, John Goodman), and The Dude (*background*, Jeff Bridges) all appear to be in sharp focus.

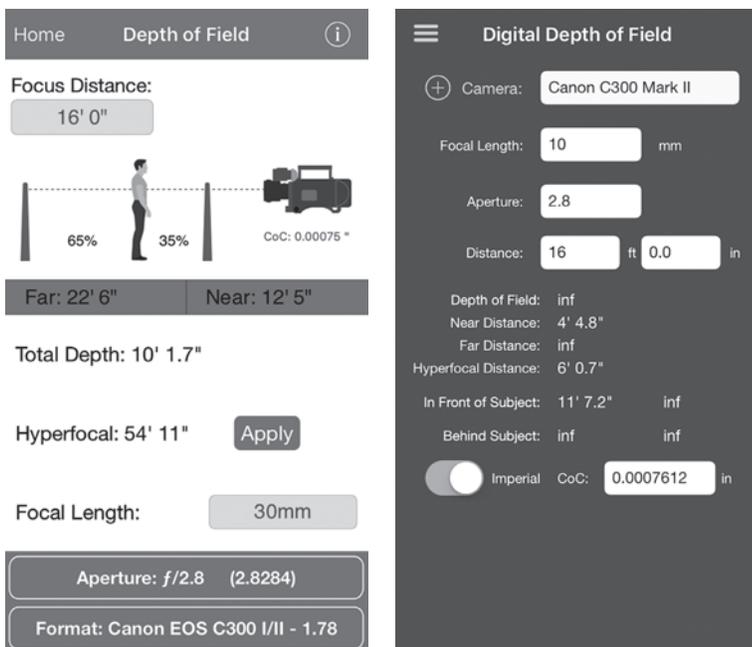


■ **Figure 10-28** The very shallow depth of field in this scene from Payne's *Sideways* (2004) causes Miles (Paul Giamatti) to fall in and out of focus, reflecting his inebriated state when he places an ill-advised call to his ex-wife.





■ **Figure 10-29** Controlling DOF through aperture. Both of these images were shot with the same lens and focus distance (the double dot fret position marker). The *left* image was shot at $f/22$ and gives us a deep DOF, notice that the bridge pins are in focus. Adding ND filters to reduce the light entering the lens allowed the aperture to open up to $f/4$ which resulted in a much shallower DOF (*right*), now the bridge pins and foreground strings are out of focus.



■ **Figure 10-30** Many DOF calculators are available as apps for your portable devices, like this pCam iPhone app (*left*), and the Digital DOF app (*right*). Both accurately calculate the far and near distance of the DOF when all of the variables are entered.

- *The focus point setting (distance of the plane of critical focus).* The closer to the camera the focus setting, the shallower the depth of field will be, and the farther away we place the plane of critical focus, the deeper the DOF will be.

It should be fairly obvious that controlling DOF by changing your focal length or focus point setting isn't always possible because it has substantial aesthetic implications on the compositional and perspective aspects of your shot. That leaves aperture as *the* most flexible variable determining the actual DOF range, and there are ways that we can manipulate aperture without having a significant impact on the desired exposure. For example, if we want to close down the aperture to get deeper DOF, we can add more light to the scene (especially if we're shooting in an artificial lighting situation) or increase the sensitivity of our sensor ISO. Conversely, employing neutral density (ND) filters to cut the light entering the lens (see page 314) or decreasing the sensitivity of the camera's ISO allows us to open up our

aperture to achieve a shallower DOF (**Figure 10-29**). In both cases, however, the ISO solution can be tricky because if you alter the sensitivity of your sensor too drastically the texture of the image changes and it will be difficult to cut this footage seamlessly with your other shots.

When shooting with a large HD monitor in the field, we can see the DOF range fairly well, but using the field monitor isn't precise enough, especially when planning shots where selective focus is critical. In these cases filmmakers often use DOF calculators to get a very precise measure of the potential DOF range (**Figure 10-30**).

To get a direct idea for how the variables affect the actual depth of field range, I created these DOF tables (**Figure 10-31**). These tables take into account all the DOF variables that you'd enter into any calculator:

- *The format* is the Super 35mm sensor (found in the Canon C300); other formats, like $\frac{1}{3}$ ", APS-C, or full frame video, require different tables.

Lens Focal Length: 30mm		Sensor Format: Super 35mm (Canon C300 Mk II)												CoC = 0.019mm		
focus distance (feet)	f/2		f/2.8		f/4		f/5.6		f/8		f/11		f/16		f/22	
	Near	Far	Near	Far	Near	Far	Near	Far	Near	Far	Near	Far	Near	Far	Near	Far
3	2' 11"	3' 1"	2' 10"	3' 2"	2' 9"	3' 3"	2' 9"	3' 4"	2' 7"	3' 6"	2' 6"	3' 10"	2' 4"	4' 3"	2' 1"	5' 2"
4	3' 10"	4' 2"	3' 9"	4' 3.7"	3' 8"	4' 5"	3' 6"	4' 8"	3' 4"	5'	3' 1"	5' 7"	2' 10"	6' 8"	2' 7"	9' 3"
6	5' 7"	6' 6"	5' 5"	6' 8.7"	5' 2"	7' 1"	4' 11"	7' 8"	4' 7"	8' 7"	4' 2"	10' 6"	3' 9"	15' 4"	3' 3"	42' 8"
8	7' 3"	8' 11"	7'	9' 4.1"	6' 8"	10' 1"	6' 3"	11' 3"	5' 8"	13' 6"	5' 1"	18' 10"	4' 5"	42' 11"	3' 9"	∞
10	8' 10"	11' 6"	8' 6"	12' 2"	8'	13' 5"	7' 4"	15' 8"	6' 7"	20' 5"	5' 10"	35' 10"	4' 11"	∞	4' 1"	∞
12	10' 5"	14' 2"	9' 10"	15' 4"	9' 2"	17' 4"	8' 4"	21' 2"	7' 5"	31'	6' 5"	90'	5' 5"	∞	4' 5"	∞
14	11' 11"	17' 1"	11' 2"	18' 9"	10' 4"	21' 10"	9' 4"	28' 4"	8' 2"	49' 3"	6' 11"	∞	5' 9"	∞	4' 8"	∞
16	13' 3"	20' 1"	12' 5"	22' 6"	11' 4"	27' 1"	10' 2"	38'	8' 10"	88'	7' 5"	∞	6' 1"	∞	4' 10"	∞
18	14' 8"	23' 5"	13' 7"	26' 8"	12' 4"	33' 5"	10' 11"	52'	9' 4"	229'	7' 10"	∞	6' 4"	∞	5'	∞
20	15' 11"	26' 11"	14' 8"	31' 4"	13' 3"	41'	11' 7"	73'	9' 10"	∞	8' 2"	∞	6' 7"	∞	5' 2"	∞
30	21' 8"	48' 9"	19' 5"	66'	16' 11"	130'	14' 4"	∞	11' 10"	∞	9' 5"	∞	7' 4"	∞	5' 7"	∞
40	26' 5"	82'	23' 2"	146'	19' 9"	∞	16' 4"	∞	13' 1"	∞	10' 3"	∞	7' 10"	∞	5' 10"	∞
50	30' 5"	140'	26' 2"	545'	21' 11"	∞	17' 9"	∞	14'	∞	10' 10"	∞	8' 2"	∞	6' 1"	∞
∞	78'	∞	55'	∞	38' 11"	∞	27' 7"	∞	19' 6"	∞	13' 10"	∞	9' 10"	∞	7'	∞

Lens Focal Length: 100mm		Sensor Format: Super 35mm (Canon C300 Mk II)												CoC = 0.019mm		
focus distance (feet)	f/2		f/2.8		f/4		f/5.6		f/8		f/11		f/16		f/22	
	Near	Far	Near	Far	Near	Far	Near	Far	Near	Far	Near	Far	Near	Far	Near	Far
8	7' 11"	8' 1"	7' 11"	8' 1"	7' 10"	8' 2"	7' 10"	8' 2"	7' 9"	8' 3"	7' 7"	8' 5"	7' 6"	8' 7"	7' 3.2"	8' 11"
10	9' 11"	10' 1"	9' 10"	10' 2"	9' 9"	10' 3"	9' 8"	10' 4"	9' 7"	10' 6"	9' 5"	10' 8"	9' 2"	11'	8' 10"	11' 5"
12	11' 10"	12' 2"	11' 9"	12' 3"	11' 8"	12' 4"	11' 7"	12' 6"	11' 5"	12' 8"	11' 2"	13'	10' 10"	13' 6"	10' 5"	14' 2"
14	13' 9"	14' 3"	13' 8"	14' 4"	13' 7"	14' 6"	13' 5"	14' 8"	13' 2"	14' 11"	12' 10"	15' 5"	12' 5"	16'	11' 11"	17' 1"
16	15' 9"	16' 4"	15' 7"	16' 5"	15' 5"	16' 7"	15' 3"	16' 10"	14' 11"	17' 3"	14' 6"	17' 10"	14'	18' 9"	13' 3"	20' 2"
18	17' 8"	18' 5"	17' 6"	18' 6"	17' 4"	18' 9"	17'	19' 1"	16' 8"	19' 7"	16' 2"	20' 4"	15' 6"	21' 6"	14' 7"	23' 5"
20	19' 7"	20' 6"	19' 5"	20' 8"	19' 2"	21'	18' 10"	21' 5"	18' 4"	22'	17' 9"	23'	16' 11"	24' 6"	15' 11"	26' 11"
30	29'	31' 1"	28' 7"	31' 6"	28' 1"	32' 3"	27' 4"	33' 3"	26' 5"	34' 9"	25' 1"	37' 3"	23' 6"	41' 5"	21' 7"	49' 1"
40	38' 3"	41' 11"	37' 7"	42' 9"	36' 8"	44' 1"	35' 5"	46'	33' 10"	49'	31' 9"	54'	29' 3"	63'	26' 4"	83'
50	47' 3"	53'	46' 3"	54'	44' 10"	57'	43'	60'	40' 8"	65'	37' 9"	74'	34' 3"	93'	30' 3"	143'
75	69'	82'	67'	85'	64'	91'	60'	99'	56'	115'	50'	147'	44' 4"	243'	37' 11"	3488'
100	90'	113'	86'	120'	81'	130'	75'	148"	68'	186'	60'	288'	52'	1308'	43' 4"	∞
∞	864'	∞	611'	∞	432'	∞	306'	∞	216'	∞	153'	∞	108'	∞	77'	∞

■ **Figure 10-31** Two DOF tables for the Super 35mm sensor format (as found on the Canon C300). The *top* table is for a 30mm lens and the *bottom* table is for a 100mm lens. All DOF variables are represented on the table.

- *Lens focal length* is located at the top left of the chart. The two charts here are for a 30mm lens (a “normal” lens for this format) and a 100mm telephoto lens.
- *Focus distance* options are located down the left vertical column.
- *f-stop settings* are on the top, horizontal column.

So now let’s see how these variables affect DOF very specifically.

Look at the DOF table for the 30mm lens (normal lens) (**Figure 10-31 top**). If we are focused at 16 feet with an aperture of f/2.8, we can see that the DOF range is 12’ 5” to 22’ 6”. All objects between these points will appear to be in focus even though your actual plane of critical focus is 16 feet. The total range of apparent focus along the z-axis is therefore 10’ 1”. Now read across the f-stop scale for the same focus point (16 feet) and you will see the DOF get deeper as the aperture gets smaller, and as the aperture opens up, the DOF gets shallower. Now, read down the various lens focus distances for f/2.8 and you will notice that the DOF gets shallower the closer the focus point distance is, and deeper the farther the focus is set.

Now let’s say we change our lens to a telephoto lens. Look at the table for the 100mm lens (**Figure 10-31 bottom**) and compare the same settings (focus at 16 feet

and aperture at $f/2.8$). The DOF is 15' 7" to 16' 5". The range is only 9 inches—much shallower.

Now, check out the DOF calculation on the Digital DOF smartphone app in [Figure 10-30 right](#); you'll see the same settings (focus distance at 16 feet and aperture at $f/2.8$), but this time calculated for a 10mm lens. Now, with the wide-angles lens, the DOF range is from 4' 5" to infinity!

Look again at the examples for setting focus for narrative and emotional impact (In Practice box starting on page 241), you now understand that it's not just a matter of where you set your focus ring, but you must also understand just how deep the focus range is in order to accurately achieve the shot you want. In [Fig. 10-14](#), using a wide-angle lens and lots of light (small aperture) might have brought Anton Chigurh into the DOF range and the character would have lost much of his menace and mystery. For [Fig. 10-15](#), a DOF only a few feet deeper would have brought Oskar and all the other children into sharp focus and we may not have even noticed the bullies, and the shot would have lost its tension and meaning. A wide-angle lens and smaller aperture would have made both figures in [Fig. 10-16](#) in sharp focus and the scene would have lost much of the emphasis and emotion of this climactic moment.

DOF Range Distribution

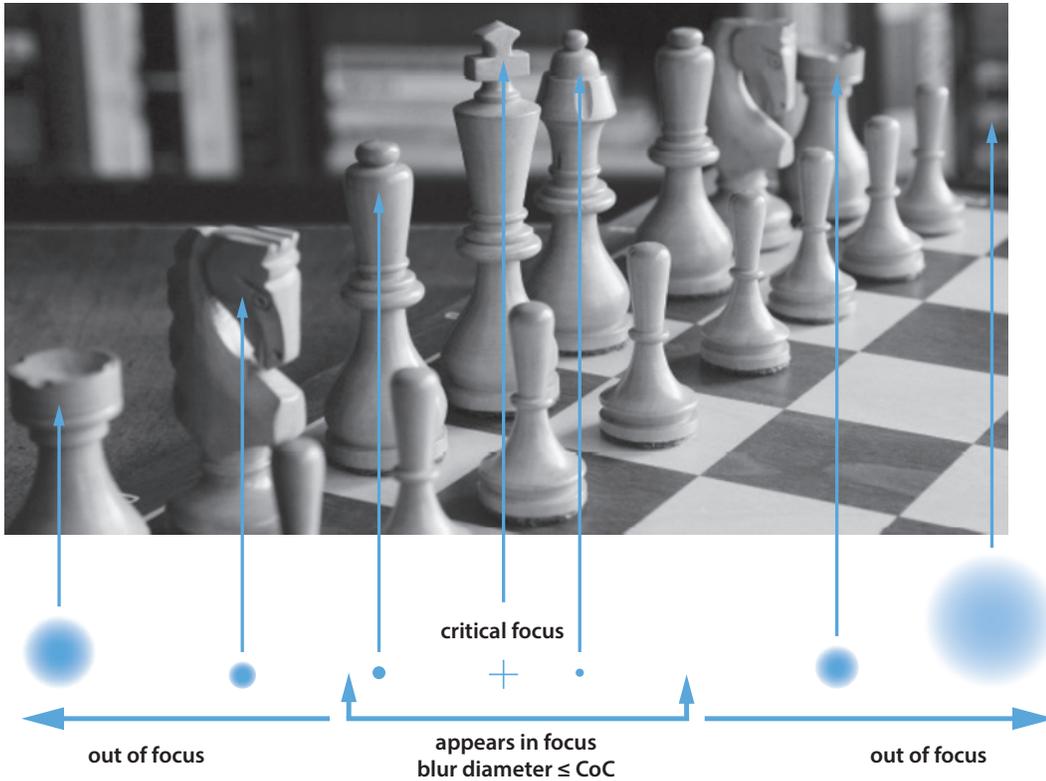
You may have noticed when you compare the actual focus point setting versus the near and far parameters of the DOF range that more of the DOF range seems to be behind the focus setting than in front of it (see [Fig. 10-30 left](#)). This is always the case. Depending on the lens and aperture, the actual amount of the DOF range in front of or behind the focus point will change—but you'll always have more of the DOF behind your subject. Knowing exactly how much of the range of apparent focus is in front of or behind your subject can be important when you are moving subjects into or out of focus, or if you want to keep subjects strictly within the DOF parameters so that they remain in focus.

Circle of Confusion

So now we know that depth of field is a phenomenon of an *apparent* focus range along the z-axis, but why does this happen? Why do objects that are in front of or behind the plane of critical focus look sharp at all? Critical focus, as we have defined it, is achieved when a point of light coming off our subject is registered as a point of light on the sensor plane and we know that there is only one setting that will be truly in focus (e.g., focus point is 20 feet). This means that the light points emanating from the area in front of and behind the plane of critical focus are not registered as points; rather, they begin to spread larger and larger and get fuzzier the farther away their origin is from the focus setting point, some call this a “blur spot.” However, neither the human eye nor a video sensor can distinguish between *very small degrees* of unsharpness. Therefore, there is an acceptable blur diameter size to which a point of light can spread (be technically out of focus) and still *appear* to be in sharp focus. The measurement of acceptable blur diameter, which maintains the appearance of focus, is called the **circle of confusion (CoC)**

Take a close look at [Figure 10-32](#). In this shot the critical focus is on the King, but the neighboring Queen (behind and right) and King's Bishop (in front and left) appear to be in focus as well because their focus points fall within the circle of confusion. As we move deeper or closer along the z-axis, objects become increasingly out of focus. The furthest point away from the plane of critical focus are the books, and they are the blurriest.

The specific blur point diameter limit for the circle of confusion is determined by the shooting format. For the Super 35mm sensor format that I've been using for these DOF calculations (found in many cameras like the Canon C-300 MkII), a point of light can spread to a diameter of 0.00075" (or 0.019mm) on the sensor, and still appear to be in sharp focus. Beyond that diameter, the image starts to appear fuzzy. You can find the CoC for a



■ **Figure 10-32** Circle of confusion: although technically out of focus, if the diameter of a blur point is smaller than the ability of the sensor to perceive its blurriness, it will appear to be in focus because it is within “acceptable sharpness” for the imaging format.

shooting format on any DOF calculator app (see Fig 10-30). Every format size has its own acceptable CoC measurement.² The CoC for the APS-C format (Canon 7D/T3i) is 0.00073 and the Micro Four Thirds format (Lumix GH4) is 0.00059”. The CoC of a 1/2” HD sensor is 0.00028” and for a 2/3” HD sensor it is 0.00035”, and so on.

² Because sensor size is highly proprietary these days, many DOF calculator apps determine CoC by camera make and model rather than general sensor types.



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Camera Support

It doesn't matter what format or which camera you are using to shoot your movie, deciding if your camera should move during a shot, and how you want the camera to move, is as important to the tone, style, and meaning of your film as the lighting, locations, costumes, or any other creative element. Directly related to camera movement is the critical factor of **camera support**; that is to say, what will hold your camera? Whether you're panning, tracking, following, craning, or even remaining stationary, choosing the appropriate camera support is vital. You need to understand the equipment you have available to you and the expressive potential each piece of gear allows so that you can achieve the aesthetic impact you want.

For example, maybe you and the D.P. decide that your film would best be told as a series of meticulously lit and composed static compositions, where the camera never moves, as with *Ida* by Pawel Pawlikowski (2013) (cinematography by Lukasz Zal) where every frame is absolutely stationary with the only exception being a few tracking shots in the last two minutes of the film; or perhaps you conceived the visual style of your film to be similar to Alejandro González Iñárritu's *Birdman or (The Unexpected Virtue of Ignorance)* (2014) (shot by Emmanuel Lubezki), with long, tracking shots that trail characters fluidly down corridors, through doors, and from inside to outside to follow the unfolding drama in real time; or perhaps you want to invoke hard realism and explosive nervous energy through a restlessly moving, seeking, lurching, edgy handheld camera, as we see in a film like *The Hurt Locker* by Kathryn Bigelow (2008) (D.P. Barry Ackroyd) (**Figure 11-1**).

All three of these choices were perfectly suited to the content and concept of each film, and each one required a different kind of camera support. You need to ask: What will allow me to achieve the particular look I'm after? And, of course: Do I have or can I afford what I need to achieve that look? The way you support your camera is central to achieving the visual style you're seeking. Let's take a look at some options.

■ THE HANDHELD CAMERA

The cheapest and most readily available method of camera support is the human body. "Going handheld" means using your hands, arms, and shoulder for holding and moving the camera. Handholding a camera always introduces some human instability in the image because the frame reveals the movements of the camera operator, and no matter how steady the operator is, a handheld camera is never as stable as one mounted on a tripod; nor should it be. The movement obtained with a handheld camera has an aesthetic quality that recalls the documentary style of Direct Cinema, and this quality has been used to great effect to



■ **Figure 11-1** Precisely composed frames and a stationary camera match the contemplative tone of Pawlikowski's *Ida* (top). In Iñárritu's *Birdman* (center) much of the film is shot with a smoothly gliding camera, creating a "real-time" feeling that reflects the theatrical content. Bigelow's *The Hurt Locker* (bottom) uses handheld cameras to reflect the danger and nervous tension experienced by an Army bomb disposal squad in Iraq.



■ **Figure 11-2** Handholding a small digital camcorder or DSLR can feel easy at first, but maintaining control using only your hands for stability can become challenging over time (*left*, filmmaker Diana Logreida with a Panasonic DVX-100). Handholding is clearly more physically demanding with larger film or video cameras (*right*, cinematographer Rain Li with an Arriflex 435).

add a sense of immediacy, spontaneity, and direct involvement in numerous narrative films, including *Fruitvale Station* (2013) by Ryan Coogler; *District 9* (2009) by Neill Blomkamp; *Eternal Sunshine of the Spotless Mind* (2004) by Michel Gondry; and *La Promesse* (1996) by the Dardenne Brothers. All of these films, though from very divergent genres, were shot entirely or mostly with a handheld camera.

Using a handheld camera is not as easy as simply grabbing a camera with your hands and shooting. We've all seen plenty of home movie footage that's so jittery that we had no idea what the subject was and watching it makes us nauseous. Techniques for handheld shots require practiced skills and a great deal of body control and strength to keep from looking haphazard, or sloppy, or from not adequately showing what needs to be shown to tell the story (**Figure 11-2**). If you decide to go handheld, your movements should be as controlled as possible. Don't worry that it will look like a tripod shot; it won't. It will look handheld. If what you're after are super smooth moves and rock-steady compositions, then don't go handheld in hopes that no one will notice the human movements; they will. *Controlled imperfection* is the aesthetic point.

Here are a few tips for shooting with a handheld camera:

- Camera movement comes from the body, not just the hands. Use your entire body—feet, legs, torso, arms, and hands—to perform a camera move.
- Keep your knees bent and loose, like a skier, for shock absorption.
- Stay toward the wide-angle end of the lens. A telephoto lens only magnifies the jitter and instability of the frame. Use wider-angle lenses and move in close for tight shots and out for longer shots.
- Breathing should be long and steady. Don't hold your breath or you will find the need to gasp for air in the middle of a shot, causing an inevitable jerk of the frame.
- Don't hold the camera rigid. Rhythm, grace, and controlled movement are key.
- Take advantage of the pivoting LCD screen (or small portable monitors) to go beyond eye-level shots. These monitors allow you to remove your eye from the viewfinder yet see your compositions even when the camera is dangling low from your arm or held aloft far over your head.
- Practice, practice, practice. Like any other creative skill, you get better at handholding a camera by doing it over and over again. Great cinematographers who are skilled at handheld technique, like Christopher Doyle, Rachel Morrison, Anthony Dod Mantle, Maryse Alberti, and Thomas Mauch, are great because they've handled a camera nearly as often as a great pianist has touched the piano keys or a tennis pro has swung a racket. No great skill is acquired without effort, learning, and practice.

Shoulder Mounts

Large camcorders and 16mm film cameras, common before the advent of small HD digital video cameras, had the advantage of being heavier and long enough to mount on your shoulder. While this would not necessarily seem like an advantage—after all, more muscle is required to support a heavier camera—the footage from cameras that mount on an operator’s shoulder are far more controlled and smoother than images from small, feather-light cameras, like DSLRs or Black Magic’s Production camera, held only in the operator’s hands. Also, the lens of a shoulder-mounted camera rests at approximately the same level as the eye of the cinematographer, creating what may feel like a more natural perspective for the viewer than a camera at torso-level, where many small cameras are more comfortably held.

For these reasons, many cinematographers working with DSLR and other small digital cameras prefer to use a **shoulder-mount rig** when going handheld (Figure 11-3). When choosing a shoulder mount, it is important to consider what type of camera you are using. Some rigs can accommodate several types of cameras, while others are suited to one specific model. It is also possible to add additional equipment to the mount, increasing both its functionality and its weight. Common add-ons include a small external monitor, follow focus systems, external batteries, matte box and filter holders, and receivers for wireless microphones.

Given the amount of gear one can affix to the shoulder rig, it’s critical that it be properly balanced. Proper balance means that the weight should be borne primarily on your shoulder and the weight should not pitch forward or backwards, or to one side. An improperly balanced shoulder rig will force the camera operator to use their arms to hold up the front end, which is difficult for long filming periods and likely to produce back injuries. Adding battery packs, wireless systems, or weights to the back of the shoulder mount allows the operator’s body to do the work of supporting the camera, and gravity helps the camera stay balanced and increases the amount of control the operator has over its movements.

■ THE TRIPOD

Tripods are perhaps the most common form of camera support. Their design has remained essentially unchanged since the earliest years of cinema (Figure 11-5). **Tripods** are a three-legged support designed to both hold the camera steady for precise subject framing and to allow for fluid pans, tilts, and compound moves. Professional tripods are especially adjustable, allowing a filmmaker to frame and maneuver with a precision and fluidity not possible with a handheld camera.

A tripod can be broken down into two major components: the head and the legs (also called sticks). Some less-expensive tripods are constructed with the *head* and *legs* in one unit, but the most flexible tripods are those that are designed as systems, so that each component is separate and interchangeable to fit a variety of production situations (Figure 11-6).

Tripod Head

In terms of movement precision, the most important component of any tripod is the **head**. The tripod head is where the camera is mounted and is the component that swivels left and right for panning, and up and down for tilting. The quality of the head greatly affects the smoothness of the camera moves. Tripod heads also come in different sizes to accommodate various camera weights. A small head, like the Cartoni Focus HD, is designed specifically for lightweight HD cameras up to 26 pounds. Larger heads, like the Miller DS60, are built to accommodate the bulk of large video camcorders and heavy film cameras weighing up to 65 pounds. For smooth, controlled camera moves, and even for safety’s sake, the tripod weight rating should match the camera being used.



■ **Figure 11-3** With small digital cameras and DSLRs, camera operators often prefer to use a shoulder-mount rig to improve control for handheld shots.

A good example of how camera support and handling can add an additional emotional layer to a narrative can be seen in Gemma Lee's award-winning short film *The Wake*, one of the films streaming on the *Voice & Vision* companion website. *The Wake* tells the story of Jonathan, a social misfit who shows up at the wake of an old friend's father. Even though the film comprises mostly verbal interactions between two or three characters in contained spaces, Lee and her cinematographer Simon Ozolins decided not to employ the stability of a tripod, and instead went handheld for every shot. Rather than use a traditional shoulder-mount rig, Ozolins used an Easyrig® mount which puts the weight of the camera on the operator's hips and dangles the camera on a cable in front of the operator. Going handheld has obvious practical advantages because not having to move, position, and re-balance a tripod (or lay tracks for a dolly) with every new setup saves on production time. But there are also risks; if the camera operator isn't experienced in handheld camera technique the result could be the opposite, with sloppy camerawork requiring more takes per shot. In any case, more important than the practical advantages are the indispensable aesthetic contributions that the handheld camera brings to *The Wake*. As with other films, handholding the camera lends a degree of immediacy and realism to the look, but in *The Wake* there is something else going on. The handheld unevenness of the camera is carefully controlled and not particularly overt or obvious to the viewer, yet it does provide a degree of instability and precariousness



■ **Figure 11-4** D.P. Ozolins and his Easyrig® system on the set of Lee's short film *The Wake*.

to the image, which in turn conveys (and adds to) the discomfort and awkwardness of both the solemn occasion and Jonathan himself, who consistently teeters on the edge of doing the wrong thing for the circumstances (**Figure 11-4**).



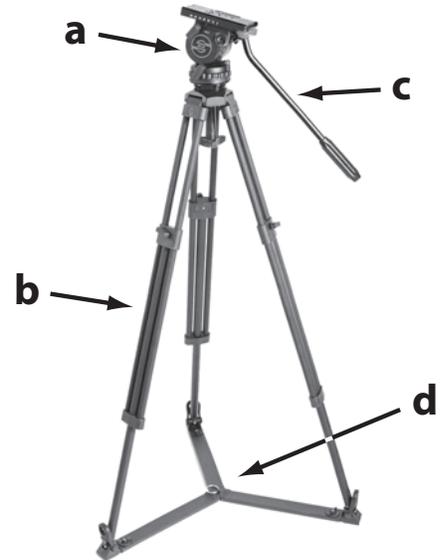
■ **Figure 11-5** The tripod has been used since the early history of filmmaking, as seen in Vertov's film *Man with a Movie Camera* (1929).

An important factor determining the quality of the tripod's panning and tilting abilities is the **resistance mechanism**. Smooth moves with a tripod are accomplished by adjusting the resistance of the tripod head against the weight of the camera and the speed of the move. A very slow pan, for example, is smoothest with heavy drag on the pan mechanism. The two types of resistance mechanisms you're likely to come across for low-budget film production are **fluid heads** and **friction heads**. Fluid heads use pressurized hydraulic fluid to provide the adjustable drag necessary for smooth camera moves. Friction heads use the surface friction between internal plates, sometimes lined with cork, to create movement resistance. Fluid heads are more expensive but they also give you much more precise and varied adjustments to facilitate your camera move, and they generally have a smoother and more even action throughout the panning and tilting

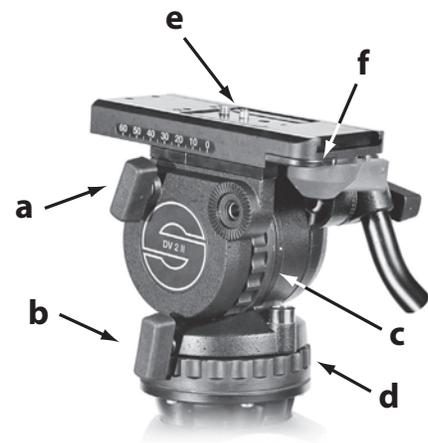
range. Whenever possible, avoid friction head tripods especially if your film involves pans and tilts.

There are several features on a tripod head that are common to all professional tripods, and you should locate these right away (Figure 11-7):

1. **Pan and tilt locks** completely lock down the mechanism, keeping the tripod from pivoting at all. The most important lock for you to locate is the tilt lock. If your camera is slightly unbalanced on the tripod (because of changing a lens, or the addition of a battery or whatever) this will cause the camera to tilt forward or backward *all the way*. If unattended, the whole thing can eventually pitch all the way over, sending the camera crashing to the ground. The standard procedure to avoid this catastrophe is to tighten the tilt lock between takes and never leave the tripod and camera unattended.
2. **Pan and tilt dampers** adjust the amount of resistance for their respective movements. Generally speaking, the more slowly you wish to execute a move, the more resistance you want, and vice versa. This assures smoother motion and greater control.
3. **The pan handle** is used to control the movements of the camera. On good tripods, the angle of the pan handle can be adjusted for various tripod heights and personal comfort. Many tripods allow you to mount the pan handle on the left or right, depending on whether you are right- or left-handed. Take the time to adjust the handle for maximum comfort and control. The important cautionary note here is that you should never carry a tripod by the pan handle. Pan handles are usually made of lightweight aluminum and the adjustment threads can easily strip or they could simply break off.
4. The **head mount** is at the base of the tripod head and is where the head mounts to the tripod legs. With modular tripod systems, the head can be used with a variety of sticks offering a broad range of heights. Most quality tripods have claw ball or ball-and-socket mounts, which can be loosened to freely adjust the angle of the tripod head in any direction to achieve a level base no matter where the tripod is standing. It is much easier to level a tripod by using this adjustment than by varying the lengths of the three legs. Tripods with adjustable heads also usually have a **bubble leveler** to assist in leveling of the head (Figure 11-8).
5. Finally, all tripod heads have a **camera mounting plate** where the camera is attached to the tripod head. Cameras are secured to the mounting plate with a threaded mounting screw. Most film cameras and professional HD cameras use a $\frac{3}{8}$ " mounting screw, while small



■ **Figure 11-6** A tripod system will commonly have a head (a), extendable legs (b), a pan handle (c), and a spreader (d).



■ **Figure 11-7** A professional fluid head has a tilt lock (a), a pan lock (b), tension adjustments for the tilt and pan controls (c, d), a base plate for the camera (e), and a quick release lock for the base plate (f).

in practice

You might be wondering why I mention a tiny detail like the size of the camera mounting screw. As I've mentioned before, in film production every little detail is crucial. I have had more than a few students go on location with tripod heads that had the wrong-sized mounting screw. These students were usually shooting with a small HD camera (with $\frac{1}{4}$ " mounting threads), but wanted to use a larger tripod or dolly system generally reserved for 16mm film cameras without stopping to think that they also needed a different mounting screw. These students arrived on location with everything in place—crew,

cast, costumes, locations—but had no way to secure the camera on the tripod. In one case they gaffer-taped the camera to the tripod head, which was not only unsteady but also nearly destroyed the delicate camera. In another case the director simply decided to go handheld, and the dolly they had rented sat on the sidelines, unused. Unfortunately, the handheld look was not the aesthetic approach they were after at all. In both cases the look of each project was seriously compromised, all on account of one lil' ol' screw!



■ **Figure 11-8** A camera operator adjusts the level of the tripod head by loosening the ball and socket mount (*left*) and using the bubble leveler at the base of the head (*right*).



■ **Figure 11-9** The individually extendable legs of a tripod make it possible to get stable support on uneven surfaces, such as a staircase.



■ **Figure 11-10** In Wenders' *Tokyo-Ga* (1985), Yasujiro Ozu's longtime collaborator, cinematographer Yuharu Atsuta, demonstrates a quintessential element of the Ozu style: the "tatami" shot, made possible through the use of a baby-legs tripod.

HD cameras and DSLRs use a smaller 1/4" mounting screw. Make sure the mounting screw matches the threads on the underside of the camera.

It's also important to note that many tripods have adjustable and quick-release mounting plates. An adjustable mounting plate will slide slightly forward and backward on the head. This allows the camera operator to precisely balance the camera on the tripod. Ideally, you should be able to take your hands off the camera, without the tilt lock engaged or any drag on the mechanism, and the camera will remain level. This way, the operator doesn't fight gravity while executing a camera move. The quick-release function allows you to pop the camera on and off the head of the tripod quickly, which makes

moving the tripod and camera from one location to another much faster. You should never carry the tripod around with a camera attached. Quick release also lets you quickly remove the camera from the tripod to go handheld and then pop it back on again for tripod shots.

Tripod Legs

The **legs** (or **sticks**) of a tripod are adjustable so that the tripod height, and therefore the camera height, can be easily changed from shot to shot. Also, because the legs are independently adjustable, they provide a firm footing on uneven terrain, like a hillside or on stairs (**Figure 11-9**). Some tripod systems offer legs in three different heights, on which the same head can be used interchangeably. Typical **standard legs** position the camera between 3 feet and 6 feet. Some standard legs are two-stage legs, which means that they have additional length for extension and offer even higher angles. For shots lower than 3 feet we often use **baby legs**, which have a height range from 1 foot to about 3 feet (**Figure 11-10**). Lower than baby legs is a **high-hat**, which is a fixed metal head mount, usually attached to a plywood board. In addition to being the lowest base for a camera, a high-hat can also be attached with clamps in areas where a tripod cannot be used (**Figure 11-11**).



■ **Figure 11-11** A high-hat allows the camera to be placed close to the ground or attached to other surfaces with the use of clamps, as pictured.

On many professional tripods, the legs are allowed to open out freely to any width for a stable base of support. To keep the legs from completely sliding out from under the camera, a **spreader** is often used. Some tripods have a built-in spreader, while others require a separate unit. The feet of some tripod sticks have spikes that can be pushed into the ground in exterior locations, but these spikes will obviously slip on hard surfaces or destroy wooden floors, so you must use a spreader in these situations.

Tripods have remained the single most essential camera support throughout the history of cinema because they are inexpensive, extremely mobile, and give a filmmaker great control and a wide variety of camera angles and fluid camera movements.

■ THE DOLLY

A **dolly** is a camera support on wheels that is used when your shot requires a dynamic move (when the camera itself moves through space) and you want it to be smoother and more controlled than what you can achieve with a handheld camera. Many types of dollies are available, from expensive to inexpensive and extremely heavy to relatively portable. Some dollies move on soft, inflated rubber tires and require a smooth, even floor (**Figure 11-12**). Other dollies run on tracks that are laid out in straight or curved sections along the desired path of the camera movement. Laying dolly tracks creates extremely smooth camera moves, but it is a time- and labor-intensive task that requires the careful placement of wooden shims to even out the dolly's movement. For this reason, students often think twice about using dollies on tracks (**Figure 11-13**).

Professional dollies provide a post for you to mount your fluid head so that you can execute smooth pans and tilts while the camera is being moved around; inexpensive dollies require that you mount the entire tripod on the base, which is substantially less stable. There is no doubt: dynamic moves with dollies are wonderful, but you need to be aware that using a dolly can be a time-consuming addition to your production schedule.

■ SLIDERS

A far less expensive and time-consuming alternative to dolly systems is the slider (**Figure 11-14**). A slider is a small apparatus, usually only a few feet wide, that you can put between two stands or two tripods. Mounting a very small HD camera on a slider and pushing it laterally will create a smooth dynamic move that feels like a dolly but requires much less effort and preparation. While it is true that the range of movement might be limited, you can nonetheless easily create some very dynamic moving shots using a slider.



■ **Figure 11-12** A doorway dolly (*left*). Inflatable wheels allow for a smooth transit and do not require tracks. A spider dolly, capable of crablike lateral moves (*right*).



■ **Figure 11-13** Dollies that use tracks can create extremely smooth moving shots, even over rough terrain, but their setup is a time- and labor-intensive endeavor.



■ **Figure 11-14** Mounting a very small digital camera on a slider and gliding it laterally will create a smooth dynamic move that feels like a dolly but requires much less effort and preparation.

One secret to creating successful slider moves is to create frame with objects in the close foreground to contrast with background references—this accentuates even small lateral shifts. For those with a tight budget and a DIY spirit, a quick internet search produces many examples of home-made sliders for DSLR and other lightweight cameras, many involving roller skate wheels or skateboards.

■ JIB ARMS

As we discussed on page 63, lifting the camera vertically up and down is called booming (“boom up” or “boom down”). One very highly versatile tool for creating short to medium booming moves—and more—is a jib arm attached to tripod sticks. A jib arm is a long, telescoping boom rig (a bit like a teeter-totter) with the camera mounted on one end and counterweights at the other (**Figure 11-15**). The camera operator controls the vertical and lateral movements of the camera (as well as pan and tilt functions) at the counterweight end. You can sway the jib arm up and down or side to side to give the camera smooth, controlled movements across space. You can also use the jib arm extension to suspend a camera over an area where it would be impossible to position a tripod or dolly—like over a bed for an angle directly over a person sleeping.



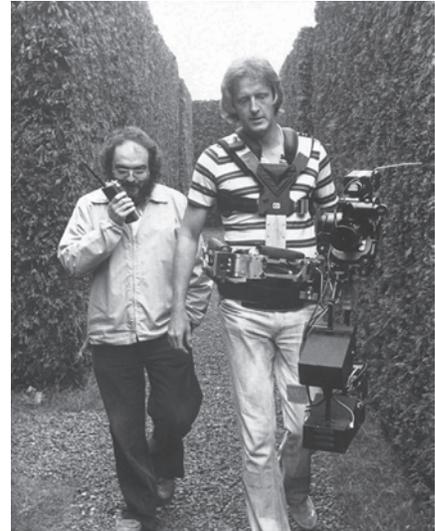
■ **Figure 11-15** Jib arms are extremely versatile camera supports. This compact jib arm designed for small digital cameras will allow an operator a range of camera moves like pan and tilt, boom up and down, swing in an arc, or suspend the camera directly over a subject.

■ STABILIZING SYSTEMS

Invented by cinematographer Garrett Brown and introduced in the early 1970s, the **Steadicam** stabilizing system completely won over the film world when it was used successfully in films like *Rocky* (1976), *Marathon Man* (1976), and *The Shining* (1980) (**Figure 11-16**). It has since become a standard tool on large-budget productions. The Steadicam is basically an articulated arm incorporating a complex system of gimbals, counterweights, and springs to isolate the camera from any camera operator movements by absorbing all shocks, shakes, and bounces. On one end of the arm is a camera mount and at the other end is a vest that the camera operator wears to carry the weight of the entire apparatus. Combining the mobility of a handheld camera with the smooth and controlled movements of a dolly, the Steadicam system allows the operator to move, walk, or run with the camera through space, in any direction, while the articulated arm maintains a

steady and easily controlled frame. The downside to Steadicam systems for students and low-budget filmmakers has always been the high cost and complexity of the system, and the need to hire a trained Steadicam operator which adds another (costly) crew member.

Since the advent of lightweight digital cameras and the popularity of DSLRs, we've experienced the emergence of a whole range of far less expensive and less cumbersome **stabilizing arms** (Figure 11-17 *left*). The least expensive HD camera stabilizing arm systems are the lightweight handheld units that use a simple system of counterweights to smooth out the movements of the operator as they move with the camera through space. With a little practice, you can get wonderfully smooth tracks, dollies, and arcs with these systems. More recently a relatively low-budget variety of powered gimbal stabilizing systems using gyroscopes and gimbal mounts for cameras has emerged (Figure 11-17 *right*). These typically involve one person holding the camera, while another controls the pan, tilt, and zoom functions remotely using a computer or smartphone. The **gimbal stabilizer** can smoothly correct for tilt, roll, and pan movements, and can even be set to deal with issues such as the vibration when shooting in a car.



■ **Figure 11-16** Stanley Kubrick (*left*) and innovator Garrett Brown (*right*) in the hedge maze set for *The Shining* (1980), one of the first films to use Brown's Steadicam system.

■ JERRY-RIGGED OR IMPROVISED SUPPORT SYSTEMS

As the saying goes, necessity is the mother of invention, and many people throughout the history of cinema have used their ingenuity to achieve their ends with minimal resources. The cost and complexity of dollies and Steadicam systems have given rise to many wonderful improvised methods for achieving more or less smooth, dynamic camera moves. One of the most common dolly-like devices is a wheelchair (Figure 11-18). The cinematographer simply sits in the wheelchair and is pushed. Obviously this requires relatively smooth surfaces and a stable hand, but this simple solution has been used by countless students and also by great filmmakers, from Godard to Gondry.

For his *Evil Dead* films, director Sam Raimi and D.P. Tim Philo invented the “shakey-cam,” which was an ultra-inexpensive stabilizing system made by mounting a film camera in the middle of a long wooden board (Figure 11-19). With two grips holding the board on each end, they could run, lift, lower, or tilt the suspended camera, and the board itself absorbed all the shocks. The framing isn't terribly accurate, but the moves, reflecting the point of view of a demon as it rushes through the woods, are exceptionally dynamic and



■ **Figure 11-17** The emergence of small video and DSLR cameras has prompted the creation of lighter, cheaper stabilizing systems, like this Glidecam (*left*) being used for a moving shot. Gimbal stabilizers use computer controlled motors, like this DJI Ronin—M (*right*).



■ **Figure 11-18** New wave icon Jean-Luc Godard is seen here pushing cinematographer Raoul Coutard in a wheelchair for a moving shot during the filming of *Breathless* (1960).



■ **Figure 11-19** Raimi's use of a long wooden board as a camera support made it possible to execute a dynamic shot in his film *The Evil Dead* (1981).

sufficiently demonic. So impressed were the Coen Brothers with this jerry-rigged system that they used it themselves in *Blood Simple* (1984) and *Raising Arizona* (1987).

Yet another example of creative camera support can be seen in one scene in *The Celebration* (*Festen*) (1998). Director Thomas Vinterberg and D.P. Anthony Dod Mantle simply secured an ultra-lightweight DV camera to the end of a long microphone boom pole and swung it around the room to move the camera in a spiral from ceiling height to eye level to create a highly dynamic and memorable shot.

Even if the shot does not involve a moving camera, there are times when a camera operator needs to improvise camera support to get just the right angle. Sand bags are a common improvised support for extremely low angle shots (**Figure 11-20**). However, always remember that however you improvise the support for your camera, you must always assure that it is safe and stable for both the equipment and operator. And no, skateboard is not a recommended improvised camera support.

The stories of improvised dynamic camera moves and jerry-rigged camera supports are endless, because in the final analysis it doesn't really matter how you arrive at a specific effect (makeshift device or expensive equipment rental), all that matters is what it looks

■ **Figure 11-20** Mike Figgis using whatever is handy for a camera mount (*top*, on the set of *Miss Julie*, 1999). Director Miles Adgate and D.P. Nick Vega on the set of *Kiarra's Escape* using sandbags to stabilize the camera (*bottom*).



like when it is projected on the screen. The fact that he used a simple wheelchair dolly did not keep Godard's film *Breathless* from being one of the most important films in the history of cinema.

■ DRONES

One of the more recent trends in camera support options is the use of **drones** or **UAVs** (Unmanned Aerial Vehicles) or **Small UASs** (small Unmanned Aircraft Systems), which are becoming increasingly popular for aerial shots. Once upon a time an aerial shot was a complex and very expensive option that involved renting a plane or a helicopter, and working with highly specialized aerial photography equipment and personnel. Today small drones—flying devices that mount tiny action cams—are easily accessible and allow for shooting in an amazing number of situations. Typically these systems will transmit video via WiFi directly from the air, so you can monitor and control your shots carefully. Many drones come equipped with stabilizing systems like gimbals (see earlier) that allow for extremely smooth and complex aerial moves (**Figure 11-21**). But drones are not fun little toys; they require training, prudence, and permits. As drones become more and more popular, legal restrictions on their use are emerging. The FCC, local governments, film offices, and films schools are quickly devising policies regarding their use. While drones can give you beautiful panoramic aerial shots, they are also not “easy” to control and are prone to crashing. In short, drones can be dangerous. See page 433 for more on the safety issues concerning UAVs.



■ **Figure 11-21** Action cams mounted onto small drones are becoming a common tool for aerial cinematography, but trained operators, extreme caution, and research into local regulations are necessary.

in practice

Barry Lyndon

Stanley Kubrick's study of the 18th-century English aristocracy, *Barry Lyndon* (1975), tells the story of Redmond Barry, a relentless and ambitious social climber who attains a name and position among the nobility by marrying the rich widow Lady Lyndon. Photographed by D.P. John Alcott, much of the film is shot in steady, carefully composed frames, with the camera planted firmly on a tripod, a choice that perfectly reflects the strict and rigid social codes of conduct of aristocratic culture. Even the duels are

photographed with poise and containment, which adds to the genteel restraint and cold ritualization of the violence. Late in the film, however, after Barry has spent vast amounts of effort and money to be accepted into the aristocracy, he holds a music recital in his home and invites the elite of the society. In this scene (**Figure 11-22**), his stepson, incensed that a lowly soldier has married his mother and obtained the family fortune and title, reveals Barry Lyndon's true origins by bringing Barry's real son into the salon. Barry erupts with anger and humiliation and



■ **Figure 11-22** Kubrick's *Barry Lyndon*, when Barry (Ryan O'Neal) assaults his stepson (Leon Vitali) for openly displaying contempt for Barry's marriage to his mother, the camera's handholding adds a visceral feel to the emotional eruption of violence (*left*). Later on, when Barry duels with him, the camera's stability reflects the more civilized nature of ritualized conflict resolution in the 18th century (*right*).

physically attacks his stepson. Suddenly the camerawork becomes a raw, unfettered handheld style—reflecting the deep impulsive rage Barry is expressing. These actions are not proscribed by culture anymore; they emerge from an animal instinct, and the camera style telegraphs the uncontrollability of this violence. The contrast with the controlled style of the rest of the film makes this an even more powerful moment, as we are certain that Barry has, in one rash moment, revealed his true nature and undone everything he has worked so hard to accomplish.

Nine Lives

In “Maggie,” the final episode of Rodrigo García’s film *Nine Lives* (2005), a mother and her 8-year-old daughter, Maria, visit a grave in a large cemetery. They talk and play; at one point Maggie scolds her daughter for stepping on graves and later keeps a lookout as the little girl takes a pee behind a tree. On a blanket they’ve laid out in front of a grave, they share some grapes, clearly a favorite fruit of the little girl, and they play patty-cake. It’s all very casual and remarkably free from the pathos and gloom usually associated with cemeteries. But, in the middle of the patty-cake game, Maggie breaks down in a sudden moment of grief. She tells Maria “I’m tired,” and lays her head on her little girl’s lap to sleep (Figure 11-23).

At that moment, the camera begins a long, slow pan, away from the pair by the tombstone and across the beautiful, tree-filled cemetery. The camera is mounted on a stabilizing arm, so the move feels as if it is gliding, floating across the cemetery. The pan covers a full 360 degrees, and when it returns to the tombstone, Maggie is now alone and folding the blanket to leave. The pan, which lasted only 30 seconds, creates a time ellipsis; clearly an hour or so has passed. After Maggie folds the blanket, she lays the grapes on the tombstone. The camera move not only traverses the space of the cemetery but it also initiates a complete perception shift for the audience. What we understood to be true, a mother and daughter’s visit to the grave of a long-dead relative, is in fact revealed to be a grieving mother’s visit to the

grave of her daughter. Her imagination brought back memories of her little girl so vividly that the daughter took on real flesh and blood beside her. One could say that the camera move serves as a psychological transition, beginning in Maggie’s fantasy and ending in reality. *Nine Lives* was shot by Xavier Pérez Grobet, and his perfectly placed camera move completely flips our perspective on the story.

The Hurt Locker

Very few films in recent memory have injected as much tension, anxiety, and second-by-second suspense in so many scenes as Kathryn Bigelow’s *The Hurt Locker* (2008), which follows the final weeks in the rotation of an elite bomb disposal squad in Iraq. People frequently use words like “excruciating” and “unbearable” to describe this film, and often you’ll hear, “makes you feel like you’re there.” This “feeling” is largely a result of D.P. Barry Ackroyd and his camera operators who shot the preponderance of the film with handheld cameras, frequently multiple cameras. Handheld camerawork is often associated with a documentary aesthetic; it feels as if “you are there” because the visual approach is that of a non-fiction film objectively recording real events. But this is not the way Bigelow and Ackroyd employ a handheld camera. Their camera technique is highly subjective. The camera relentlessly and anxiously pans, searches, scans, focuses and refocuses, putting us directly into the consciousness of these men as they carry out their horrifically dangerous missions in broad daylight and in plain sight of an unknowable public. Surrounded by onlookers, it’s impossible to know who is friendly, who is an enemy, who is the bomb maker, who has a gun? The visual approach encourages the viewer to experience what it’s like to monitor 360 degrees of hostile territory, searching for clues, watching for signs, keeping tabs on everyone. The palpable danger of the situation is occasionally punctuated by shocking reverse angle subjective shots. Suddenly, someone is watching them! Who is it? Friend or foe? More than a few times one thinks an onlooker is surely out to kill them, or maybe this person is the bomb maker. We jump to these conclu-



■ **Figure 11-23** In García’s *Nine Lives*, a 360° pan takes us from Maggie’s (Glenn Close) imagined reality to the sad truth: she’s actually mourning the loss of her daughter (Dakota Fanning).

sions without any real evidence—does a video camera constitute a mortal threat? Three men whispering to each other? The wave of a hand? A cell phone? These are guesses born of the danger we’re feeling because the camera movement plunges us into the subjectivity of a fearful and adrenalized state of mind; jittery, nervous, hyperalert, hypervigilant, very human—you can almost sense a racing pulse in the camera movements (Figure 11-24). And then a bomb will detonate, and time stands still—the moment becomes vertical. The largest actions (an enormous explosion of flame) and smallest details (sand lifting off the ground) are registered in extreme slow motion and a rock steady, stabilized camera. In contrast with the frenetic motion of the moments before the blast, this abrupt shift plunges us into another altered and extreme psychological state, one that is even closer to death.



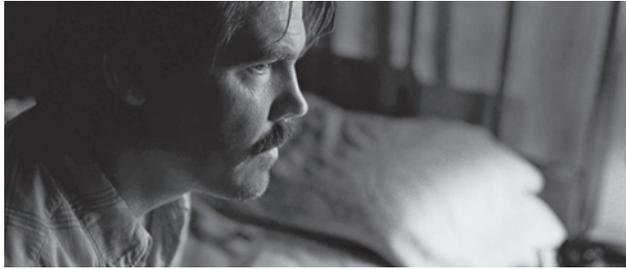
■ **Figure 11-24** Friend or foe? The nervously searching handheld cameras in Bigelow’s *The Hurt Locker* reflect the apprehensive state of mind of soldiers in hostile and dangerously exposed circumstances.

■ AESTHETIC AND PRACTICAL CONSIDERATIONS

The camera support you ultimately choose should help you achieve the look and style required to tell your story. From the super controlled fluidity of a dolly, to the edgy movement of the handheld camera, to the pivot moves of a tripod, different supports offer different “feels.” There is no system that is better or worse—there is only what is appropriate for the conception of your film. Even within a single film, there may be some scenes that conceptually work best with a handheld camera, and others that require the stability of a tripod. But, of course, choosing the right support to move your camera is more than simply a matter of style for style’s sake. Whether you handhold a camera, put it on a tripod, or wheel it around on a dolly, both the movement of the camera and the fashion in which it moves must be motivated by the story you’re telling. You need to ask yourself: Why move the camera? Why move the camera now? Why move the camera in this fashion?

Here are a few important tips to consider if you intend to do any camera moves:

- *Always practice moves before you roll camera.* Rehearsals and blocking on the set are not just for the actors; they are also for the camera. The director of photography must know before recording begins how to execute a move in relation to the action in the scene. Performing a good camera move, especially combination moves, takes a few rehearsals to get just right.
- *Always know where your camera move begins and ends.* Moving the frame means constantly reframing your shot. It is very important to know in advance where your move begins and precisely where it ends and what pace and path you will take to accomplish the move so that you can be accurate with the composition and mise-en-scène from the beginning to the end. A common problem with inexperienced filmmakers is that they begin a camera move without knowing exactly where they are going, and they wind up fishing around for a place to land, making the move look sloppy.
- *Practical considerations must be considered in deciding on one or another camera support.* To begin, moving the camera always adds production time because there are more technical details that can go wrong, like losing focus and camera bobble, which may require multiple takes. Using a dolly requires more time for camera and subject choreography and for laying down tracks (when necessary), not to mention the addition of dolly grips to your crew. Some camera support systems, like professional dollies and Steadicam systems, are relatively expensive and are a major budget item if



■ **Figure 11-25** Small camera reframes maintain a consistent composition of the subject within the frame. In this shot from the Coen Brothers' *No Country for Old Men* (2007), looking room is maintained by a slight camera adjustment down and to the right when Llewelyn (Josh Brolin) leans to reach the telephone.

you need them every day. And many professional dollies are so heavy that you need to rent a van to transport them. In the final analysis, you must be realistic about what practical ramifications there might be with any piece of equipment. You don't want to commit to a major piece of gear only to have it slow you down so much that you don't get your film done.

Camera Moves versus Camera Adjustments

Whether you're executing a pan, tilt, dolly, or track, a camera move is a clear and substantial alteration of the subject or composition. A **camera adjustment (or reframe)**, on the other hand, is a slight shifting of a frame to maintain your composition on a person or object that is moving only a little. For example, if we frame a character in a medium close-up (MCU) while they speak to someone off screen, the actor may shift from one foot to the other or take a step forward or back, or even just shift their gaze from screen right to screen left. Each one of these changes requires a minor adjustment of the frame to maintain a balanced MCU composition. The person operating the camera needs to have a keen sense for the emotional content of the script, the rhythm of the performance, and the body language of the actor to anticipate these little movements and adjust accordingly. For this type of adjustment, we say that the camera is "breathing with the subject." Camera adjustments are practically invisible to the audience, but you can spot them by looking, not at the main subject of a shot, but at the edges of the frame. You'll see objects in the background moving in and out of the frame as the camera adjusts to maintain a steady composition on the primary subject (**Figure 11-25**).



For a video comparison between a camera move achieved by hand holding, a tripod, and a stabilizing arm, go to the *Voice & Vision* companion website.

Basics of Exposure

Photography is first and foremost a record of light. You are alone behind the camera, doubling as artist and scientist, hoping that your light—and it is your light—will bring it all to life.

Tom McDonough (From *Light Years*, 1987)

This quote by cinematographer and writer Tom McDonough neatly sums up the split personality of the cinematographer's art ... or is it craft ... or is it science? The truth is, getting just the right image for the story you are trying to tell, for the mood you want to create, for the connection you're trying to make with the audience, requires the instincts and sensitivity of an artist, the discipline of a craftsman, and the research of a scientist. In other words, when we create the film image, we need to know aesthetically what we want and technically how to achieve that. Here and in the next two chapters we will look at the essential conceptual and technical factors of exposures and lighting so that you can tell your story with visual eloquence and impact.

■ IMAGE EXPOSURE

What does it mean to get an exposure? It's all about light: how much of it is bouncing off your scene, into your lens, and tagging your image sensor. But how do we control exposures? How can we assure that the image we imagine in our heads is the one that will make it onto the sensor? Come to think of it, what is a "correct" exposure anyway?

The first thing to consider is that every scene we record has a range of **brightness values** (or luminance values) that fall somewhere between pure black and pure white. This is called a scene's **contrast range**. That range of brightness values is quite variable; it can be very broad including bright white details and dark black areas and many gradations in between, and other times the contrast range might be very narrow consisting of only a few different tones (**Figure 12-1**). Getting a proper overall exposure for either



■ **Figure 12-1** In this somber frame from Haneke's *The White Ribbon* (2009, left) a farmer (Branko Samarovski) regards his wife's body following her mysterious death; notice the wide range of light values from bright white to inky black. And the shot from Pawlikowski's *Ida* (2013, right), which shows four young novices praying around a recently repaired statue of Jesus in the wintertime, has a very narrow contrast range consisting mostly of pale grays—even the snow is not quite pure white.



■ **Figure 12-2** A correct exposure is one in which the brightness values of the scene are rendered accurately (*top*). Overexposure occurs when too much light hits the sensor, causing all of the brightness values in a scene to be rendered too bright, with whites losing detail (clipped) (*bottom left*) and underexposure occurs when insufficient light hits the sensor and everything is reproduced too dark, with blacks losing detail and becoming a solid mass (crushed) (*bottom right*).

case is essentially the same. Simply put, a **correct overall exposure** is one in which the appropriate amount of light hits the image sensor so that the brightness values of the scene are rendered accurately. White objects appear white, black objects appear black, and the gradations of gray tones in between are distinct and accurate. In a correctly exposed image, a white object and a black object will usually maintain some visible detail if it's there in the scene (**Figure 12-2 top**). An **overexposed** image occurs when too much light hits the sensor, causing all of the brightness values in a scene to be rendered too bright: blacks become dark gray, mid tones become bright and washed out, and the whites get blown out and lose detail (**Figure 12-2 bottom left**). Whites that are so overexposed that they lose detail and become a solid mass of pure white are called **clipped**. Color values are also affected, becoming bleached out (de-saturated). Conversely, an **underexposure** occurs when too little light hits the sensor to render a scene accurately, and everything in the frame is reproduced too dark. Whites become light gray, mid tones get murky and dark, and blacks lose detail entirely. Blacks that have lost all detail and become solid masses of pure black are called **crushed** (**Figure 12-2 bottom right**). Underexposure also results in muddy colors, and a grainy, noisy image, particularly in the darker areas of the shot.

I think we all have an intuitive sense for what *overall* underexposure and overexposure means. But there is much more to the notion of exposures in

cinematography. As image creators, we're interested in considering the nuances of exposures *within the frame*. Each area and object in a frame has its own specific brightness value and these areas represent the range of values that must be lit and balanced to produce the image you want, with the feeling you want. That's the artistry of image making and exposure control. The three images in **Figure 12-3** (and those in **Fig. 12-1**) are good examples of a few essential principles about exposures to always keep in mind:

- A good exposure renders the range of brightness values within a scene accurately.
- A good exposure does not necessarily mean that everything in an image is perfectly visible, there may be very dark or very bright areas in your scene where detail is difficult to see—that's great.
- You can certainly have an overall bright or an overall dark image that is correctly exposed—as long as the exposure is true to the contrast range (brightness values) in the scene itself.
- Often you will be in a lighting situation where there are a number of options for achieving a “correct” exposure. The ultimate factor is, of course, your creative needs: what you want the audience to see and how you want them to see it.

The thing about cinematography is you're not there to shoot amazing images, because each film demands its own look [...] I don't want anybody, while they're watching the film go, 'oh, that's an amazing image,' because that's ... then suddenly they're not in story.

Roger Deakins (From “*Sicario* cinematographer Roger Deakins”
Interview with David Cohen, 2015)

It's easy enough to arrive at a “correct” exposure, but your primary task as a filmmaker is to find the “best” exposures for what you want to express. As Roger Deakins reminds us, the primary function of lighting and exposures is to create images that serve the narrative and emotional needs of the story. The next three chapters are dedicated to exploring the tools, techniques, and aesthetics of lighting and exposing images in digital filmmaking.

Elements of Exposure

Every exposure you make involves an intricate inter-relationship between all of the variables that produce, transmit, control, transform, or record light. The primary exposure elements along the path, beginning at the light source and ending at the video sensor, are:

- The light source (intensity) (see Chapter 13)
- Scene reflectance
- Camera filters (see page 314)
- Lens aperture (see Chapter 10)
- Shutter speed (frame rate and shutter angle) (see page 273)
- Sensor response (ISO, Gain) (see page 272)

Although we've already explored many of these factors in other chapters, let's look at them again in the context of creating an exposure.

Scene Factors:

1. *The Light Source.* Whether you are shooting under the sun or with artificial lights or a mixture of both, the intensity of your light is of central importance for image exposure. The light that is *falling onto your scene* is called **incident light** (or **illuminance**) and the instrument we use to measure incident light is an **incident light meter**. We'll look at how they function on page 335. *Light intensity is a highly variable and controllable exposure factor, especially with artificial lighting.* We can control the intensity of artificial lights by selecting specific wattage, changing the distance between a lighting unit and the subject, using neutral density gels, nets, scrims, or sometimes using a dimmer switch. Sunlight is more difficult to control, we can use reflectors or add artificial lighting (HMIs) to get more light onto our subjects if that's necessary; and to reduce light intensity we can utilize large butterfly scrims or simply shoot in naturally shady areas. In any case, controlling the intensity of the light source also controls, to a certain extent, the next exposure factor.
2. *Scene Reflectance.* What are the visual dynamics of your scene? Or most importantly what are the **reflectance values** of the objects in the scene? **Reflectance** is the measure of light reflecting off the scene (toward your lens) and it takes into account the light absorption qualities of objects. For example, look again at the image details in **Fig. 12-2 top**. While the incident light is the same all over the scene, each item of laundry is reflecting different amounts of that incident light back to the camera—that's why we see the pants as white, the shirt as gray, and the towel as black (see the box “Black, White, and Middle Gray: A Waveform Monitor Introduction”). Measuring the light *reflecting off* a scene is not only a very common approach for calculating exposures, it is the basis for all in-camera metering systems and handheld reflected light meters, which we'll look at in more detail later. Keep in mind that to a certain extent we can also control scene reflectivity by carefully



■ **Figure 12-3** A well exposed image renders the range of brightness values within a scene accurately. That scene can be dark overall with areas falling into pure black, like this frame from Amirpour's *A Girl Walks Home Alone at Night* (2014, D.P. Lyle Vincent) (*top*); or it can be predominantly bright, with areas falling into pure white, like this shot from Lucas' 1978 film *THX 1138* (1971, D.P.s A. Kihn and D. Myers) (*bottom*); or it can contain a broad and balanced range of brightness values with visible detail in the highlights and shadows alike, like this shot from Bourdos' film *Renoir* (2012, D.P. Ping Bin Lee) (*center*).

considering the reflectance of our mise-en-scène details. Wall color, furniture upholstery, wardrobe choices, skin tones, and so on should be coordinated with each other and with lighting and exposure concerns.

Camera Factors:

After the light falls on and reflects off the scene, the camera lens gathers it and focuses it onto the camera sensor. Here are the various exposure factors, at the camera level:

1. **Sensor Response.** Knowing, setting, and factoring in the sensitivity of your camera's image sensor are critical to getting accurate exposures. Every digital camera has a **native sensitivity**, which is the base sensitivity for that sensor without amplification. The native ISO is the setting that gives you the best response possible for that particular sensor. On those cameras that only have a few **dB gain** presets, the 0dB setting represents the sensor's native sensitivity, and on cameras that have multiple **ISO** settings, you will need to consult your manual to find out your specific sensor's **native ISO** rating. Most cameras designed for film production have a native ISO somewhere between 650 and 1,200. Your camera manual should indicate the native ISO for that specific camera, and occasionally, as is the case with Canon Cine cameras, the native ISO is indicated in the settings menus by a pair of brackets, like this [850]. The issue of native ISO can get a little complicated when you use modified picture profiles like Cine Gamma and Log Gamma (see page 220) because these

can change the native ISO somewhat. However, 0dB always represents a sensor's native sensitivity. Again, check with your camera's technical manual for specific details and settings.



■ **Figure 12-4** Digital cameras can shoot in extreme low-light situations by boosting ISO or video gain; however, increasing electronic gain sacrifices resolution and adds video noise. It's best to stick with the camera's "native ISO" or 0dB gain for maximum video quality.

In any case, it's generally recommended that you shoot at the camera's native sensitivity and only change it when circumstances call for it—like unavoidably low-light locations. On page 219 we discussed the settings that can alter a video sensor's sensitivity: Gain (on consumer and mid-level camcorders) and ISO (on DSLR, hybrid and professional cameras). Both Gain and ISO determine the degree of the electronic amplification of the sensor's video signal. Increasing gain or ISO will electronically boost the sensor's image output and make the image brighter; however, increasing gain also boosts electronic aberrations that can change the texture of the image, or worse, it can compromise resolution and introduce video noise (**Figure 12-4**). As the old saying goes, "more gain, more grain." So, while ISO might *seem* like a flexible exposure variable, it's really more of a set-it-and-forget-it type of option.

With all that said, it's not in my nature to throw anything overboard wholesale, so while high levels of gain involve serious image compromises, that noisy, low-grade quality could constitute a "look" that might work well for certain scenes as an aesthetic choice. You never know, so tuck it away into your visual toolbox in case found footage horror films come back into vogue.

2. **Frame Rate, Shutter Speed, and Shutter Angle.** These three variables are related because each determines the amount of time each frame of video is exposed to light. While all three are significant in terms of exposures, they are not considered particularly flexible variables because they also alter the quality of motion in the frame, so we pretty much change them only when attempting a special visual effect like slow motion.

The standard frame rate (shooting and editing) for most narrative film projects is *24p frames per second* (23.976 fps) and this is conventionally paired with a shutter speed of *1/50 of a second*. These settings come closest to duplicating the traditional look

of celluloid film which also has a frame rate of 24 fps. With 24fps, each frame represents $\frac{1}{24}$ of a second, and due to a film camera's 180° rotating shutter, each frame is exposed to light for only half of that time: $\frac{1}{24} \times \frac{1}{2} = \frac{1}{48}$. Therefore the shutter speed for each film frame exposure is $\frac{1}{48}$ of a second—often rounded off to $\frac{1}{50}$ th. 24p video replicates that same frame rate and shutter speed to approximate the “film look,” meaning two things: the number of frames that visually sample one second of action is the same (24), and the relatively slow exposure time ($\frac{1}{50}$) produces characteristic **motion blur** in areas of movement. This motion blur artifact contributes to the sense of fluid action that we've come to expect from a movie; it just feels “normal.”

Another conventional option for video shooting (and editing), though less common for narrative production, is 30p frames per second (29.97 fps), coupled with a shutter speed setting of $\frac{1}{60}$ of a second (again, duplicating the 50% exposure time of a 180° rotating shutter). In this case, you get similar motion blur effect, but you have more frames defining each second of motion—so 30p looks somewhat less like the movies we're used to, and more like broadcast TV video.

In either case, increasing the frame rate from the norm reduces the light that exposes each frame, but it also creates a slow-motion effect. Footage shot at 48 fps, for example, and placed into a 24p edit timeline will take twice as long to play back—the motion is slowed down by 50%. Also, increasing shutter speed, from say $\frac{1}{50}$ to $\frac{1}{200}$ of a second, will reduce the exposure by 75%, but it will also have a significant impact on the motion blur effect because you are creating a sharper, crisper image in each frame—thus the footage will look choppy or stroboscopic (**Figure 12-5**). Definitely not “film-like.” Reducing the shutter speed from $\frac{1}{50}$ to, say, $\frac{1}{25}$ will double the amount of light exposing each frame, but the slower shutter speed will greatly exaggerate motion blur, perhaps to the point of becoming “motion smear” and obscuring movement and detail. The extreme visual impact on motion is precisely why we rarely change frame rate or shutter speed simply to make exposure adjustments. So we can consider frame rate and shutter speed (24p at $\frac{1}{50}$) a set-it-and-forget-it exposure factor (unless you're going for a special motion effect).

Only very few ultra-high-end D-Cinema cameras have a mechanical rotating shutter; most cameras use an electronic shutter, and yet many cameras offer a setting for shutter angle. This can be somewhat confusing. How can we adjust the shutter angle when there is no actual shutter? **Shutter angle adjustments**, if they are available, are essentially another way of altering shutter speed and it has the same impact on exposure and motion blur. Let's say we deviate from the standard 180° shutter angle and decrease the angle to 90° which means you're exposing each frame only $\frac{1}{4}$ of the time, the calculation looks like this: $\frac{1}{24} \times \frac{1}{4} = \frac{1}{96}$ shutter speed. A much faster shutter speed with all the same repercussions on motion as simply changing your shutter speed. Again, for a special motion effect, this can be effective, but for exposure control we usually simply set the shutter angle to 180° and leave it alone.



■ **Figure 12-5** A slow shutter speed setting (less than $\frac{1}{50}$ th) increases exposure time, but smears the image (*top*), whereas a fast shutter speed (greater than $\frac{1}{60}$ th) reduces exposure time, capturing even fast action in sharp definition and with no motion blur (*bottom*).

Standard Settings: 24p fps; 1/50th shutter speed; 180° shutter angle	
Faster Frame Rates Reduces exposure. Slows motion.	Slower Frame Rates Increases exposure. Faster motion.
Faster Shutter Speed (narrower shutter angle) Reduces exposure. Less motion blur (choppier).	Slower Shutter Speed (wider shutter angle) Increases exposure. Smears motion.

3. **Lens Filters.** **Lens filters** are often employed in film production to alter the quality, color, or intensity of the light entering the camera. We don't always use lens filters, but when we do, they have an impact on exposure because any filter placed in front of the lens will reduce the light entering the lens. Some filters cut only a little light while others take a significant exposure whack, like the polarizing filter, for example. However, the filters most important for exposure control are **neutral density (ND)** filters because that is precisely their function, to help control the amount of light entering the lens (see page 314). ND filters are gray tinted filters that simply cut down the amount of light entering the lens without affecting color. The various filter grades allow you to precisely reduce the light by 1 stop, 2 stops, or 3 stops. ND filters are commonly used to control exposure for those situations where you must shoot at a specific f-stop. For example, an ND filter can help you achieve shallow depth of field when shooting under bright sunlight because it cuts the light entering your lens, thus making it necessary to open your aperture to compensate for the loss of light—and as you know by now, a larger aperture equals a shallower depth of field (see Fig. 10-29).
4. **The Lens Aperture.** As we mentioned in Chapter 10, all of the light exposing your image sensor passes through the lens. Lens optics play a primary role in forming the composition (wide angle, telephoto, etc.), but it is the **lens aperture** that controls the amount of light that is allowed to pass through to tag the sensor. The smaller the aperture opening (larger f-stop number) the less light hits the sensor. The larger the aperture opening (smaller f-stop number) the more light flows through to expose the sensor. The final step in determining an exposure, and the endpoint for all of the light evaluations and meter calculations, is the f-stop setting. Given a certain lighting setup and after all of our settings have been entered (i.e., ISO, frame rate, shutter speed) our goal is to arrive at the f-stop that will give us our best exposure. Lens aperture is one of our most flexible variables for creating the best exposure for each image.

Summary of Exposure Factors

Every exposure factor has ramifications for all the others. Change one, and you'll need to compensate elsewhere. For example, let's say you take your camera outside and shoot in the bright sun. To accommodate the surplus of light, you can *theoretically* close down your aperture, or add a ND filter, or make your ISO less sensitive, or speed up your frame rate, or choose a faster shutter speed, or close down your shutter ... that's a lot of options, but not all of them are useful. I think you can see that without *fixing* some of these factors, you can wind up with a mess. In reality, some of these factors *should not* be considered as variable for normal shooting situations. They are simply not useful tools for exposure control:

- Changing *shutter speed* and *frame rate* have a direct and extreme effect on the visual quality of the motion, so these are not good options for exposure compensation. Set these variables for standard shooting and forget them (unless you want a special effect of course).
- Changing the *gain* or *ISO* settings can also change the texture of the image by adding video noise and artifacts. While you can change ISO somewhat for extreme exposure situations (like shooting at night with few lights) in most circumstances set this variable to your camera's native ISO (or 0dB gain) and forget it.

This leaves *lighting intensity*, *ND filters*, and *lens aperture* as our most flexible and adjustable options for exposure control. And in most circumstances, while we are lighting and exposing a scene, we're constantly tweaking lights and f-stops in interior locations, and ND filters and f-stops in exterior locations. The rest of this chapter and the next are dedicated

to learning more about the interplay between light intensity and f-stops in order to arrive at your best and most expressive image exposure.

■ FINDING EXPOSURES WITH IN-CAMERA METERS

Inside your video camera is a fairly sophisticated **through-the-lens** light meter (TTL). All built-in camera meters are reflected light meters that are calibrated to the exposure factors you've entered during your camera setup (ISO, frame rate, shutter speed, etc.). **Reflected light meters** read the light reflecting off your scene and calculate an exposure setting (f-stop) by averaging the various light values you have in your frame (see box "Reflected Light Meter Limitations").

Additionally, most video cameras by default employ a **center weighted** reflected light meter which gives greater calculation priority to the exposure values at the center of the frame than toward the edges of the frame (Figure 12-6). This design assumes that your subject is in the center of the frame, though obviously our subjects, or the area we want exposed correctly, won't always be in the middle of the frame, but that's fine. Once we know how the meter is reading the scene, we can use it no matter where our subject is.

Using the meter in your camera (or a handheld light meter) to determine the light values in a particular area in a scene is called **taking a light reading**. The basic goal is to arrive at an f-stop setting that will give you a correct exposure for the scene. On page 247 I showed you why narrative filmmakers never use auto-exposure (auto iris) when shooting a scene. But that doesn't mean that auto-exposure isn't useful when metering a scene. In fact, to take a reading using the in-camera meter, we must, at some point, engage auto-exposure—but we very quickly turn it off again. You'll see.

Here are two very simple methods for finding exposures using your camera's meter (and other exposure tools that may be built into your camera). These methods are especially good in situations where, because of time or equipment limitations, you cannot utilize any of the more advanced metering options that we explore in Chapter 14.

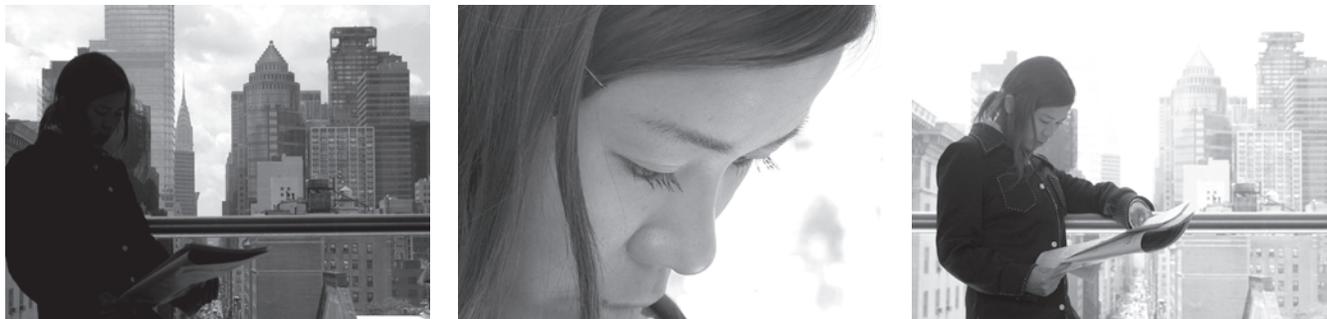
The Run 'n' Gun Exposure Method

This method comes to us from documentary cinematography where exposures are critical, equipment is minimal, and events unfolding in real time don't give us enough time to take multiple meter readings or to consult waveform monitors, and histograms, and so forth. Determining correct exposure with this quick and simple method requires using a combination of the in-camera meter, the manual exposure setting, the auto iris toggle switch (or button), and the zoom lens (Figure 12-7):

1. Decide which area of the frame you would like exposed correctly. This is an aesthetic decision based on the composition, mood, and story. Very often it is your subject's face (but not always).
2. Zoom in to the area of the composition you want exposed correctly and center it in the frame. Try to eliminate any details that have brightness extremes that might confuse the averaging meter (like hot windows).
3. Toggle to auto iris mode (usually just a button or switch, see Fig. 9-28) and let the auto iris select its exposure for that small portion of the total scene.
4. Turn off the auto iris (back to manual exposure) and this will lock in that exposure.
5. Zoom out and compose your shot. It doesn't matter where in the frame you place your subject, or how bright the background is, or what might pass in front of the lens during the take: that exposure is locked in and will not change.



■ **Figure 12-6** Assuming that our subject will be in the center of the image, the TTL meters commonly found on digital cameras employ a center weighted metering system which gives priority to exposure values in the middle of the frame.



■ **Figure 12-7** Setting exposures using a camcorder's TTL. Zoom in so that the subject fills the frame and the auto iris finds a good exposure (*middle*). Then switch to manual override to “lock in” that setting. The subject will remain correctly exposed no matter how we re-frame the shot (*right*).



Go to the *Voice & Vision* companion website to see a video of this process.)

6. Evaluate the exposure on a high-quality field monitor (see “Using Field Monitors” later), and if necessary, tweak the iris manually to finesse the shot.
7. Check your 100% zebras to ensure that your whites are not clipping—and make adjustments if necessary (see “Zebras” later).

Keep in mind that you can zoom in to multiple areas of the scene (and lock in the exposure) to explore the effect of various apertures. This will give you a clear sense for the range of light values and exposure possibilities within your scene.

The Gray Card Exposure Method

As we've seen, a reflected light meter—such as the one in your camera—measures the intensity of all the light values in your frame (with extra weight given to the center), averages them out to middle gray (18% gray), and then suggests an f-stop to render middle gray accurately (allowing the other brightness values to fall where they belong). While this works well much of the time, in the box on the next page, I show how a reflected light meter can be fooled by scenes that are essentially monochromatic. Reflected light meters can also be fooled by very bright areas in your scene, like a bright window in the background. But, you can make your camera's meter more consistently accurate and foolproof in any situation: simply *take your reading off an object in the scene that is exactly middle gray*—and this is why they manufacture middle gray cards. A **middle gray card** is simply a piece of plastic or cardboard with a matte surface that is exactly 18% gray (**Figure 12-9**). By metering off a gray card held in the scene, the camera TTL will be averaging only middle gray reflectance, and will calculate the precise aperture to render that middle gray card, middle gray. Objects lighter or darker will then be accurately rendered in proper relationship to middle gray (no matter what your scene looks like). This is why most serious cinematographers always have a middle gray card with them on the set.

The **gray card exposure method** is exactly the same as the run ‘n’ gun method described earlier, BUT you simply need to place a middle gray card in the area where you want to peg your exposure so that it catches the lighting in that area (usually the face of your subject in the key light, but not always) and zoom in to the card so that it *completely fills the frame* (i.e., the meter sees nothing but middle gray). Like this:

1. Decide which area of the frame you would like exposed correctly. This is an aesthetic decision based on the composition, mood, and story (e.g., subject's face in the key light).
2. Hold a middle gray card in that area, making sure that representative light is falling on it and that it is flat to the camera lens (not angled up, down, or side to side).
3. Zoom in tightly to the gray card so that it fills the frame.
4. Toggle to auto iris mode and let the meter select its aperture for the gray card.
5. Turn off the auto iris to lock the exposure in place.
6. Zoom out and compose your shot; that exposure is locked in and all of the other luminance values in the scene (brighter and darker) will fall where they belong.

REFLECTED LIGHT METER LIMITATIONS

I mentioned earlier that a **reflected light meter** reads the light reflecting off your scene and calculates an exposure setting (f-stop) by averaging the light values that you have in your frame. But what do we mean by “averaging the light values”? A reflected light meter measures your scene’s overall light intensity, which *ordinarily* includes a mix of light and dark areas, and it calculates the f-stop to expose for the exact middle of the brightness scale between pure black and pure white—this is called **middle gray** (see “Black, White, and Middle Gray: A Waveform Monitor Introduction” later). Theoretically, once middle gray is exposed correctly, all of the other brightness values in the scene from white to black will be rendered accurately. Reflected light meters are remarkably accurate in ordinary situations; however, they can be fooled in situations that don’t truly have a range of brightness values. For example, **Figure 12-8** shows a shot of two shirts, one black and one white. When metered on both shirts (*top*) the auto iris averaged out the overall luminance values and landed on the

aperture (f/8) to render the middle tone (middle gray) correctly. The shot looks great at f/8, both shirts look as they should. But, when I filled the frame with the black shirt only, the meter read that black luminance and averaged it out for middle gray and calculated an aperture setting that is 3 stops overexposed (f/2.8). This rendered the black shirt close to middle gray (*bottom left*). The same issue happened when I took a reading off the white shirt only. The meter took that white luminance and averaged it out to middle gray, thus giving an aperture setting that was 3 stops underexposed (f/22) and making the white shirt look close to middle gray (*bottom right*). This example illustrates how scenes that do not have a range of brightness values can fool a reflected light meter—like shooting a polar bear in the snow, or a black cat sleeping on a black sofa. Luckily, there is a way to make our in-camera reflected meter (or any reflected meter) foolproof in any situation. The simple “Gray Card Exposure Method” described on page 276 will circumvent this limitation and make your in-camera reflected meter (or any reflected meter) foolproof in any situation.



■ **Figure 12-8** TTL metering averages the overall luminance in your frame to a middle gray reference. With a range of luminance values in the shot, this method can work well (*top*), but if your frame has very limited tones, like filling the frame with a black subject (*bottom left*) or with a white subject (*bottom right*) the auto iris will be “fooled” and attempt to render it middle gray.



■ **Figure 12-9** During the lighting process a stand-in holds a middle gray card to help the cinematographer meter accurately and determine correct exposure.

7. Check your 100% zebras to ensure that your whites are not clipping—and make adjustments if necessary (see “Zebras” later).
8. Tweak the manual iris to finesse the exposure by looking at the final result on a high-quality field monitor (see “Using Field Monitors” later).

Figure 12-10 is an illustration of how accurate this technique can be. We intentionally flagged the sunlight on this subject to place him half in sun and half in shadow, and had him hold two middle gray cards in each area. The *left* image was metered off the “sunny” middle gray card, and the auto iris selected an aperture of $f/16$, perfectly exposing the gray card and the sunny side of his face, hand, and shirt, while the shadow side naturally falls 3 stops under (notice the “shadow” gray card is rendered 3 stops darker than middle gray). The *right* image was metered off the “shadow” middle gray card and the auto iris calculated an aperture of $f/5.6$. Now the shadow side of his face, hand, and shirt are exposed correctly and the sunny side naturally falls 3 stops overexposed (notice the “sunny” gray card is now 3 stops lighter than middle gray).

lated an aperture of $f/5.6$. Now the shadow side of his face, hand, and shirt are exposed correctly and the sunny side naturally falls 3 stops overexposed (notice the “sunny” gray card is now 3 stops lighter than middle gray).

Zoom versus Spot Meter Function

Both the “run ‘n’ gun” and the “gray card” methods I outlined earlier make use of a zoom lens to isolate areas of the scene for metering. This works well for camcorders and situations where there is actually a zoom lens on the camera. But what if you’re not using a zoom lens? Some video cameras offer a **spot meter mode** which forces the internal light meter to read only a small cluster of pixels at the center of the frame (around 2–5% of the overall frame) and ignore the rest. This makes it very easy to place the spot metering area over a gray card held in the scene to take your reading even if you don’t have a zoom lens. If you have a spot meter mode in your camera, by all means use it. Unfortunately, while spot meter mode is common on mirrorless and DSLR cameras (which are designed for still photography) it is not available on many cameras designed for film production (hybrid and D-Cinema cameras)—and this is where handheld light meters (page 335) and waveform monitors (page 338) come in. While somewhat more advanced in their application and learning curve, these are the preferred tools for exposure control for many narrative film professionals, as we will see in Chapter 14.



$f / 16$



$f / 5.6$

■ **Figure 12-10** Exposing for middle gray in the sunny areas will underexpose the shaded areas (*left*, $f/16$), while exposing for middle gray in the shaded areas will overexpose the sunny areas (*right*, $f/5.6$). Note the effects of exposure change on the middle gray cards (which are both exactly the same shade of gray).

Which Exposure?

If your scene is lit fairly evenly throughout, then one reading at your subject may suffice, and you can set your exposure for that f-stop, but very often scenes are made up of areas with different light intensities that yield different exposure readings. In these cases the “correct” exposure determined through one reading at a single spot might give an *acceptable* result, but perhaps not the best or most expressive exposure. To truly control the visual impact of your images, you should take multiple readings to determine the variation of exposures in your scene, and then make a creative choice given the range of possibilities. Let’s look at a simple example.

Figure 12-11 shows a scene with two subjects in the frame; one subject is standing in the shade and the other is standing in the sun. When you meter the sunny side you get a reading of f/16, but when you take a reading in the shade you get f/8. So where do you set your f-stop? Which reading is “right”? The truth is, neither reading is right or wrong. If you set your aperture to f/8 to expose for the shade, then the subject in the sun will be 2 stops overexposed, and if you set your aperture to f/16 to expose for the sunny side, then the man in the shade will be 2 stops underexposed. You could split the difference and set the exposure at f/11, in which case one person will be 1 stop overexposed and the other will be 1 stop underexposed—a little compromise both ways. All three options are technically “correct,” so now you need to ask yourself: What do I want this image to express? What is the mood of the scene? What do I want to show the audience, or hide from them? Do I need to show the guy in the shade in full detail? Does it help the story if he remains a bit indistinct, mysteriously lurking in the shadows? Or conversely, does it matter if the man in the sun is bright, perhaps that could provide a visual cue to the intensity of the sun on a blisteringly hot day? And, if you’re reading this and thinking, “Why not use a reflector to bounce some of that sunlight onto the guy in the shade to bring their exposure values a bit closer?”, then you’re starting to think like a cinematographer! In any case, deciding what area in your frame you wish to expose correctly is called **pegging your exposure**. Once you’ve decided where you’ll peg your exposure, all the other exposure values are rendered relative to that.

In short, exposures are such an important creative element of your film that they should not be left up to the indifferent calculations of a light meter. Instead, choosing the right exposure is a creative decision determined by the filmmaker. We will revisit this issue of creative exposure control in detail in the Chapter 14.

More Metering Options

The two metering methods outlined earlier are very quick and simple ways of finding exposures when all you have is your video camera to work with. However, there are other exposure tools and methods that you can employ when you have a bit more gear, a bit more time, and a little more expertise. Please see the section “Advanced Exposure Tools” in Chapter 14 for more options and information on determining exposures.



■ **Figure 12-11** A common situation shooting outdoors on a sunny day: Exposing for the sunny side, at f/16, underexposes the subject in the shade; exposing for the shade, at f/8, overexposes the subject in the sunny side. A compromise exposure of f/11 can be used to show both subjects with some degree of detail. All options are viable if the narrative calls for it.

Deciding on the best exposure for any scene is a critical creative decision that can have tremendous impact on the meaning and emotional tone of a scene. Sometimes, the right f-stop is not necessarily the one that gives a “correct” exposure of the subject. Sometimes over- or under-exposure tells a better story (**Figure 12-12**).

The first shot (*top frame*) shows a crucial moment from Paul Thomas Anderson’s 2007 film, *There Will Be Blood*. Oil prospector Daniel Plainview (Daniel Day-Lewis) is just coming into some serious profit when he is visited by a man claiming to be his long-lost brother Henry. At first Daniel is thrilled to discover that he has kin, but later he begins to doubt Henry’s stories of their past. This moment on the beach is where Daniel realizes for certain that this man is an imposter. The shot is not unlike **Fig. 12-3** with one man in the sun and the other in the shade, and Anderson and D.P. Robert Elswit decided to expose for Daniel and allow “Henry” to fall into deep underexposure. The exposure not only isolates



■ **Figure 12-12** Precise and expressive exposure choices: Anderson’s *There Will Be Blood* (*top*), Coen Brothers’ *No Country for Old Men* (*center and bottom*).

Daniel and draws the viewers’ attention to him as he realizes that he’s being deceived, but the similar body positions and extreme contrast of the two figures bring to mind a man and his shadow. By rendering “Henry” as Daniel’s shadow, Anderson has in effect created a visual metaphor for Daniel’s inner demons and indeed from this moment on we witness his inexorable descent into fury, madness, and violence.

Latent violence is also the undercurrent in the next shot (*middle frame*) from the Coen Brothers’ *No Country for Old Men* (2007). In this scene the psychopathic killer Anton Chigurh (Javier Bardem), who has already left behind him a collection of corpses in his search for pilfered money, has arrived at the hideout of Carla Jean, the wife of the man who took the money. We already know that Chigurh can kill easily, or he can just as easily let people go. But we don’t know which Chigurh is in the room with Carla Jean as she tries to reason with him to spare her life. The Coens and D.P. Roger Deakins chose to place Chigurh in the shadows in a corner of the room. The decision to expose for the bright areas of the room (see his hands in the sun) and allow Chigurh’s face to fall several stops into underexposure heightens the tension of the scene because it keeps his features difficult to make out and his intentions utterly inscrutable.

Staying with the film *No Country for Old Men*, we can find an instance where a very different exposure decision was made (*bottom frame*). In this scene Sheriff Ed Tom Bell (Tommy Lee Jones) investigates a drug-related shootout in the desert. The sun is intense but Deakins chose to expose for the Sheriff’s face which is under the shadow of his hat brim. There is a narrative advantage to showing the Sheriff’s reactions clearly as he explores the horrific crime scene; it presents the thematic idea that the ultra-violent, merciless, and remorseless deeds of contemporary criminals has pushed beyond his comprehension. In addition, the choice to expose for the shadow area under his hat brim caused the rest of the frame, bathed in direct sunlight, to overexpose—in a good way. The slightly bleached-out environment makes us feel the heat and intensity of the brutal desert sun, which in turn adds to the cruelty of the crime scene.

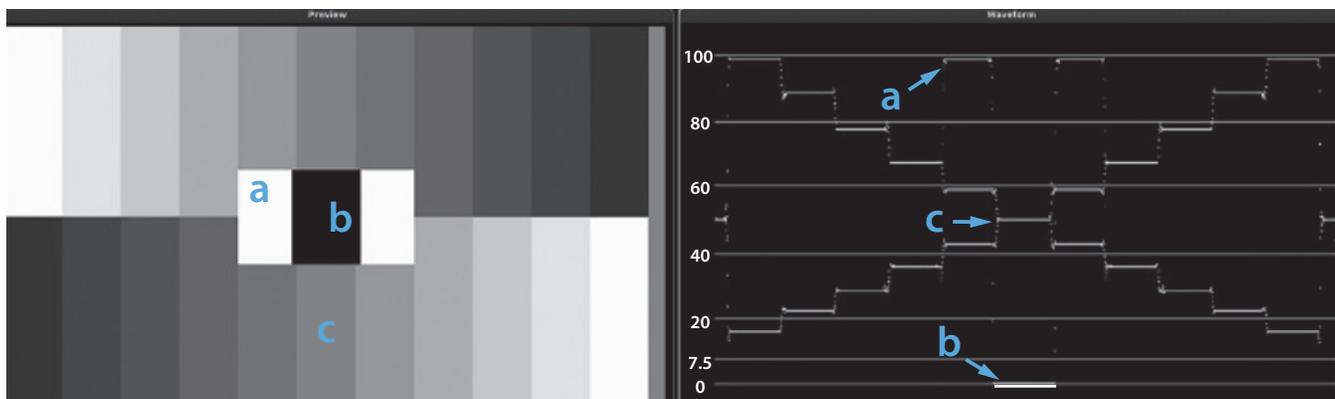
Black, White, and Middle Gray: A Waveform Monitor Introduction

When it comes to exposures, we are interested in the brightness of areas and objects in our scene, and that means we are interested in measuring the image's **luminance values** (page 271). The range of luminance values that we can shoot falls between pure white (beyond which there is no detail) and pure black (below which there is no detail). In video, this luminance range is dictated by our old friend, ATSC standard Rec. 709 color space (see page 197). But in order to truly measure what white and black are, we need some way to objectively measure and visualize exactly how our sensor is responding to the brightness values in a scene, and we need some baseline unit of measure. High-definition monitors are great to have on a set, but they are not entirely accurate because calibration, ambient light, viewing angles, and so forth can alter the true tonalities in the image—we need something uniform and consistent.

Let me introduce you to the waveform monitor—the most important and powerful exposure tool in a digital filmmaker's arsenal. A **waveform monitor** (or **waveform scope** or **WFM**) measures the video signal voltage in a live video image at the sensor level, and those voltage levels correspond directly to the brightness levels within the image. The scale that a WFM uses to measure voltage is the **IRE scale** (for Institute of Radio Engineers) and you'll find it rising vertically along the left side of the monitor graticule. The unit values on the IRE scale are referred to interchangeably as IRE or percentages, for example: 100 IRE = 100%, 70 IRE = 70%, 50 IRE = 50%, and so on (**Figure 12-13**). The horizontal axis of the waveform is your complete video frame (from left to right) represented as luminance values.

Our baseline parameters on the IRE scale are **0 IRE** which is the measure for **pure black** and **100 IRE** which is the measure for **pure white**.¹ These are the exposure limits for **legal video**, and all of the brightness values in your image fall between these parameters. Scene highlights that go beyond 100 IRE lose all visual detail creating totally overexposed images, or **clipped whites**, and areas that fall below 0 IRE lose all visual detail and are solid black, or **crushed**. Be aware that clipped whites and crushed blacks have no image detail in them that can be retrieved, so you cannot “fix them in post.”

Figure 12-13 shows a correctly exposed gray scale chart with two rows of gray tones from black to white (and a pure black chip at the center flanked by two pure white chips). Looking at the waveform representation of the chart you can easily see how the waveform corresponds to the various brightness values on the chart: the white chips fall on 100 IRE,



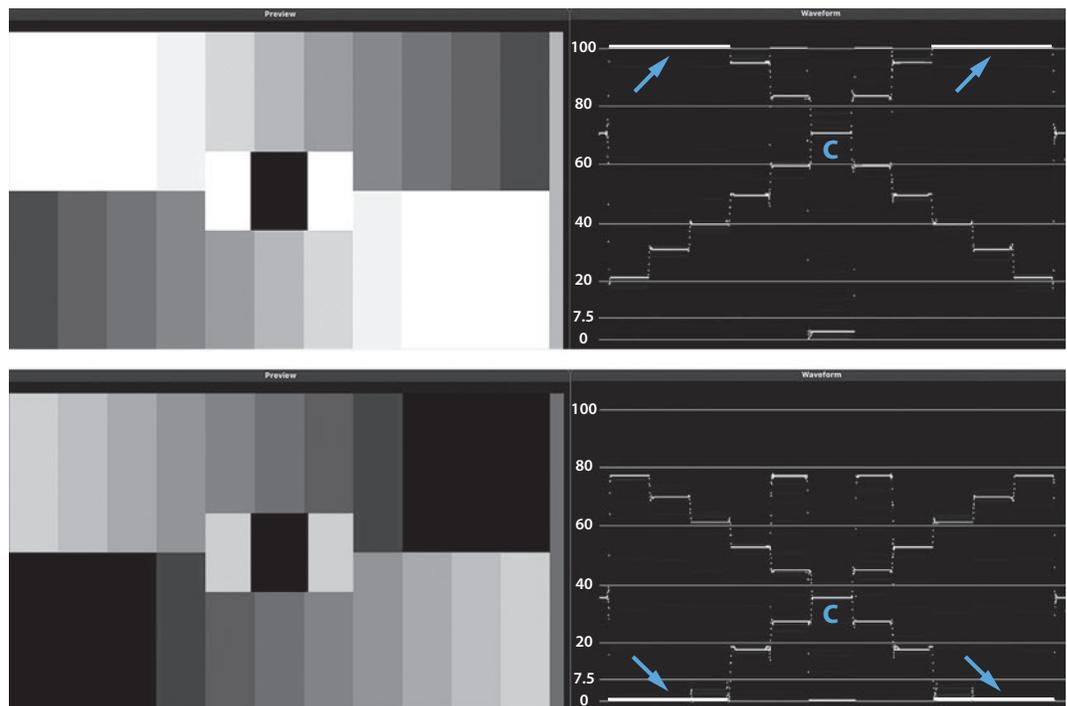
■ **Figure 12-13** On a properly exposed gray scale test chart, the pure white value (a) will read at 100 IRE on a WFM, the pure black chip (b) falls to 0 IRE, and middle gray (c) is at 50 IRE. Notice that the black and middle gray values are on the same vertical in the chart and therefore read on the same vertical on the WFM.

¹ Some high-end cameras can shoot up to 109 IRE with detail. The space between 100 and 109 IRE is known as superwhite and for most purposes it's avoided in order to protect white clipping.

the black chips fall on 0 IRE and all of the various shades of gray fall evenly throughout the scale. It's important to remember that many objects on screen that appear to be white, like a white wall or a white shirt, actually fall somewhere between 75–85 IRE. It's only very bright highlights, like sun reflections off a polished surface, that hit 100 IRE. And it's the same with black. Many objects that appear black on screen often fall between 5–12 IRE.

From our earlier discussion on reflected light meters, you know that **middle gray** is the luminance value midway between black and white, and middle gray is a crucial tone for metering and exposure control. All light meter calculations (reflected or incident) use middle gray as a reference point. You will often hear middle gray referred to as **18% gray**. This is because the photographic **zone system**,² devised by photographers Ansel Adams and Minor White, determined that the middle gray tone reflects 18% of the incident light falling on it. But, where do we find middle gray on a WFM? When properly exposed, middle gray should fall at 50 IRE (directly between white at 100 IRE and black at 0 IRE).³ But be aware that there are some variations to this when shooting in other gamma profiles (not Rec.709), but we'll get to that in Chapter 14.

Now let's see what happens with over- and under-exposures: **Figure 12-14 top** shows how a 3 f-stop overexposure clips the bright areas that were previously visible under proper exposures, while **Figure 12-14 bottom** shows how a 3 f-stop underexposure crushes into pure black the dark grays that we could previously see in a proper exposure. In fact, using the WFM you can see precisely how all the luminance values are affected by over- and under-exposure.



■ **Figure 12-14** Overexposure clips the brights, causing them to become pure white with no visual detail (*top*); conversely, underexposure will crush shadows, pushing them to 0 IRE where they lose all visual information and appear pure black. Notice what over- and under-exposure has done to the middle gray chip (c).

²  For more detail on the zone system, see “The Celluloid System” on the companion website. This is essential knowledge for anyone aspiring to be a cinematographer.

³ With the zone system, reflectance percentages follow a logarithmic progression, which is why middle gray reflectivity is at 18%. The waveform measures the relative voltage of the video signal (btw. 0–100 units). This different scale places middle gray at 50% for Rec. 709.

If you've been reading this chapter carefully up to this point, I think you can start to see how the WFM can be a powerful exposure tool. We'll discuss how we use a WFM to help us light a scene and determine exposures in Chapter 14.

Zebra

Another exposure aid found on many cameras is **zebra stripes** (or **zebras**). Zebras are thin, slanted black lines that show up in the hot spots in your image. They are seen in your display (if you've turned them on) but they are not recorded. Zebra stripes tell you when a bright area in your image has reached the limits of proper exposure and is in danger of being overexposed. The two most common **luminance settings** for zebras are **100 IRE white** and **70 IRE white** (sometimes 80 IRE white).

By far, the most useful setting for zebras is 100 IRE white (or 100%) because that is the absolute upper range of brightness for a video exposure, beyond which your whites clip or "burn out." When 100 IRE stripes begin to appear in the white areas of the frame, you know you've reached the limits and do not want to open up your aperture any more.

Let's say we are shooting a subject leaning against a white car and we want that car to gleam nice and bright, but don't want it to clip. In the manual exposure mode, we can open up the iris to the point when zebra stripes show, and then we close down just enough that they begin to disappear. Now that white car is properly white (**Figure 12-15**).

There are two benefits to using zebras: the first is that they give you an absolute measure of brightness in your image. Monitors might be slightly off, even after calibration, but zebras will show up at 100 IRE white no matter how you've calibrated the monitor. And the second is that zebras show you, right on your image, exactly *where* you are clipping. Keep this in mind; in many situations you may have minor areas in your frame that clip (and it looks natural for them to clip). An exposed light bulb, or car headlights, metallic jewelry or eyeglasses that reflect the sunlight, or a window on a very bright day may clip and look fine that way. But zebras help us remove clipping in important areas of our frame where we want white and detail in image.

Some cameras allow you to calibrate zebra stripes to 70% or 80% white, which is considered the upper limit of "proper" exposure for Caucasian skin tone. These zebras start to show at 70% white and then disappear around 90%. The logic here is based on the assumption that Caucasian skin is properly exposed around 70 to 80 IRE. When shooting the face of a Caucasian subject, you should see zebras in the highlights of the face, like



■ **Figure 12-15** The zebra stripe function is useful to control overexposure in our shots. Zebras are usually calibrated to display overexposures in white areas (100%) (*left*); a lesser used zebra pre-set is for "correct" exposure on Caucasian face tones (70%) (*right*).

the cheekbones and the forehead. The limitations of 70% zebras should be fairly obvious. Are all Caucasian skin tones alike? Surely not. And what about all of those other skin tones we might want to shoot? In addition, there are many situations where we don't want to use an exposure standard that makes our people look like they're being taped for the evening news. So 70% stripes—if you use them at all—should be considered only as an exposure guide and never as an absolute.

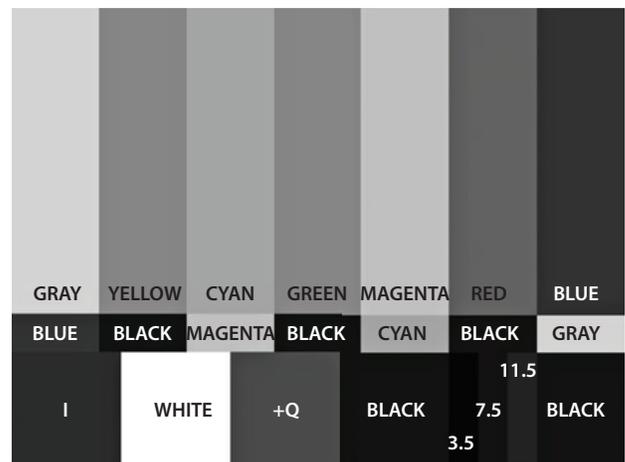
Using Field Monitors

Unfortunately, it is not uncommon for beginners to shoot entire projects with just that little built-in camera LCD screen as their reference display. It happens often that when reviewing the footage later, on a professional monitor, they find the exposures are markedly different and they cry out, "But it didn't look that way when I was shooting it!" The fact that we can see the video image as we shoot can be a great help in evaluating composition, focus, and lighting and even exposures to a certain extent, but filmmakers must be confident that what they are viewing is an accurate representation of what is actually being recorded by the camera. The flip-out LCD screens on digital cameras cannot be relied on for image evaluation and critical judgments for a number of reasons: (1) they cannot be accurately calibrated; (2) viewing LCD screens at oblique angles causes shifts in color, contrast, and brightness; (3) ambient light can easily wash out an LCD flip screen; and (4) LCD screens are often not capable of displaying the full latitude that many digital cameras are capable of recording. And they're just so dang small! For these reasons, narrative filmmakers will routinely use a high-quality, high-resolution **portable field monitor** that is receiving the video output from the camera. Field monitors are so sophisticated these days that they have become a nearly indispensable tool to have on the set (**Figure 12-16**). Many monitors have memory card slots to record HD and UHD video in a variety of codecs (greatly expanding a camera's capacity). Many also offer a variety of image evaluation scopes built in, like a waveform monitor, vectorscope, and histogram (see **Fig. 14-17**). Finally, many newer HD monitors have built-in viewing LUTs (or accommodate custom LUTs) for Log Gamma shooting situations (see Chapter 14 for more on using LUTs).

For maximum accuracy, the color, brightness, and contrast settings for any field monitor must be set to a standard in order to ensure that what we are seeing is indeed what we are getting. Nearly all digital cameras generate a video test pattern called **NTSC split field color bars** for the purpose of calibrating field production monitors (**Figure 12-17**). NTSC color bars are a standardized set of colored stripes and squares that allow you to easily calibrate your monitor's adjustable settings for brightness (luminance), contrast, hue (tint),



■ **Figure 12-16** High-resolution, portable field monitors are an indispensable tool for narrative filmmakers. In addition to simply monitoring your image, they often offer a variety of image evaluation scopes and some can even serve as a secondary recording device.



■ **Figure 12-17** Monitors should always be carefully calibrated to color bars for luminance, contrast, hue, and saturation, providing an accurate rendition of the video signal from the camera. See the color insert.

and saturation (color level) to ensure faithful display of the images being recorded. I have included a full set of instructions for calibrating monitors to color bars on the *Voice & Vision* companion website. 

In addition to calibrating your monitor, you need to take care to protect the monitor screen from the glare of the sun or movie lights, which can wash out the image. **Monitor hoods** are often used in the field to avoid these problems.

in practice

■ CELLULOID FILM EXPOSURE INFORMATION IS LOCATED ON-LINE

 Celluloid film is certainly still being used for image capturing, however its use is most common on commercial feature-film projects and even at that, we're seeing the use of film diminish every year. In the last five years or so celluloid film shooting has all but disappeared from college level film programs, with the exception of specialized cinematography or experimental film tracks. In previous editions of *Voice & Vision* I included lengthy sections on the celluloid film system, including

detailed chapters on cameras, film stock characteristics, exposure control, and celluloid workflows. For readers who are keen on taking the celluloid journey, you can still access and download all of these chapters and information on the *Voice & Vision* companion website, under the "Celluloid Film System" tab. Even if you are not planning to shoot on film, there is great benefit in exploring the basic materials, tools, processes, and aesthetics of celluloid film; this knowledge will enhance your understanding of digital video shooting, workflow, and aesthetics. Sometimes, it's helpful to know where you came from, to know where you are going.



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Basics of Light and Lighting

Everything can be transformed, deformed, and obliterated by light. Its flexibility is precisely the same as the suppleness of the brush.

Man Ray (From *La Photographie N'est Pas L'Art*, 1937)

I came to love the moment when you had decided the set-up with the director, and you'd be left alone in the set with your gaffer and your sparks and your lights to create the scene – like a painter in his studio.

Douglas Slocombe (From “Visual Style” by Wandering Gio, 2015)

A cinematographer has to design and write a story, starting at the beginning, through the evolution, to the end. That's why I consider my profession is as a writer of light.

Vittorio Storaro (From “Visual Style” by Wandering Gio, 2015)

Movie lighting is an art form in which the interplay of light, shadow, color, and movement serve as fundamental expressive elements in the telling of a story. You can light a film using only the sun as a light source, or only available lights, or only three movie lights, or over 20 lights, but like all art forms, there is really only one absolute rule to dramatic lighting—make it work. Your lighting approach must work in coordination with the other elements of the film (story, location, performance, sound, editing, and so on) to support and enhance the overall tone, mood, and narrative contour of the project. However, as with all art forms, “making it work” means having the skill and control to actually pull “it” off. With lighting, the more knowledge you acquire about the history, conventions, and approaches of dramatic lighting and the more control you develop over the materials, tools, and techniques of the craft, the more successfully you will achieve your vision. To gain this sort of control you must start with a solid foundation, which means knowing what tools you have at your disposal and how those tools work. It also means knowing some basic principles of light and lighting. Principles, unlike rules, can be applied creatively, used to improvise, and serve as the foundation for creative exploration and expression. As the great cinematographer Maryse Alberti tells us, “You have to master your tools and stay in the creative zone. It begins with knowing what you want your images to look like and why” (see box on page 321).

A thorough understanding of lighting principles is especially important to student and independent filmmakers, who are typically making films on limited budgets and a tight time schedule. Lighting is the most time-consuming and labor-intensive process in making movies. It takes muscle and many hours to get lighting gear onto a set, into position for shooting, broken down afterward, and loaded back onto the truck. Hollywood films look like Hollywood films because they have all the time, money, and manpower they need for elaborate lighting schemes and setups. But just as with every other element of a filmmaker's art, money and size don't necessarily translate into a good, or successful, or even beautiful film. Ingenuity, imagination, and a practiced eye are your primary resources for using light to tell your story with visual eloquence and impact. If you really want to learn about expressive lighting on a budget, don't turn to the Hollywood blockbuster, which has an army of grips, gaffers, and electricians and several five-ton grip trucks filled with state-of-the-art lighting and grip equipment. These films make you feel that your resources are insufficient, when in fact this surfeit of resources often proves to be an encumbrance that threatens to supersede the creative impulse with logistics and pure technical procedure

for its own sake. Anyone who goes to the movies on a regular basis sees many films that were made with virtually limitless access to gear and labor but that nonetheless feel lifeless. This feeling comes, in no small measure, from the lighting approach itself, which, for all of its professionalism, is often blunt and overproduced rather than uniquely expressive.

Both film students and independent filmmakers should look instead at the filmmakers who have made great movies with very little—whether out of necessity or by choice—and who have nonetheless conceived of simple, elegant, and expressive lighting designs.

Check out the brilliantly innovative and visually agile work from French New Wave cinematographers like Willy Kurant (*Masculin/Féminin*) and Raoul Coutard (*Breathless*, *Jules et Jim*). The New German Cinema movement also produced micro-budget films that were visually provocative shot by D.P.s like Michael Ballhaus (*The Marriage of Maria Braun*) and Robby Müller (*Kings of the Road*). If you look at the résumés of both of these artists, you'll see that their influence extends far into international and American cinema as well. Of course, you can observe visual eloquence, innovation, and power on bare bones budgets in the next generation of independent American and European cinematographers like: Ellen Kuras (*Personal Velocity*), Anthony Dod Mantle (*The Celebration*), Earnest Dickerson (*Do The Right Thing*), Chung Hoon-Chung (*Old Boy*), Agnes Godard (*Beau Travail*), Christopher Doyle (*Chunking Express*), and Maryse Alberti (*The Wrestler*). And finally, you can trace that same artistic spirit and eloquent craftsmanship to the most recent generation of independent filmmakers in movies like *Fruitvale Station* (2013, Rachel Morrison, D.P.), *Mother of George* (2013, Bradford Young, D.P.), *Only Lovers Left Alive* (2013, Yorick Le Saux, D.P.), *A Girl Walks Home Alone at Night* (2014, Lyle Vincent, D.P.), *Dheepan* (2015, Éponine Momeceau, D.P.), *Moonlight* (2016, James Laxton, D.P.), and on and on.

All of the films mentioned had relatively to *extremely* modest lighting resources, but those resources were used with a profound understanding of science, artistry, and technique. These films and cinematographers can teach us far more about lighting, camerawork, and storytelling than the latest \$200 million Hollywood production (**Figure 13-1**).

The great cinematographer Néstor Almendros made a critically important point when talking about his work lighting and shooting Eric Rohmer's *La Collectionneuse* (1966). In his



■ **Figure 13-1** Expressive and innovative lighting with modest resources. Top row: (a) Godard's *Masculin/Féminin* (1966); (b) Fassbinder's *The Marriage of Maria Braun* (1979); (c) Wong's *Chunking Express* (1994). Bottom row: (d) Denis' *Beau Travail* (1999); (e) Jarmusch's *Only Lovers Left Alive* (2013); (f) Jenkins' *Moonlight* (2016).

interview for the book *Masters of Light* (by Dennis Schaefer and Larry Salvato, 1986), Almendros talks about his naturalistic lighting approach, working with Rohmer, and how few lights and crew they discovered they actually needed to make the film: “[We] realized that most technicians had been bull****ing, you know, and inventing uses for enormous amounts of light to justify their importance, to justify their salaries and to make themselves look like someone who knows a secret, when there is technically very little to know.”

■ THE FUNDAMENTAL OBJECTIVES OF LIGHTING

Whether we are lighting with a grip truck filled with movie lights, a small portable lighting kit, or just the sun, there are five fundamental objectives to lighting any scene:

1. Get an exposure (i.e., detail visibility)
2. Control depth and dimension
3. Create visual and narrative emphasis
4. Establish tone and mood
5. Maintain consistency.

The most rudimentary and utilitarian function of movie lighting is *exposure and visibility*, ensuring a scene will register on our image sensor and a viewer can see details. However, anyone can blast thousands of watts of light at a scene and guarantee that the viewer will see absolutely everything! Expressive lighting, on the other hand, involves lighting for the dramatic needs of the scene. This means manipulating light sources, shadows, and colors to create the visual look appropriate for your scene and story. As we mentioned on page 54, lighting angles and shadows are significant factors in creating or minimizing *depth and dimension* within a shot, and this contributes significantly to the composition of the frame. Additionally, we must consider how our lighting scheme works to compliment the *visual narrative emphasis* that may be required in a scene; for example, lighting to reveal some details clearly while perhaps concealing others; or to create areas of greater and lesser prominence within a shot; or lighting to create visual relationships between characters or maybe characters with their environment. These aspects of lighting function in tandem with shot composition and set design to give emphasis to visual information and to guide the viewer’s attention. Very closely related to this is the fourth objective of lighting, to establish a particular (and appropriate) *emotional tone or mood* for a scene. The inclusion or elimination of shadows, the range of colors in a scene, the hardness or softness of the light, the direction from which lights come: all of these lighting choices, when conceived intelligently from the content of the script, can have a profound impact on the emotional tone that will be communicated to an audience. The way we use, control, and manipulate our sources of light to create narrative and emotional emphasis plays an enormous role in the overall visual style of the cinematography and therefore the film. That style can be anything from naturalistic to highly stylized (I explore these concepts in detail in Chapter 14). Finally, with so many possible lighting variables available every time we set up a new scene, we need to be vigilant that our lighting schemes *remain consistent* from shot to shot and scene to scene so that the finished film has a unified visual style (even if specific lighting details change to reflect tonal shifts in the story). If we light each shot without considering the larger canvas, we run the risk of creating shots that look fine on their own, but will not edit next to other shots (lighting continuity) or scenes which break the emotional tone of the film.

■ THE FUNDAMENTAL SOURCES OF LIGHT

Anything that gives off light, from the blazing midday sun to a candle, can be used as a lighting source in a scene. **Natural light** refers to a light source coming from nature, a source that is not artificial. Usually we mean the sun when we talk about natural light, but the term also applies to light that comes from nonelectric sources that aren’t naturally occurring, like campfires, candles, and fireplaces. **Artificial light** is any light source that generates light through electricity. Artificial lights can be as big as a 50,000-watt movie light or as small as a flashlight ([Figure 13-2](#)).

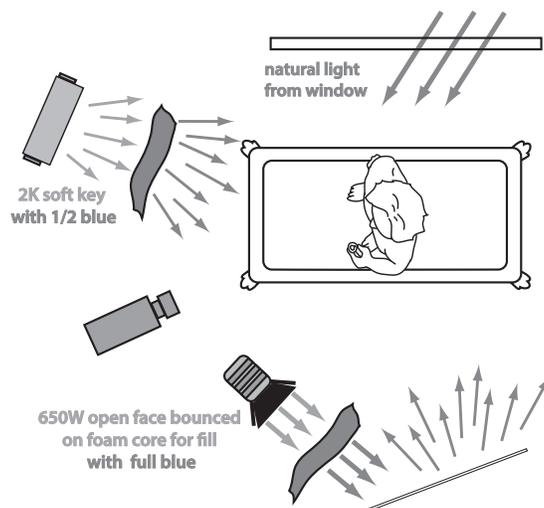


■ **Figure 13-2** An 18,000-watt HMI on location (*left*) and a flashlight in *The Blair Witch Project* (1999, *right*). Usable artificial lights come in many sizes.

The term **available light** refers to light sources that ordinarily exist in any given location. For example, if you walk into a grocery store with your camera and simply shoot by the light of the fluorescent fixtures overhead or if you shoot in a bedroom illuminated only by the sun streaming in from a window, you are shooting with available light. **Mixed lighting** refers to combining available sources and artificial lights to achieve the look you're after. It's very common to use the sun as one light source and artificial lights as another (**Figure 13-3**).

Very often natural or available light sources are not powerful enough to create an exposure, but we nonetheless want the audience to feel like that particular source is illuminating the scene. For example, a character is watching TV and we want the audience to believe that the glow from the screen is the only light illuminating her face, but the glow from a TV (or candle, or fireplace, or 25-watt reading lamp, etc.) is almost never strong enough to get a good exposure, especially if your character is some distance away. In this sort of situation we bring in an artificial light to duplicate the color, quality, and direction of the ostensible light source, but at a higher intensity (**Figure 13-4**). While this light obviously remains off screen, the ostensible source is often shown in the scene (see the "Specials and Practicals" section).

This strategy of using movie lights to duplicate where light would logically be emanating from is called **motivated lighting**. Motivated lighting is a central strategy for creating **naturalistic** lighting designs (see page 350). These are **realistic** lighting setups where the light direction, intensity, and texture can be derived from what the viewer knows about the logical source of light in the location.



■ **Figure 13-3** In this scene, from Katherine Hurbis-Cherrier's *Ode to a Bar of Soap*, mixed lighting (artificial and sunlight) has been balanced for color temperature and quality. See the color insert.

■ THREE ESSENTIAL PROPERTIES OF LIGHT

Light sources don't simply give off generic light: every light source emits a light that has specific characteristics that contribute to the look of your scene. Three of the basic properties of light that give any light source its distinctive character are **intensity**, **hard versus soft**, and **color temperature**.

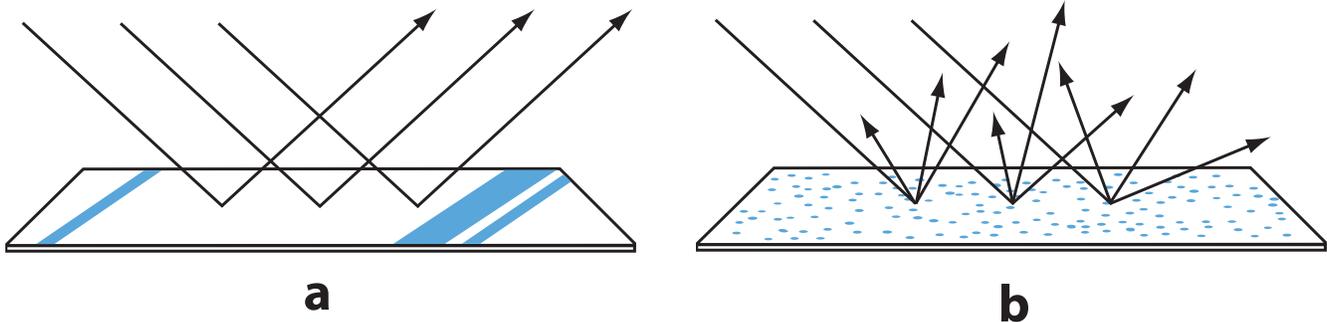
Intensity

Light **intensity** is the strength of the light emitted by a source. Direct sunlight is obviously a very intense source of light, although the actual intensity changes depending on its angle at various times of day. With artificial light, intensity depends on the **wattage of the lamp** used (500 watts, 1,000 watts, etc.) and on the **reflector system**. When we speak of lamp wattage we use the symbol "K" to stand in for "thousand." So a 1,000-watt light is called a 1K and a 2,000-watt light is called a 2K. Do not get this K mixed up with the "K" symbol used for degrees Kelvin, when referring to color temperatures (see page 293). A very common movie light is a 1K Fresnel with a color temperature of 3,200 K.

Some lighting instruments have a **specular reflector system**. A specular reflector system uses a highly polished, mirror-like surface to reflect the light from the lamp and is very efficient in maintaining the intensity of the lamp wattage. Other instruments use a **diffuse reflector system** to soften the light, and this cuts down the intensity (Figure 13-5). In addition, some lighting units employ a lens in front of the lamp to help control the directionality of the beam, but this, too, cuts down the intensity of the light.



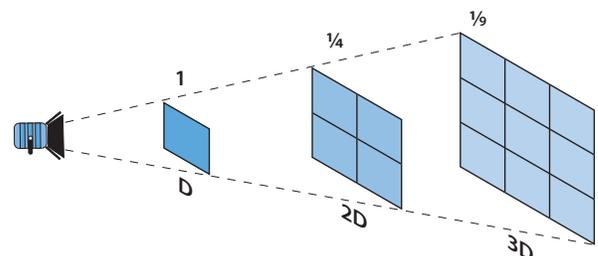
■ **Figure 13-4** The real glow of a TV could not produce enough light for an exposure, so its output was amplified with the use of a movie light in Ingmar Bergman's *Persona* (1966).



■ **Figure 13-5** A specular surface, like a mirror or a polished reflector (a) maintains the directionality of the light rays it reflects. A diffused surface (b), like foam core or a matte reflector, scatters the light rays, changing the quality of the light from hard to soft.

The intensity of incident light on your scene is also greatly affected by the lighting unit-to-subject distance. The farther away an instrument is placed from the subject, the weaker the light is falling on the scene. This diminishing intensity as the unit is moved away follows the **inverse square law**, which says that the intensity of light falls off by the square of the distance from the subject (Figure 13-6).

Obviously the converse applies when you bring a light in closer, to increase its intensity on the subject. If the inverse square law seems like a lot of calculation to do on the set, you can simply apply this rule of thumb: if you double the



■ **Figure 13-6** The inverse square law. Doubling the distance from the light source to our subject means that the illumination is spread over four times the area and is therefore only one fourth the intensity.

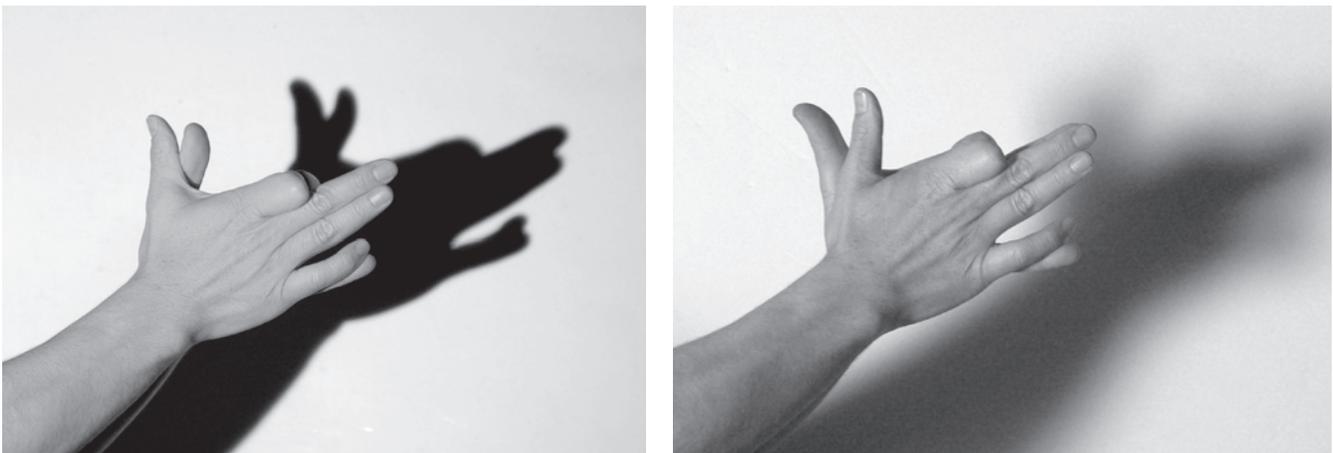
distance between the lighting unit and your subject, say from 10 feet to 20 feet, the strength of the light will fall off four times and will be only one-fourth the intensity compared to the original position. If you halve the distance between the subject and the lighting unit, you will increase the light intensity four times from the original position.

There are other ways to change the intensity of a lighting unit, like adding a scrim or net or diffusion in front of the light. We'll explore these techniques starting on page 311.

Quality

The texture of a light—how hard or soft it is—is referred to as its **quality**. The lamps for the most common film lights involve a wire filament, enclosed in a glass bulb, surrounded by a vacuum of inert gases, heated to the point where it glows white hot. That glowing filament becomes the **point source** of the lamp's illumination, creating a highly directional beam. Light that travels directly from a lamp to the subject is referred to as a **hard light** or **directional light**, because the light rays, which travel straight and parallel to each other, all fall on the subject from a single angle, causing sharp shadows and bright highlight areas. Lighting instruments with specular reflector systems preserve this hardness because a specular surface, like a mirror, redirects the light rays yet maintains their direct and parallel path. Units that do not illuminate directly from the lamp but instead reflect the light off an unpolished, white surface emit a **diffused** or **soft light**. The unpolished surface scatters the light rays in a variety of angles, disturbing their parallel paths (**Figure 13-7**). Diffused light rays do not hit the subject from the same angle and therefore create softer shadows and smoother highlights. This sort of lighting instrument is called a soft light. It's important to note that the larger the area of the diffused bounce surface, the softer the light will be. Also, there are lighting units that do not generate light from a point source, like fluorescent lights, and they too have a soft, diffused quality.

Understanding this principle, you can see that it is not difficult to soften the light from a hard lighting instrument by simply bouncing it off any diffused surface, like a white wall or a white bounce board. You can also soften light from a hard lighting unit by placing **diffusion media** in front of the beam (**Figure 13-8**). Diffusion media scatters the light rays in a way similar to that achieved by bouncing light off a diffusing surface (see “Altering Light with Gels and Filters” section). Be aware, however, that diffusing light either way decreases its intensity. It's also important to understand that the terms “hard” and “soft” describe a characteristic of light and one is not better than the other. As with so many other things, the appropriate choice is based primarily on applying the appropriate aesthetic choice for the content of your story (**Figure 13-9**).



■ **Figure 13-7** Hard light creates sharp shadows (*left*) because the light beams maintain their parallel direction. Soft light (*right*) creates diffused shadows because the scattered light beams reach the subject from many directions.



■ **Figure 13-8** Hard light can be softened (diffused) by applying diffusion material in front of it (*left*) or by bouncing it off a white surface, like foam core (*right*).

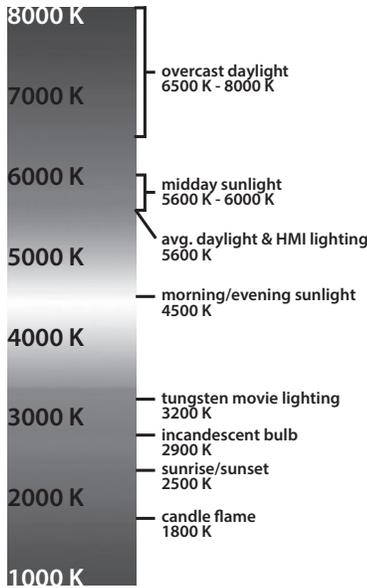


■ **Figure 13-9** The decision to use hard or soft light depends on the aesthetic needs of your film. Although both of these shots use a low-key lighting approach, S. Coppola's *Lost in Translation* (2003, *left*) uses soft light, while Godard's *Alphaville* (1965, *right*) uses hard light, which explains their radically different look and feel.

Color Temperature

Different sources of light favor different areas of the light spectrum. For example, the mid-day sun is a relatively blue hued light, but sunlight gets warmer as the day progresses toward sunset. A 60-watt incandescent bulb has a warm, amber hue, and a candle flame has an even warmer orange tone. The specific spectral content of a light source (how much red, green, and blue) is called its **color temperature**, and it is measured by the **Kelvin scale**, which was devised by Lord William Kelvin in the late 1800s. Lord Kelvin discovered that if he heated a block of black carbon until it was white hot, its glow replicated all of the colors in the visible light spectrum one by one as the heat went up, so he measured the temperature of the carbon at each color stage. The hotter the black body got, the bluer the color turned; and the lower the temperature was, the redder the color of the heated carbon. Color temperature has nothing to do with the actual heat of any light source; rather, the color temperatures ascribed to different light sources in **degrees Kelvin (K)** are simply based on matching the colors between a light's hue and Lord Kelvin's block of heated carbon (**Figure 13-10**).

The two most important color temperatures for filmmakers to remember are those for average daylight (5,600 K) and tungsten movie lights (3,200 K) which are commonly used



■ **Figure 13-10** This chart shows the color temperatures of various common light sources measured in degrees Kelvin. See the color insert.

for film production. Now, if we simply look at a character wearing a white T-shirt under average daylight conditions, that shirt will appear white to us—even though the light source has a bluish tint. And if we put that character indoors under tungsten movie lights, which have a much warmer, amber tone, that shirt will still look white to us. This is because the human eye automatically compensates for the shift in color temperatures, but video sensors need some help to accurately change their sensitivity to the color temperature of a light source. What is required is to white balance the camera.

White balancing means adjusting the sensor’s color circuitry to match the color temperature of the light source. As we saw on page 219, nearly every digital camera has two easily accessible **color temperature presets** for the most common lighting conditions: daylight (5,600 K) and tungsten (3,200 K) (see **Fig. 9-29**). In addition, most decent cameras provide a way to manually set your white balance, which is more accurate than a factory preset, especially when filming outdoors as the sun’s color temperature varies dramatically over time. Setting your sensor’s white balance is as easy as 1 – 2 – 3:

1. Fill your frame with something white and matte (like a white card or sheet of paper) that is lit with representative light for the scene.
2. Engage the manual white balance button. Whether the white card is reflecting the bluish tint of daylight or the amber tint of tungsten bulbs or the greenish hue of fluorescent lights, the camera adjusts the R, G, and B chip sensitivity levels until that card is rendered “white.”
3. When you release the manual white balance button, the adjustment is locked in.

Remember, for your image sensor to reproduce colors accurately, you must take care to **white balance** your camera each time you change location or lighting conditions.

It’s true that many cameras also have an **auto white balance** function, but like auto focus and auto exposure, this tool is too blunt and capricious for narrative filmmaking, where image control is the name of the game. When turned on, auto white balance remains sensitive to any color fluctuations in the frame, so changes in image content or a moving camera can easily fool it into adjusting tonalities mid-shot. In other words, it’s best to use the manual white balance function.

Color temperature balancing is easy if you’re *only* shooting by the light of the sun, or *only* shooting with tungsten units but things don’t always work out this neatly. What if your scene involves a character in their office with a window behind them 5,600K, but you’re lighting the character with tungsten lights (3,200K)? This situation requires manipulating the color temperature of one or the other light source. Altering and controlling light is fundamental to the art of creating expressive images. We will explore the basic lighting instruments and tools used for controlling light beginning on page 311.

■ LIGHT AND DIRECTIONALITY

The direction of the light on characters is one of the most important elements in my work – if not the most important. The direction of the light counts more for me than its hardness or softness. Direction is what gives soul to the light and to the character. The angle can be completely frontal, which I don’t do too often, or completely backlit, rendering a silhouette. Another approach is hard three-quarter rim lighting matched by a very soft side lighting from the other side. Classic side lighting is also very beautiful. There are so many variations.

Darius Khondji (From “Visual Style” by Wandering Gio, 2015)

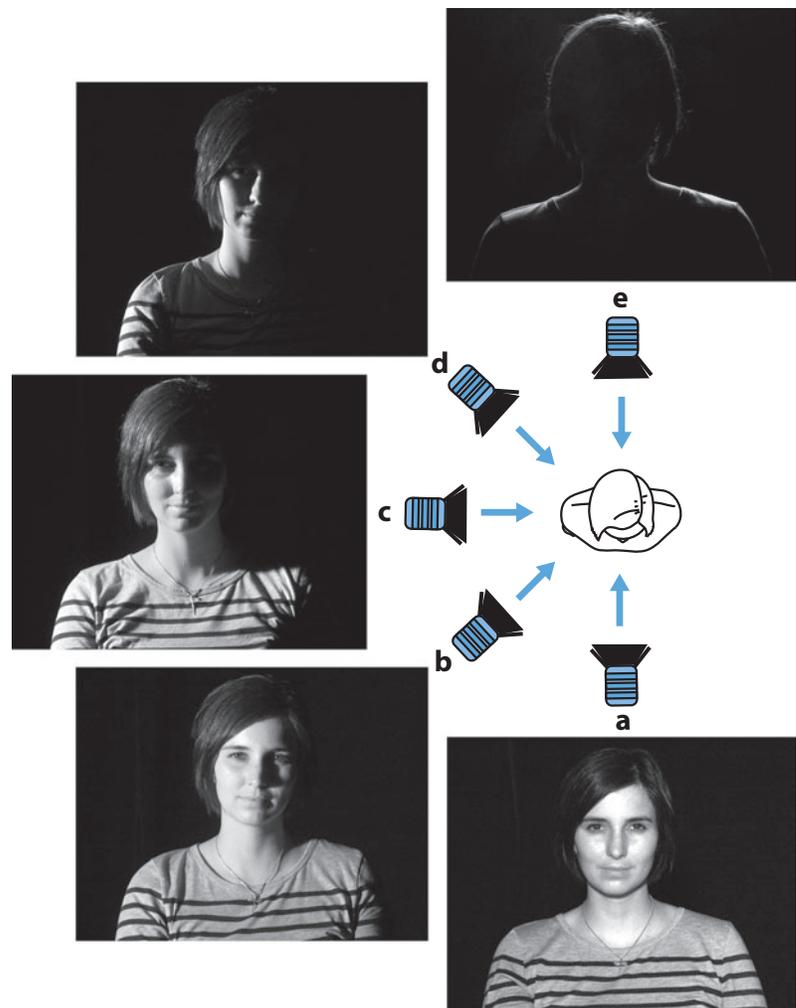


■ **Figure 13-11** The overhead lighting used in Coppola’s *The Godfather* (1972) created deep shadows over Vito Corleone’s (Marlon Brando) eyes, adding an inscrutable quality to his character (*left*). In Welles’ *Mr. Arkadin* (1955), a light placed low on the ground throws an ominous shadow as a murderer gets away (*right*).

When we devise our lighting strategy, among our most fundamental considerations, along with the qualities of light, is the question of directionality. Where is this light coming from? Even if we are simply shooting a film with one actor in a park with no artificial lights, by positioning the actor to face one way or another, in order to have the sun fall in a specific way on our subject, we are in fact controlling the directionality of our light source—we are lighting.

It is crucial to know that the visual emphasis and dramatic potential of lights change significantly given their placement in relation to the illuminated object. The placement of the lighting unit not only determines the directionality of the light source but also the direction and length of the shadows. By gaining control of light and shadow you gain control over the motion picture’s most powerful elements for creating depth, texture, mood, tone, and even character and narrative meaning in your frame (**Figure 13-11**).

It is always helpful to remember that the range of light placement options is three dimensional. We can place our lights anywhere in the imaginary globe that surrounds our subject: in front, behind, along the side, high above, below, near, far—any angle, any distance, as long as the lights stay out of the frame of the shot (although this, too, is not an absolute rule). As a point of reference, here are a few basic light angles that depict a single, hard light source at the camera’s level. Remember, don’t just look at the direction of the light but where the shadow’s fall as well (**Figure 13-12**).



■ **Figure 13-12** The placement of lighting units determines the angle of illumination and the angle at which shadows fall. Pictured are five standard angles along the same horizontal plane: (a) frontal, (b) $\frac{3}{4}$ front, (c) side, (d) $\frac{3}{4}$ back, and (e) back. Go to the *Voice & Vision* companion website to see this figure in high resolution.)



■ **Figure 13-13** The vertical angle of a lighting unit can dramatically change the look of a subject. Pictured are a high-angle frontal (*top*) and a low-angle frontal (*bottom*).

1. **Frontal light** is illumination that comes essentially from the angle of the camera. Because the light rays duplicate the camera's angle of vision, most of the shadows are not visible to the lens as they fall straight back. Frontal light has a flat look resulting from the absence of visible shadows.
2. Move the light along an arc, away from the camera, and shadows start to appear and get more prominent as the light moves farther from the camera position. A $\frac{3}{4}$ **frontal light** is a lighting unit that is positioned 45° from the camera. Notice how the shadows cast by this light are at 45° angles. This light position is often also raised vertically by 45° as well.
3. Move this light another 45° away from the camera so that it is now positioned at a 90° -angle from the camera and we have a **sidelight**. This light comes directly from the side of the subject and has the effect of dividing the illuminated object in half, one side lit and the other in shadows. Sidelight maximizes shadows and therefore texture as well.
4. Moving this light another 45° away from the camera, we have a $\frac{3}{4}$ **backlight**. The area that this position lights is mostly hidden from the camera, but we do see bright highlights on the top and side edges of the subject. Notice how this angle causes the light to illuminate the shoulder and hair and cuts the light side of the figure out from the background while allowing the other side to blend into the shadows. This placement for a backlight is so common that it's known by two other names: **rim light** and **kicker**. This light is also commonly raised vertically by 45° as well to catch slightly more of the hair and shoulders.
5. Finally, move this light another 45° from the camera and the light is now 180° across from the camera, illuminating the subject's back. The camera can see only a small sliver of illumination around the top of our subject, as the front falls completely into shadow. This light position can also be used as a rim light, but rather than creating illumination along one side of the subject, it traces both sides with a bright rim (especially when raised above the subject so that it catches the shoulders and top of the head).

In addition to the horizontal angles, you need to also consider the dramatic changes in shadow and mood as you adjust the lighting unit's **height** (or **vertical angle**) from **high angle** to **low angle** (Figure 13-13).

■ FUNDAMENTAL LIGHTING SETUPS AND PRINCIPLES

Like all other art forms, lighting for film requires creativity, craft, experimentation, and experience. When you first start out, movie lighting can seem somewhat mysterious and tremendously time consuming. Simply answering the most basic questions (Where do I physically place the lights with respect to the subject and camera? What quality of light—intensity, hard, soft, etc.—should I use? How does this one light work in combination with the other lights?) can seem intricate and arbitrary. But with a little bit of book research, some hands-on experience, and by listening to the stories of other filmmakers who faced similar lighting challenges, you will quickly develop a repertoire of lighting approaches, styles, and

in practice

Always remember that you are not on your own when it comes to devising lighting strategies to tell your story. The works and accomplishments of generations of cinematographers are easily available these days for you to study and learn from. I already listed some film movements and cinematographers that you can learn from on page 288. But we can also go back to the masters who essentially invented movie lighting as we know it. Henri Alekan, Gregg Toland, James Wong Howe, Sven Nykvist and Karl Freund are five of the early masters of light whose work is more available now than ever before (Figure 13-14). Their methods and tools were often much simpler than those used today, but their imagination, ingenuity, and understanding of light itself is unparalleled. The images they created are veritable and valuable textbooks on lighting. Over the years the old lions of dramatic film lighting like these (who themselves drew from previous generations of masters of photography, theater, and painting) developed a body of fundamental lighting setups that are used, in some combination, in most film lighting situations today. The basic setups represent the building blocks of the cinematographer's craft. Knowing

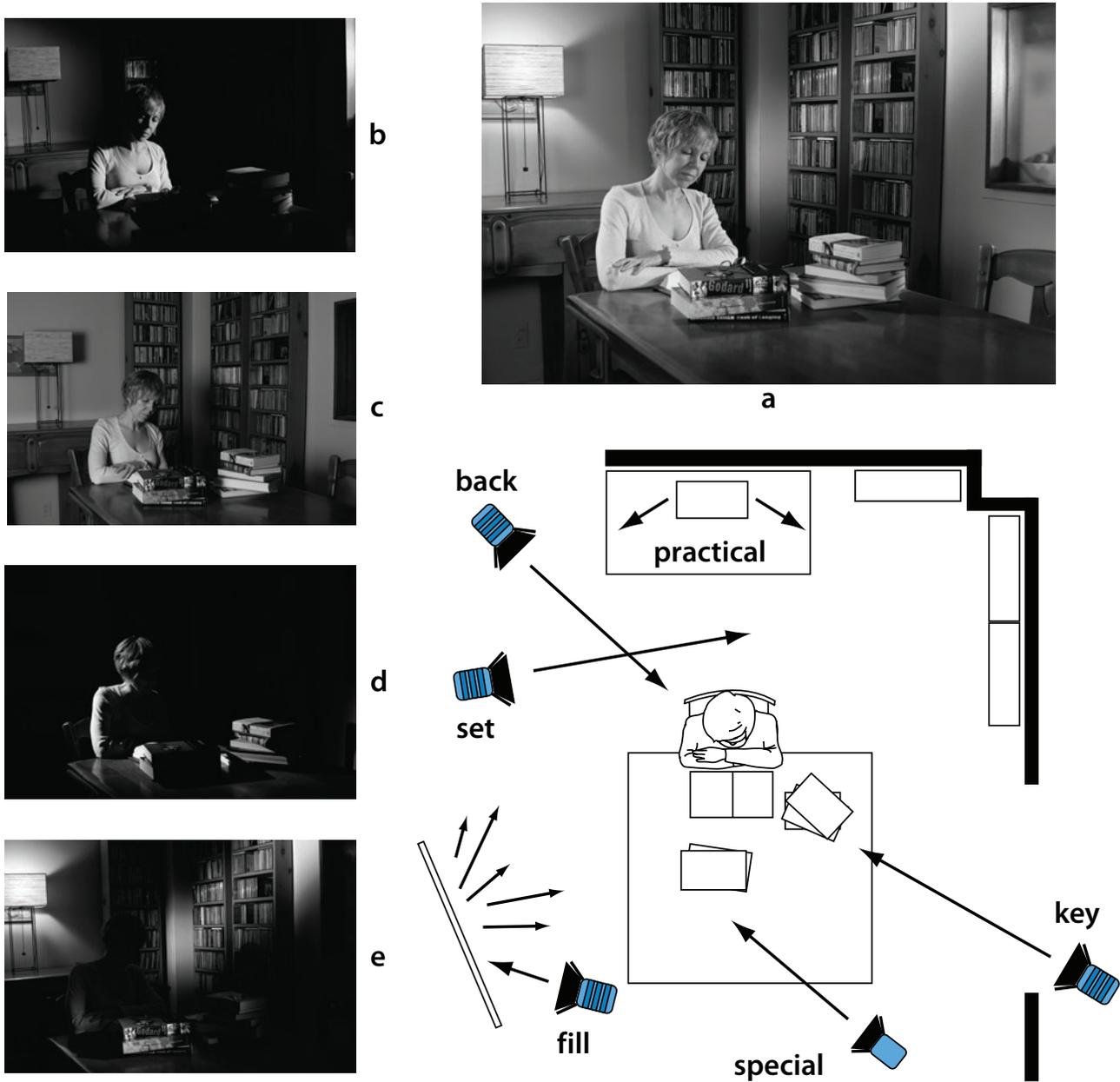
these fundamental setups, which combine directionality, quality of light, and function, will help you to understand how to create certain dramatic visual effects and will also help you determine an answer to the most basic question: Where do I put this light? All smart cinematographers learn from the giants who came before them, even the great Michael Ballhaus who worked with directors like Fassbinder, Scorsese, Coppola, and Redford, to name just a few:

[I] saw a lot of movies. I saw some films 10 to 15 times. My heroes were the French and Italian directors and cinematographers who were experimenting with film noir at the time (the early 1960s). Later, I learned a lot from Sven Nykvist (ASC) by watching his films. I saw every movie that he shot. I learned so much from just watching how he photographed faces and eyes. I have watched his Bergman movies many times. They are fantastic.

Michael Ballhaus (From "A Conversation with Michael Ballhaus," 2006)



■ **Figure 13-14** Four masters of light and shadow to learn from: (clockwise from top left) Henri Alekan (from Cocteau's *Beauty and the Beast*, 1946), James Wong Howe (from Mackendrick's *Sweet Smell of Success*, 1957), Greg Toland (from Welles' *Citizen Kane*, 1941), and Sven Nykvist (from Bergman's *The Virgin Spring* (1960)).



■ **Figure 13-15** The individual elements used in the lighting setup for this scene (a) include the *key light* (b), *fill light* (c), *backlight* (d), and a *set light* focused on the shelves (e). There are two other lights as well: a small *special* light on the books and a lamp *practical* (e). Notice that the lamp is not powerful enough to serve as a backlight, but it provides the motivation for the backlight (d). (Go to the companion website to see this figure in high resolution and color.)

techniques that you can confidently draw upon and build upon from one film to the next. What follows is a discussion of the most commonly used lights in the craft (**Figure 13-15**).

Key Light

The **key light** is the primary source of illumination in your scene (**Fig. 13-15 b**). For scenes in which a realistic or naturalistic look is needed, the key light should be a **motivated light source**, which means that when positioning this light we must consider the ostensible and logical source within the scene for that illumination. It might be that we actually use the sun streaming into a window for our key light, or we may use an artificial light to simulate the sun streaming into the window in a naturalistic way. We might place our key light at a high angle to simulate an overhead street lamp on a dark night, or as a sidelight to

simulate a reading lamp on a desk, or at a low angle to simulate the glow from a fireplace. In all of these cases, the placement of the key light is motivated by the ostensible source, visible in the frame or not, and its logical throw. Obviously, the key light can be placed anywhere. In cases where a pool of light creates a silhouette, the key light doesn't even fall on our subject (**Figure 13-16**). Usually, the key light is a hard and bright light source, but certainly not always. It's not uncommon to see soft keys being used in films.

Fill Light

As you can see in the directionality examples (see **Fig. 13-12**, a hard light (like most key lights) casts sharp and dark shadows. When lighting people, this means nose and chin shadows and sunken eyes. A **fill light** is a soft light that is positioned to fill in the shadows created by the key light (**Fig. 13-15 c**). Using a fill light is not mandatory, but it is commonly used in most lighting setups. The reason that fill lights are soft lights is that it would be counterproductive if the light we use for filling in shadows itself created additional shadows.

There are two schools of thought concerning the placement of fill lights. One states that the fill light should be placed opposite the key light, which makes sense, given that it has to fill in the shadows that fall exactly opposite the illuminated area. Other people prefer to place their fill light as close to the lens as possible, creating a soft frontal light. This way, despite it being a soft light, if the fill casts any shadows, they fall straight back and out of view of the camera. Both methods work well, so experiment with this yourself and see which works best in your situation.

The degree to which you decide to fill in those shadows varies depending on the look you are after. You can choose to keep shadows quite dark, but fill in just enough to see some detail in the shadows, or you could almost completely fill the shadows with soft illumination, flattening out the image to create a bright scene in which everything is visible. The critical factor in determining the density of the shadows is the intensity of the fill light. The stronger the fill light, the less prominent the shadows will be (see the "Lighting Ratios" section).

Usually, a fill light is not considered a motivated light source, although when you're going for a realistic look, you do need to be aware of unnatural fill. For example, if we're shooting a scene in which two characters are talking in front of an idling car in the middle of the night, with the main and only source of illumination ostensibly being the car headlights (key light), you can get away with some very light fill to boost the exposure on the shadow side of the face, because it could be mimicking the way the human eye adjusts in dark conditions. But excessive fill in this situation would look as if the light was coming from an off-camera artificial lighting unit being used by a film crew to light the scene.

Backlight

A **backlight** (aka **rim light**) is a light that separates the subject from the background by positioning a somewhat lower intensity hard to semi-soft light at a high angle and behind the subject. This creates, along the edge of the subject, a rim of light that clearly traces the edges of the figure and helps create depth in the frame (**Fig. 13-15 d**). When lighting people, this light is often a $\frac{3}{4}$ backlight (or kicker), positioned opposite the key, which illuminates the hair and shoulders of the subject. Obviously the color of the subject's hair is a factor in determining the intensity of the backlight. Blonde hair tends to thin out and create a halo when intense backlights are used.



■ **Figure 13-16** Careful placement of the key light off the subject in Laughton's *The Night of the Hunter* (1955) effectively reverses the conventional association of light with good and darkness with evil by silhouetting righteous Rachel (Lillian Gish) while illuminating evil preacher Harry (Robert Mitchum).

Backlights are notoriously easy to overuse. Overly intense backlight coming from seemingly nowhere will give your shot a highly artificial feeling. Automatically employing a $\frac{3}{4}$ backlight opposite the key can quickly make an image seem generic. For this reason, a backlight should be considered a motivated light source that needs some logical source, whether it's an existing overhead light, the sun behind the character, a neon sign in the background, or a wall sconce over the subject's shoulder.

Backlights are especially helpful when shooting very dark objects that absorb light. An object with low reflectivity, like a black curtain or dark wood bar counter, cannot be adequately lit by pouring light onto it because it simply will not reflect the light back. Instead, a backlight, glancing off the edges of the dark object, will create a rim of illumination that will define and highlight the object's dimensions.

Set Lights

Set lights are used to light the larger area of the set: the architecture, furniture, set dressing, etc. (Fig. 13-15 e). The angle and intensity of set lights are greatly determined by the key light, as the setting often shares the same motivated primary light source, so this must remain consistent.

Specials and Practicals

Specials are low-wattage, unobtrusive lights whose function is to kick up the illumination on a specific object or a small area of the frame for special emphasis. Careful control of specials can help create compositional emphasis to guide the viewer's eye by increasing the relative exposure level (by 1 or 1½ stops) on an important area or object in the image (Fig. 13-15 e).

Lights that are included as part of the *mise-en-scène*, including wall sconces, household lamps, and overhead fixtures, are called **practicals**. In some cases they can provide some illumination but usually they are not powerful or controllable enough for a good exposure. More often than not, they are set dressing and they also provide the motivation for the movie lighting setup by being the ostensible source, as is the case with the chandeliers in the third *Ed Wood* still in Figure 13-17 and the lamp in Fig. 13-15.

in practice

Tim Burton's film *Ed Wood* (1994) is a good example of the creative use of the basic lighting positions. The lighting design of the film, which was shot by Stefan Czapsky, clearly references the lighting of the B-movie horror genre of the 1950s, but it also manages to appear substantially more polished and expressive. Burton is obviously not making a straight up B-movie; instead, he is telling a poignant, tragic, and at times hilarious story of Ed Wood (Johnny Depp) and Bela Lugosi (Martin Landau), the alienation they experience, and the community of supportive misfits, loners, and outcasts they forge through making movies. Just like the screenplay, the lighting style is at one and the same time humorous, camp, and touching (Figure 13-17):

- **Fill light.** In the top still, Ed takes his new true love Kathy (Patricia Arquette) out on their first date to a carnival and, naturally, they take a

turn through Ed's favorite carnival ride, the "Spook House." In the middle of the ride it breaks down and they're stuck. All of the lights that have been swirling around them stop, and the couple is lit only by soft, low-intensity fill and hard backlights. The lighting creates a calm, flat, and honest tone. Ed takes this opportunity to tell Kathy that he likes her a lot *and* that he likes to wear women's clothing, hoping that she'll be okay with all of it. Kathy thinks a moment and then says, "Okay." At that moment the Spook House ride comes alive again, complete with swirling lights.

- **Key light.** Bela (*center still*) is lit with a very low angle, hard key light, making him look especially ghoulish. This is typical of the excessive lighting approach of B-movie horror films;



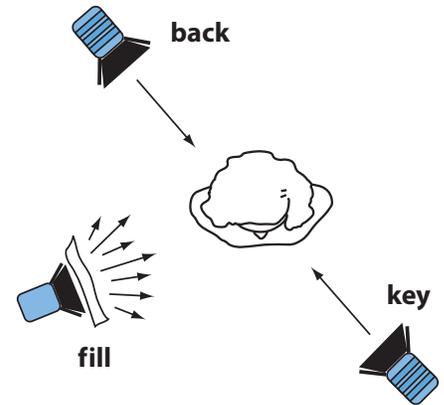
■ **Figure 13-17** Three expressive lighting examples from Burton's *Ed Wood*, which make dramatic use of a soft fill light (*top*); a low angle, hard key light (*center*); and hard backlight motivated by visible practicals (*bottom*).

however, the content of the scene is anything but campy. Bela is broke, addicted to drugs, and completely at the end of his tether; he is holding a gun while Ed is trying to keep him from committing suicide. The lighting here creates a profoundly unnerving ironic tension between a genre style that we can't take seriously and desperate human emotions that we must.

- *Backlight*. All of the light (*bottom still*) in this beautifully designed shot is motivated. The key light comes from the candle (augmented) on the bar counter under Ed, and the backlight is designed to appear to be coming from the chandeliers hanging in the background (also augmented). Notice the important function the backlights serve in illuminating the curves of the bar countertop, Ed's cigarette smoke, and glass ashtrays. Dark objects and transparent material (glass, smoke, water) are difficult to light from the front. Backlighting that glances off the surface creates a gleam that defines the dimensions of the object while keeping the overall look of the scene dark—the way a dimly lit bar should look.

Three-Point Lighting

Three-point lighting refers to a specific and commonly used lighting strategy that employs a key light (usually a $\frac{3}{4}$ frontal light, positioned at 45° from the camera and at a 45° vertical angle), a fill light (usually opposite the key), and a backlight (usually a $\frac{3}{4}$ back) (**Figure 13-18**). This is something of a classical Hollywood approach to lighting people and you can see three-point lighting used extensively in television dramas and documentary interviews. Three-point lighting is quick and efficient and often a good starting point for a lighting approach. However, it's important not to think of three-point lighting as a rule that must be observed in every shot, and it's especially problematic to think that one should *a/ways* light people with the three-point lighting scheme. Automatically following conventional approaches by rote can only lead to bland images.



■ **Figure 13-18** A typical three-point lighting setup consists of a key light, a fill light, and a backlight. This setup was considered the standard for decades during the studio system era in Hollywood, as seen in this scene from Hawks' *Bringing up Baby* (1938).

Lighting Order and Exposures

When lighting a scene, it's routine to set up your key light first and find your exposure (f-stop) from that key. Adjustments to the key light's intensity can be made through placement (distance), nets, or scrims and so on, depending on what f-stop you'd prefer to shoot at, called **pegging your exposure**. This is determined by a number of factors, like your camera's dynamic range, the contrast range of the scene, and compositional requirements, like depth of field. We discuss these factors in more detail in Chapter 14.

Once you've established your key light angle, and made adjustments to get the exposure you want, you can now add the fill light. The intensity of the fill light depends on the lighting ratio you need for the aesthetic look you are after (see the "Lighting Ratios" section). Because the fill light is a soft source, it commonly augments your base exposure so depending on the intensity of the fill light, an f-stop tweak is often necessary.

Finally, set up all the other lights in the scene (back light, set lights, and specials). These lights rarely have an impact on the exposure established by the key (and fill), although there is always that possibility depending on the setup. The most important thing to remember is that the intensity of all the other lights in the scene are determined relative to the main source of illumination in the scene, the key light.

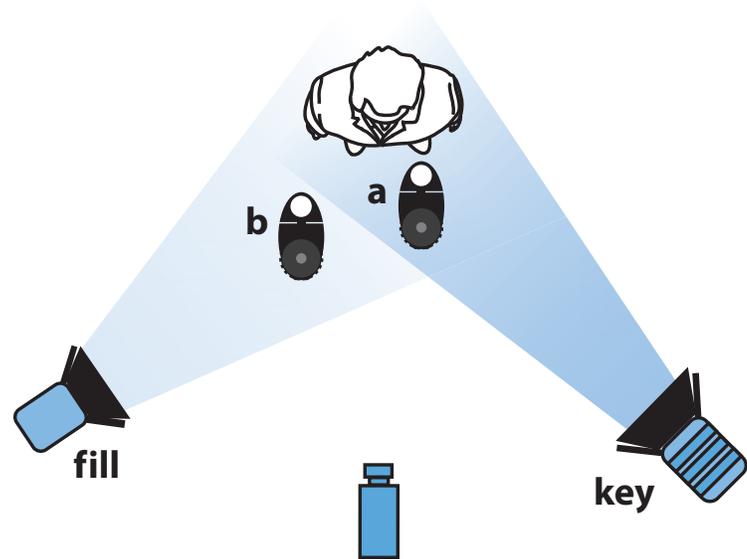
Lighting Ratios

The amount of shadows in your scene and their depth relative to the highlight areas can give your image a sense of tone, mood, compositional emphasis, and even narrative meaning. Through lighting control, we can easily create an image with very few shadows or one in which shadows dominate the composition, or any nuance in between. We can use our lights to manipulate the depth of the shadows to create any kind of style, from a naturalistic to an expressionistic look. The dramatic needs of your story should suggest to you the look you need, but understanding how shadows are measured and controlled is important to getting the look you're after.

Lighting ratios (also called **key-to-fill ratios**) are a measure of the relative intensities of the two major light sources illuminating your subject: the *key light* and the *fill light*. The lighting ratio tells us, for a given lighting setup, how deep the shadows will be on the fill side relative to the brightness of the key side. The key light, as we know, is the primary source of illumination, but the fill light, being a soft source, not only fills the shadows created by the key light but also spills onto the key side and augments the amount of light falling in the areas lit by the key (especially frontal fills). For this reason, the ratio

between the primary illumination and the fill light is expressed as **key + fill : fill**. This means that to find this ratio, you need to first measure the intensity of both the key and fill lights falling on your subject. Then you measure the intensity of only the fill light, and then divide these two readings (Figure 13-19).

There are two ways we can measure lighting ratios: with a handheld incident light meter or with the zoom lens on the camera. An incident light meter is *much* preferred for determining lighting ratios because it is highly portable and it has an absolute measure for the intensity of incident light (light falling on a scene)—footcandles. For example, using the incident meter function at the subject, let's say that the key + fill reading shows 640 footcandles, and the fill light alone reads 160 footcandles, then the lighting ratio is 640:160, which can be simplified as 4:1. The total illumination (key light plus the fill light) is four times brighter than the fill alone. Even easier, this ratio can also be determined through a comparison of f-stop readings. If the key + fill gives you a meter reading of f/8 and the fill only side comes in at f/4, then we have a 2-stop difference, for a 4:1 ratio (remember, each stop doubles the light, 2×2). If the meter readings were to give us a difference of, let's say, f/8 and f/2.8, then the 3 stop difference would mean a lighting ratio of 8:1 ($2 \times 2 \times 2$). Lighting ratios are such a common measurement in film production that many of the newer digital light meters will make the ratio calculations for you. In the following chapter (page 335) we discuss using an incident meter for digital video production.



■ **Figure 13-19** Lighting ratios are expressed as key + fill : fill. To determine this ratio you first measure the intensity of both the key and fill lights falling on your subject (*right meter*). Then you measure the intensity of only the fill light (*left meter*) by turning off or shielding your meter from the key light.

If you don't have a light meter, you can always use your camera's metering function like a light meter to determine f-stop readings. Simply zoom in to the key side of your subject (with the fill on), engage the auto-exposure button and see what f-stop the camera gives you (say f/8). Then zoom in to the fill side of your subject (preferably with the key off) engage the auto-exposure button and see what exposure you get (say f/4). And you'll get the same result using the camera metering function as you would with a light meter, 4:1.

Indeed, there is a great technical benefit to noting your lighting ratios, especially in a scene that is shot over several days. This information can help you replicate a specific look over time with consistency. But let's look at the aesthetic heart of this issue: What visual difference do various lighting ratios make?

A lighting ratio of 1:1 would mean that both key and fill are the same intensity and there are no shadows at all. A lighting setup with a low ratio, like 2:1 or 3:1, means that the fill light is filling in shadows until they are quite light. So, a lighting setup with a *low* key-to-fill ratio is called (somewhat confusingly) **high-key lighting**. High-key lighting ensures visibility in all parts of your scene with overall bright and even illumination. High-key lighting minimizes shadows, texture, and dimensionality (Figure 13-20 *right*).

Conversely, a high lighting ratio, say 16:1 or 36:1 or greater, will yield very dark and prominent shadow areas. This occurs when the intensity of the fill light is considerably lower than the key, allowing areas to be submerged in the shadows created by the key. A lighting setup with a *high* key-to-fill ratio is called, you guessed it, **low-key lighting** (Figure 13-20 *left*).



■ **Figure 13-20** Controlling the ratio between the key and the fill produces low-key (*left*) and high-key (*right*) images, and these lighting styles can have profound storytelling impact. These frames from Allen's *Stardust Memories* (1980) (shot by Gordon Willis) show Dorrie (Charlotte Rampling) at different stages of her life. Low-key lighting is employed when she is having a nervous breakdown (*left*) and the high-key image is used during a moment when Dorrie is happily in love (*right*).



■ **Figure 13-21** It's important to not only consider the lighting and exposure on your subject, but to consider your subject's relationship to the exposure level of the background. Here are three shots with precisely controlled background-to-subject ratios: the Coen Brothers' *A Serious Man* (*top*), Hausner's *Amour Fou* (*center*), and Villeneuve's *Sicario* (*bottom*).

Background-to-Subject Ratio

In addition to the key-to-fill ratio, which concerns how the subject itself is lit, there is another important ratio to consider, the **background-to-subject ratio**. This ratio is crucial because it compares the relative brightness of your subject to the background, which in turn determines if and how your subject will stand out from the background. Routinely, filmmakers try to make their subjects anywhere from $\frac{2}{3}$ to $1\frac{1}{2}$ stops brighter than the background (approximately 2:1 ratio). In this case, the subjects do not appear overtly brighter than what's behind them (in fact, most viewers won't even notice the difference in brightness), but the subject will pop and become more prominent, as you can see in the scene from Joel and Ethan Coen's *A Serious Man* (2009) shot by cinematographer Roger Deakins (**Figure 13-21 top**).

White walls can make it difficult to keep subjects brighter than their background because of their extreme reflectivity. If you cannot paint your walls a more subdued tone (a common strategy on film sets) then a common practice is to pull your subjects away from the white wall and reduce the light on the background by several stops. This idea is perfectly illustrated by this shot from Jessica Hausner's *Amour Fou* (2014) where cinematographer Martin Gschlacht allowed far less light on the wall in the far background than on the subject (**Figure 13-21 center**).

Beyond this, there are many aesthetic approaches you can take when considering the comparative brightness of the subject versus the background. For example, shooting your subject against a background that is much brighter can create a silhouette effect which can contribute power to a dramatic moment. This is precisely what Roger Deakins went for in this shot from Denis Villeneuve's *Sicario* (2015) where the brightly lit

wall in the background is exposed correctly, causing the unlit characters to become silhouettes. (Figure 13-21 bottom; also see Fig. 13-24).

in practice

It is difficult, and rather pointless, to ascribe absolute and fixed moods to high-key and low-key lighting approaches (as many film books do) (Figure 13-22). It is true that many comedies, like John Hughes' *Ferris Bueller's Day Off* (1986) (top left), employ high-key lighting to create a lighthearted and cheerful mood. One could even say that high-key lighting is closely associated with this sort of comedy. But many films use high-key lighting to create other moods, like sterility, austerity, or alienation. High-key lighting can also be used in situations where flattening out the image might provide a sense of dramatic irony or could even infuse a scene with a soft, affectionate tone. George Lucas' film *THX-1138* (1971) (top right), for example, is a dystopian tale of a future where a subterranean society controls its human citizens through the mandatory use of narcotics that suppress emotions (especially sexual desire). In this film the stark, flat white pallet and shadowless high-key approach creates a sterile and dehumanized world of oppressive uniformity. There are no emotions, no individuality, love, despair, ambiguity, laughter, or humanity in this existence lived under fluorescent tubes.

There are similar assumptions made with low-key lighting, which is commonly used in the darkly lit film noir and horror genres and psychological dramas.

Paul Haggis' 2004 film *Crash* (bottom left), for example, employs an overall visual look that is decidedly dark and shadowy for its unflinching exploration of racism and violence in America. But many lighthearted action pictures or horror film parodies have successfully used low-key lighting for laughs. Steven Spielberg's *Raiders of the Lost Ark* (1981) is a good example in which humorous scenes are often lit with heavy shadows and a dark tone to invoke an ominous mood, only to have the actions of the characters humorously undercut the expectations generated by this mood (bottom right). In this case, rather than producing an implement of torture as we expect, the device Gestapo Agent Thot (Ronald Lacey) assembles turns out to be a clothes hanger for his jacket.

The specific tone that emerges from your image depends on the unique alchemy between your lighting design and your story, characters, settings, actions, and other creative elements. Remember, there are no absolutes in the creative process of making a film, from writing the script to conceiving your lighting strategy. Indeed, there are conventions associated with high-key and low-key lighting, but conventions are not rules, and you, as a filmmaker, need to marshal all of your creative instincts and technical prowess to make your movie look and feel the way it should to effectively convey your story and ideas.



■ **Figure 13-22** High-key lighting has been used in such dramatically different films as Hughes' *Ferris Bueller's Day Off* (top left) and Lucas' *THX-1138* (top right). Low-key lighting can be seen in films with completely different emotional tones like Haggis' *Crash* (bottom left) and Spielberg's *Raiders of the Lost Ark* (bottom right).

 Phil and Olly's 2009 short film *The Black Hole*, which is one of the example shorts in the companion website for this book, contains an excellent example of how a shift in lighting ratios and in lighting angles at just the right moment can imply a shift in tone and character. When we are first introduced to the office clerk, he is bathed in the bland, soft fluorescent light of a large office. This high-key approach is not only realistic for the environment, but it emphasizes the flat, colorless, and mundane nature of the clerk's work life (**Figure 13-23 left**). However, after the clerk discovers the power and potential uses

for the black hole, his demeanor changes, greed overtakes him, and he decides to break into a locked office to steal money. When he opens the office door and turns on the light, the fluorescent key light now comes from directly overhead and in the absence of any fill light, it creates a low-key effect that emphasizes his avaricious urges and the hatching of a sinister plot (**Figure 13-23 right**). In both cases the lighting is totally motivated by the normal existence of fluorescent lights in an office building, yet the filmmakers found a way to modulate the fluorescent effect to convey a variety of moods.



■ **Figure 13-23** Reflecting internal character motivation through high-key and low-key lighting in Phil and Olly's short film, *The Black Hole*.

■ EXTERIOR LIGHTING

Shooting outdoors does not mean simply accepting the light nature has to offer. In fact, the minute you ask your talent to face a specific direction in order to have the sun illuminating them from a particular angle, you are “lighting” the scene. All of the preceding principles about lighting apply to exterior shooting; the only difference is that student and ultra-low-budget independent filmmakers usually do not have extensive time, money, or crew to indulge in the sizable lighting equipment (like generators, HMIs, and 20-by-20-foot silks) needed to artificially enhance the available light of exterior scenes. When lighting exterior scenes, we must be crafty concerning the way we control our light sources: the sun during daylight hours and available artificial light during nighttime hours. The following sections offer a few strategies.

Location Scouting and Scheduling

Take the time to scout your location ahead of time to figure out the angles and period during which the light is just right, and schedule your production around that moment. Remember, the sun is constantly shifting, so when timing is critical make sure to schedule your call early, allowing for setup time and run-throughs so you'll be ready to shoot when the light is perfect. If your schedule doesn't allow this much flexibility and you are required to shoot whenever you can get the location, you should scout the location at the time you anticipate shooting to get a good sense for the angle of the sun during your shooting hours.

in practice

My colleague Gustavo Mercado shot a scene for his feature film *Becoming* (2007) that involved a simple long-shot two-shot conversation between two people in front of a river. Mercado wanted to obscure these figures by showing them as silhouettes against the bright sun glistening off the water behind them (an extreme background to subject ratio). The talent would be on the east side of the river, with the camera facing west. Obviously, he needed to shoot somewhat later in the day so that the sun, in the western sky, would be glancing off the water toward the camera. Mercado and his producer took an afternoon to simply sit where the camera would be placed and watch the shifting angle of the sun—occasionally snapping some digital photos. They determined that 5:45 p.m. was perfect. Two days later they arrived on location



■ **Figure 13-24** In this scene from Mercado's *Becoming*, careful research into the position of the sun at a specific time of the day was necessary to capture this arresting shot.

at 4 p.m., set up the gear, ran a few rehearsals, and waited until the moment was perfect. In less than 20 minutes they nailed two good takes and this important scene was in the can (**Figure 13-24**).

Check the Weather

To be fully prepared, part of your production task should involve regularly checking an online weather service to determine if it will be sunny, partly cloudy, or overcast, as well as to determine exact sunrise and sunset times. The degree of cloud cover drastically changes the tone and mood of an exterior image. Overcast days diffuse the sun, creating, in effect, a soft, high-key look. Depending on the thickness of the cloud cover and the angle of the sun, there can be more or less directionality to this soft source. Sunny days produce a hard and bright light, which creates a high-contrast situation between the brightly lit areas of the frame and the areas of deep shadow. Full sun is always a challenging situation and exposures and ancillary equipment (like a reflector to create fill light) have to be carefully considered on these days. Partly cloudy conditions, especially on windy days when the sun plays hide-and-seek, are particularly challenging because exposures and the quality of light (hard/soft) can shift dramatically from one shot to the next or even within a single take. On these days it's not possible to simply set your exposure and forget it (**Figure 13-25**).



■ **Figure 13-25** A cloudy day can present a difficult exposure challenge, because available light can change from second to second, and the difference between sunny and cloudy areas can be as much as 4 or 5 f-stops!

Subject and Camera Positions

Just as with shooting indoors using artificial lights, your first lighting consideration when shooting exterior shots is where to place the key light. In this case, you cannot move your key (the sun) to change its directionality, but you *can* move the orientation of your subject



■ **Figure 13-26** Direct sun is used as a hard backlight and also bounced back onto the talent to provide a soft fill (*left*). When subjects are in the shade (*right*), a reflector can bounce sunlight back onto the subject to get a better exposure and contrast range.

and camera to get the angle you desire. Simply by turning your subject you can get a side-light, $\frac{3}{4}$ frontal light, $\frac{3}{4}$ backlight, and so on.

Sun Plus Bounced Light

Perhaps the most useful lighting instrument for exterior shooting is the **reflector** (also called **bounce board**). A reflector is a flat, broad, and lightweight foam-core board or flexible fabric disk used to bounce light from a source (artificial or sunlight) onto your scene. Whether you make it yourself or buy it, a reflector should have two sides with different reflective qualities. One side has a white, **diffused surface** that simultaneously bounces and diffuses a hard light source, like the sun. The other side is a **specular** (or **hard**) side that reflects and maintains the hard quality of the source, much like a mirror.

If you consider the direct sun as your key light, then you can think of placing a bounce board (diffuse side) opposite the sun, to soften and bounce its light right back to fill in the harsh shadows. One light source (the sun) becomes both a key and fill light (**Figure 13-26 left**).

Shade Plus Bounced Light

When the direct sun is too intense, you can always simply move your subject into the shade of a tree or a building (if your locations and script allow it). Heavy shade, however, can flatten out the image, and in cases where this is not appropriate, you can always use the specular side of the reflector board to bounce some of that hard sunlight onto your subject in the shade, creating a sharp backlight or side-light, to provide a little dimensionality to the image in a more controlled way (**Figure 13-26 right**).



■ **Figure 13-27** A butterfly scrim being set up to diffuse sunlight for a tight shot. From Sluser's *Path Lights* (2009).

Diffusing Sunlight

Another option for dealing with the extreme contrast created by harsh sunlight is to diffuse the sunlight itself with a **butterfly scrim**, a large sheet of diffusion material attached to a metal frame (**Figure 13-27**). Because they cannot cover much area, butterflies are usually used for reverse shots and close-ups. Their diffusion effect makes it look as if your character has found a shady spot, giving a nice soft light on the subject while the background remains lit by the hard sun. Butterfly scrims are cumbersome and setting them up can take up a lot of time, not to mention that they're difficult if

there is any wind at all. So unless you have the crew to deal with them, it's often easier to just find a real shady spot.

Dusk-for-Night

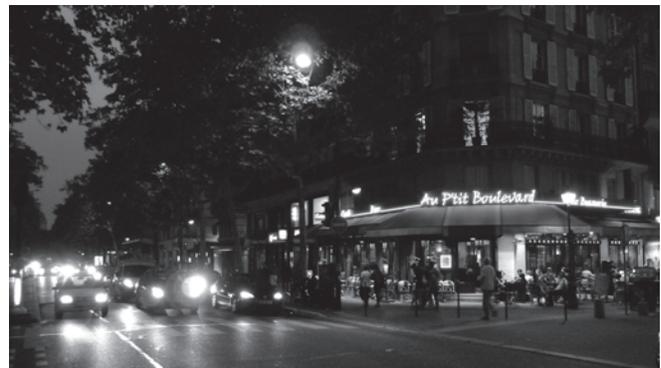
One very convincing and inexpensive method for shooting scenes that ostensibly take place at night is to shoot dusk-for-night. Just after the sun has set, at the moment when there is still ambient light in the sky but streetlights, car headlights, and building lights start to turn on, is the perfect moment to create a full nighttime effect. The dusk-for-night effect is achieved by shooting at dusk and underexposing around 2 stops. Your subject and the surrounding environment will appear dark, but visible, and those streetlamps, headlights, and building lights will glow the way they would at night. What's especially successful with dusk-for-night shooting is that there is still enough ambient light to illuminate building walls that would, at nighttime, be totally dark and indistinguishable. Even at 2 stops under, you will still see some detail, but if you were shooting at night with no lights, the side of an unlit building would appear as black space. Dusk never lasts long; you usually have a window of about only 25 minutes to get your shots and sometimes less depending on the season (Figure 13-28).

Shooting at Night

Given the startling developments in video sensor sensitivity, the average native ISO of a professional camera ranges anywhere between 800–1,600 and then fairly common cameras can offer an ISO range that pushes up toward 60,000 (albeit with serious image compromises). What this means is that it is more possible than ever to actually shoot nighttime scenes at night with available light or small portable lighting units, or both combined. Careful location scouting is critical. You'll need to strategize where you can successfully use the available lights in the location; brightly lit shop windows, neon signs, and street lamps can often give you acceptable exposures. You can also augment these available sources with small, battery-powered lights. Nighttime shooting with available light is one place where D.P.s will push the ISO of the sensor a click or two above native ISO to make the sensor a bit more sensitive, but they'll of course avoid any setting that will introduce video noise into the scene blacks. Nighttime shooting is tricky, and tests are especially recommended (Figure 13-29)

Magic Hour

The “*magic hour*” is that time just before sunrise and just after sunset when the earth's atmosphere bounces the hidden sun's light, creating a diffused and luminous ambient light. People, objects, and landscapes look spectacular during magic hour. Although there is certainly enough light to get fine exposures, the problem with shooting during this time is that the window of opportunity, before night falls (evening magic hour) or daylight breaks through (morning magic hour), is very short. For most of the continental United States, magic hour lasts around 25 minutes, which makes for very limited shooting time, so it's



■ **Figure 13-28** Dusk-for-night shooting. Both images were shot at dusk, when some daylight remained but headlights and streetlights had turned on. The *left* frame was shot with the correct exposure, and the *right* image was taken 2 stops underexposed, giving the impression of night.



■ **Figure 13-29** This shot from Jenkins' *Moonlight* (2016) was taken at night. D.P. James Laxton swapped all diner bulbs with brighter, daylight color temperature bulbs (the primary illumination in the scene) and placed a small light in the trees to boost illumination on Black and his car, and throw some leaf shadows on his back as he walks to the diner.

not terribly convenient in terms of production schedules. The actual duration of magic hour depends on a location's latitude and time of year. One reason you see so many luminous shots of polar bears and penguins is that magic hour can last many hours in the polar regions (see **Fig. 13-30 left**).

■ MAGIC HOUR

In the 1978 film *Days of Heaven*, directed by Terrence Malick and photographed by Néstor Almendros, many of the scenes were famously shot during magic hour with no artificial lighting. The film is widely considered to be one of the most visually stunning films in the history of cinema. However, shooting extensively during magic hour severely limited the amount of time available per shooting day (according to Almendros, magic "hour" lasted around 25 minutes each day), so the production schedule was drastically extended, so much so that Almendros, contractually obligated to begin another film, had to leave the project before it was finished and the film

was completed by another cinematographer, Haskell Wexler (**Figure 13-30 left**).

Gustavo Mercado's innovative short film *Yield* (2006) revolves around a brief but violent and ambiguous moment that is witnessed by a woman, the lead character. Trying to figure out exactly what happened, she recalls the moment three times and each time new clues begin to emerge—but we can't be sure if her memories, and the events of the film, are fact or selective perception. In one tense scene, the lead character meets up with a girl she perhaps saw brutalized earlier in the day; the scene takes place



■ **Figure 13-30** Magic hour cinematography as seen in Malick's *Days of Heaven* (left). A night scene shot at night from Mercado's *Yield* (right).

in practice

at a bus station late at night. Mercado was working fast, small, and with minimal equipment resources, so he carefully scouted for a location that, all on its own, had plenty of light to expose the film well, even in the late nighttime hours. He chose a sidewalk next to a rental car dealership that lit its expansive parking lot with very bright sodium streetlights. To

this he added fill from two cheap, portable, battery-powered flood lights he bought at a hardware store. By using what was available in a resourceful way, Mercado was able, even without a generator, HMI movie lights, and a big crew, to create a stunning nighttime image to match this equally stunning moment in the film (**Figure 13-30** right).

■ ALTERING LIGHT WITH GELS AND FILTERS

Camera gels and filters are used to change the quality and/or color of light in a scene. The fundamental difference between the two is that **gels** (short for gelatin) are sheets of dyed plastic material that are placed in front of a lighting unit (or on a window) to alter that particular light source *before* it falls on the scene. **Camera filters**, on the other hand, are glass or hard plastic elements mounted in front of the camera lens to change the quality of the light, from all sources, entering the camera.

Lighting Gels

Lighting gels are positioned in front of a specific light source to change the color or quality of that particular light's output *before it falls on the scene*. There are several different manufacturers of lighting gels offering literally hundreds of different colors, shades, and effects to choose from (**Figure 13-31**). Aside from those designed to create color effects, there are a few utility gels that are absolutely indispensable for the creative filmmaker.

Color Conversion Gels

Color conversion gels are used to change the color temperature of a light source, and they come in two basic flavors: **CTO**, for *color temperature orange*, and **CTB**, for *color temperature blue* (**Figure 13-32**). CTO gels convert daylight (5,600 K) into tungsten color temperature light (3,200 K) and are commonly used on windows while shooting interior locations.



■ **Figure 13-31** Gels come in hundreds of colors and intensities, including color correcting, neutral density, and diffusion media. See the color insert.



a



b

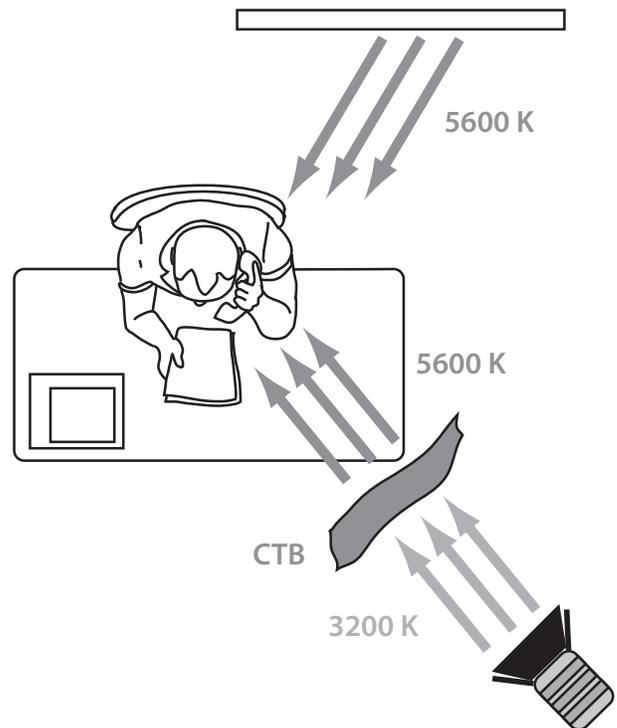
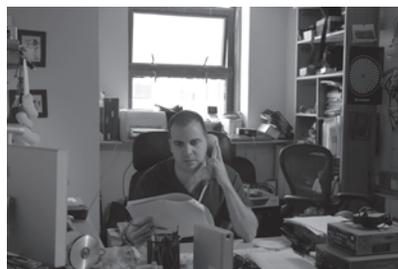
■ **Figure 13-32** CTO and CTB gels are used to correct the color temperature of a light source. CTBs are placed on movie lights to make them “daylight,” (a), and CTOs are placed on windows to make them “tungsten” (b). See the color insert.

CTO gels come in a variety of shades that allow fairly precise control over the change in the color temperature. **Full CTO** converts 5,600 K light directly into 3,200 K, but $\frac{1}{2}$ CTO converts 5,600 K daylight to 3,800 K (a little bluer) and $\frac{1}{4}$ CTO converts 5,600 K daylight to 4,500 K (even bluer). Conversely, CTB gels convert a tungsten light source to daylight color temperature and are mostly used directly in front of tungsten lighting units. **Full blue** converts 3,200 K light into 5,600 K, but CTB also comes in various conversion degrees. For example, $\frac{1}{2}$ CTB converts 3,200 K to 4,100 K (a little warmer) and $\frac{1}{4}$ CTB converts tungsten to 3,500 K (even warmer). These gels allow the cinematographer a high degree of control in matching and shifting the color tonalities of light sources.

Color Conversion Gels and Mixed-Lighting Situations

CTO and CTB gels are indispensable for situations in which you have **mixed lighting**, meaning light sources with different color temperatures in one location. Let's say we are in an interior location, lighting our subject with tungsten light (3,200 K), but we also have a window visible in the shot with daylight streaming in (5,600 K) (Figure 13-33). If we white balance our camera for daylight color temperature, the subject will look as orange as a carrot; conversely, if we white balance for the tungsten light, the window will turn an unnatural blue. A camera sensor cannot be balanced for both simultaneously. What to do? There are two ways we can balance the lighting in this situation:

We can cover the window with CTO gel (converting the daylight to 3,200 K) and then white balance the camera for tungsten light because now all lighting sources are tungsten color temperature. Using CTO gel will also reduce the light streaming in from the window somewhat so that might actually be helpful to balance exposures. But, the difficulty with this approach is that it's not so easy to cover a window with gel, especially large windows.



■ **Figure 13-33** With your white balance set for daylight (5,600 K) the sunlight coming through the window will be correct, but the tungsten light (3,200 K) will appear excessively orange (*top*). Placing a CTB gel over the tungsten unit changes it to daylight (*center*), matching the color temperature of all sources (*bottom*). See the color insert.

Lining windows with gel requires that you carefully tape the gel to the window frame, making sure that there are no wrinkles that will refract light and reveal the gel. It can certainly be done, but it takes a little time and practice.

The other option would be to cover your tungsten lights with CTB gel (turning the tungsten light to 5,600 K) and white balance for daylight, because all lighting sources are now daylight color temperature. Although putting a gel in front of a light is certainly easier, there are drawbacks to this approach, too. On a super bright day you might not want to sacrifice any of your tungsten light's intensity, because doing so creates greater contrast between the tungsten areas and the bright sunlight areas.

Both solutions work, so choosing one depends on your specific situation. The principle to remember is to use gels to change the color temperature of one source to match the other. That said, also remember that $\frac{1}{2}$ and $\frac{1}{4}$ conversion gels allow you to modulate the color conversion effect. For example, look at **Fig. 13-3** in the color insert. That scene was balanced for the daylight streaming in through the windows; however, the two tungsten lights on the subject were balanced differently. The key light had a full blue gel converting it to 5,600 K, but the fill light uses only a $\frac{1}{2}$ blue gel allowing some degree of amber to warm up the tone of the subject's skin.

Neutral Density Gels

Neutral density gels are gray tinted gels that simply cut down the intensity of light; they do not, on their own, affect the color of a light source (**Figure 13-34**). ND 0.3 cuts intensity by 1 stop; ND 0.6 by 2 stops; and ND 0.9 by 3 stops. These gels are very often used taped to windows to moderate the intensity of light pouring into interior scenes so that the lighting contrast between what's outside the window and what's in the interior space is not so extreme (**Figure 13-35**). Because these gels are commonly used on windows, you will often find ND mixed with CTO in a single gel. A **CTO ND 0.6**, for example, will change the color temperature of the daylight to 3,200 K and will reduce the intensity of the window $2\frac{2}{3}$ stops (2 stops for the ND and $\frac{2}{3}$ stop for the CTO).

Diffusion Media

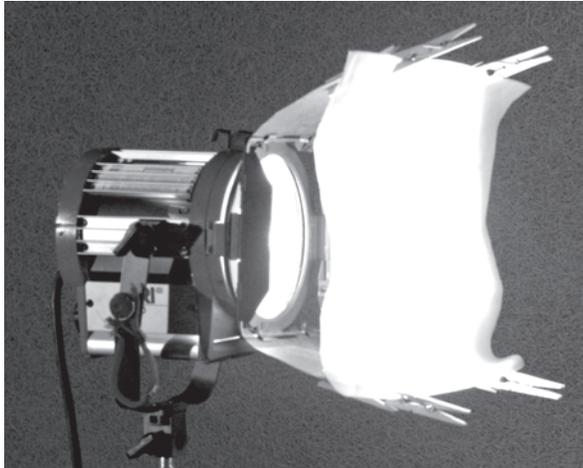
Diffusion media are used to soften the output of a hard light source (e.g., open face or Fresnel light). Using diffusion instead of bringing along a genuine soft light unit to the location is often more practical, because soft lights tend to be large and bulky (explained later). Diffusion can be used as a single layer or doubled or tripled to increasingly soften the light. Although softer light is very flattering, especially for lighting faces, the trade-offs are that diffusion can cut light intensity drastically and the spill of diffused light is harder to control with barndoors or flags. Diffusion is not called a gel because there are many different kinds of diffusion, made from a variety of materials, that determine the degree and texture of the diffusion. **Tough spun** (made of spun glass), **tough frost**, **grid cloth**, and **tough opal** are some common diffusion materials. The designation "tough" on any gel indicates that it is heat resistant and can be placed on barndoors—with caution (see page 441) (**Figure 13-36**).



■ **Figure 13-34** Neutral density gels work like their glass filter counterparts, cutting the intensity of light without changing its quality or color. Pictured are ND 0.6 (left) and ND 0.3 (right).



■ **Figure 13-35** Neutral density gels help control the extreme dynamic range caused by shooting against windows. This subject was shot in a relatively dark interior location with sunny streets visible through the window behind her. Taping ND9 gel on the window brings exterior and interior exposures closer (left half); the right half of the window was intentionally left uncovered.



■ **Figure 13-36** A layer of tough frost attached to barndoors to create a softer light from this Fresnel.



■ **Figure 13-37** Matte boxes sit in front of a camera lens and block unwanted light from hitting the lens. They can also have filter holders for rectangular glass or plastic filters. This matte box accommodates three filters (arrow).



■ **Figure 13-38** Neutral density filters cut the amount of light entering the lens without changing its color. ND 0.3 (left) reduces light by 1 stop and ND 0.6 (right) cuts the light by 2 stops. These are 3 × 3 filters that fit into a matte box filter holder.

Camera Filters

Camera filters are glass elements that are positioned in front of a lens in one of two ways: they can either screw directly onto the lens or they can be held in a matte box filter holder. Filters that mount directly onto the lens are usually glass filters inside a mounting ring. These filters come in a wide variety of sizes to match the diameter and mounting threads of various lenses. Held in place by rods, **matte boxes** sit in front of a camera and extend out from the lens to keep unwanted light from glancing off the lens. They usually also provide filter holders and slots for holding several rectangular glass or plastic filters (**Figure 13-37**). Different matte boxes are designed to hold specific filter sizes (i.e., 2 × 2, 3 × 3, or 4 × 4). Make sure that you have the proper size filter for your particular matte box.

There are literally hundreds of different filters on the market that accomplish a wide range of different effects. Camera filters break down into four broad categories of usage: **color correction**, **exposure control**, **special effects**, and **black-and-white photography**. It's not possible to cover every filter available, but the following section covers some of the most common and indispensable filters for filmmaking. The two most common color correction filters (Wratten #80A and #85) are used for balancing celluloid film to color temperature situations. *If you're shooting on celluloid film, please see the celluloid section on the Voice & Vision companion website for more information.*

Neutral Density Filters

Neutral density filters (or **ND filters**) are gray-tinted filters that simply cut down the amount of light entering the lens (**Figure 13-38**). ND filters are exposure control filters and do not affect color at all. An ND 0.3 filter cuts the amount of incoming light in half, or 1 full stop; an ND 0.6 cuts down 2 stops, and an ND 0.9 cuts down 3 stops. ND filters are commonly used when you want to shoot at a specific f-stop but cannot necessarily control the light intensity—like shooting outside on a sunny day. One reason you might want to do this is that you feel that your lens gives an optimal image at a certain f-stop, or another very common reason is that you want to control your depth of field without changing your lens, lighting, or composition. By adding ND filters you are forced to compensate for exposure by opening up your aperture, thus decreasing the depth of field. The more stops you reduce the incoming light, the shallower your DOF will be, as you open up further and further (see **Fig. 10-29**).

You may remember from Chapter 9 that many video cameras have built in ND filters which serve exactly the same function. You should check your manual to determine the specific specs for your particular camera, but very often built-in ND filters use a slightly different progression: ND1 = 2 stops reduction, ND2 = 4 stops reduction, and ND3 = 6 stops reduction in light.

Diffusion Filters

Diffusion filters are special-effect filters used to soften an image while maintaining sharpness of focus. Exactly how and how much they soften the image is different depending on whether the filter uses a white or black diffusion effect and on the degree of diffusion. **White diffusion** creates a soft haze, from the subtle refracting of white highlights, and **black diffusion** softens the image by delicately flaring the dark, shadow areas of the image. The degree of diffusion is designated by a scale beginning with fractions, $\frac{1}{8}$, $\frac{1}{4}$, and $\frac{1}{2}$ diffusion, and then going from 1 to 5 diffusion. The $\frac{1}{8}$, $\frac{1}{4}$, and $\frac{1}{2}$ diffusion filters show the least amount of diffusion and are not really considered a special effect; the diffusion is barely noticeable except that it slightly smooths out areas that have fine, sharp lines, like skin wrinkles. Many shooters feel that the Rec. 709 image can be slightly harsh and they will routinely use a very light, black diffusion ($\frac{1}{8}$ or $\frac{1}{4}$) to slightly soften the image's "electronic" edge. At 1 and 2 diffusion levels, you will begin to clearly see softer edges on everything and the subtle flaring of white or black areas (Figure 13-39). By the time you reach a 5 diffusion filter, the soft image becomes a hazy one, creating an overt "dreamy" or "romantic" effect whose use requires valid narrative motivation.



■ **Figure 13-39** Diffusion filters are used to soften the image while maintaining sharp focus. Notice in this shot, from Sluser's *Path Lights*, the glow on the metal highlights and hair and the softness added to Bobby's (John Hawkes) face. See the color insert.

in practice

It's not uncommon to find cinematographers who make their own diffusion filters by stretching very fine silk stockings over filter frames to create a customized diffusion effect. Different cinematographers swear by different brands and grades of hosiery but, anecdotally speaking, it seems that French stockings are preferred. When shooting the black-and-white portions of his film *Wings of Desire* (1987), Wim Wenders had the A.C. try a number of diffusion filters from high-end professional brands, but he was not satisfied with any of their looks. Exasperated, he turned to his D.P., the legendary French cinematographer Henri Alekan, who pulled out of his filter box an old wood-framed black diffusion filter he made in the 1930s with his grandmother's silk stockings. For Wenders the unique visual quality of this filter, that had been handmade some 50 years earlier, was perfect, and they used it.



■ **Figure 13-40** Cinematographer Henri Alekan is said to have used a special filter made from his grandmother's silk stockings on Wenders' *Wings of Desire*.

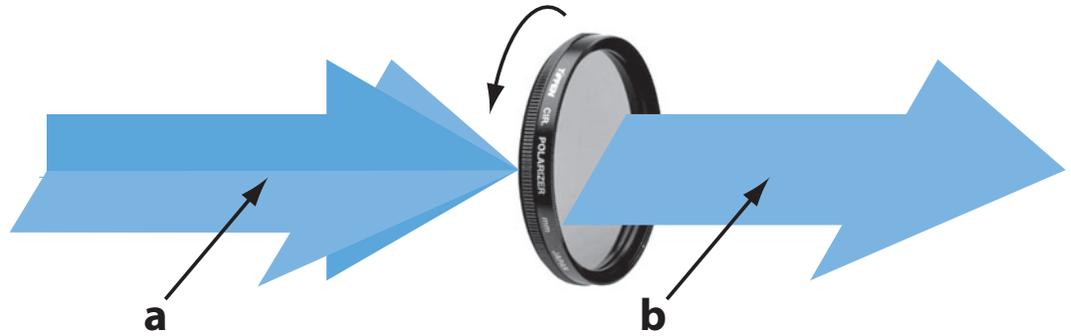
Wings of Desire is acknowledged as being one of the most visually stunning films of all time—thanks to Henri Alekan's grandmother (Figure 13-40).

Polarizing Filters

When light reflects off shiny surfaces, specifically nonmetallic surfaces like glass or water, it scatters and vibrates in many directions causing glare. A **polarizing filter** (or **pola filter**) is used to block light rays that are not parallel when entering the lens. The primary use of a polarizing filter is to reduce or eliminate the obstructing glare and reflections coming off transparent surfaces like glass and water. A polarizing filter is made of two glass elements: one is fixed and one rotates. Each element is manufactured with parallel rows of glass

■ **Figure 13-41**

When shooting shiny, transparent surfaces, the reflected and direct light travel together toward the lens (a). To “catch” reflected light, the pola is rotated until it blocks the off-axis light rays, so that only direct light (b) passes through.



grain, similar to partially opened Venetian blinds (Figure 13-41). By rotating these layered, parallel rows, a polarizing filter creates an adjustable grid that progressively blocks off-axis (reflected) light from a selectively wider or narrower axis. Polarizers offer a great amount of creative control because you can easily see, as you rotate the filter, exactly how much glare and reflection you are eliminating (Figure 13-42). Be careful, however; polarizing filters work so well that it is possible to “dial out” all glare, thereby making it seem like there is no glass in a window at all (Figure 13-43).

Because much of the light that comes from the clear blue part of the sky is reflected light (haze), polarizers are also handy for darkening blue skies to make cloud formations stand out vividly. For this use, the angle of the sun to the filter is important. Darkening blue skies works best with the sun at a 90° angle to the filter, but the technique will not work at all if the sun is along a 180° axis directly in front of or behind the filter. A polarizer does not alter the color tonalities of your scene; however, it does take a toll on exposure. Most polas require a compensation of 1½ to 2 stops. Also remember that polarizers work through the



■ **Figure 13-42** The pola filter at work. Glare on the window makes it difficult to see through it (left). Turning the polarizing filter shows the gradual reduction of the light glancing off the window’s surface (middle). At its most effective angle, the pola can almost completely eliminate glare (right).



■ **Figure 13-43** Sometimes reflections can be used as a narrative device, as Wenders did on *Wings of Desire* during the introduction of the angel Cassiel (Otto Sander). The bright neon lights that conceal his presence hint at his ethereal nature.

precise angles between the light and filter elements, so moving the camera by panning or tracking can visibly change the polarizing effect.

Graduated Filters

All of the filters discussed so far have an effect on the entire image. **Graduated filters (grads)**, on the other hand, gradually introduce a filter effect into only a portion of the frame, leaving the rest of the frame unaffected (**Figure 13-44**). A graduated ND filter, for example, will incorporate a noticeable ND 0.9 at the top of the frame, to darken the sky, but the ND effect will taper off and disappear by the center of the frame, leaving the bottom half of the image completely unchanged. Graduated ND filters are popular because they reduce the contrast range in an image that might include, say, a bright sky and a shaded area on the ground. Graduated color filters are also popular, especially those that affect the color of the sky; examples include the sunset grad filter, which warms up the sky with an amber tint, and the blue grad filter, which deepens blue skies. Color graduated filters need to be used with some caution, as they are not the most subtle effects you can apply to your image. The effect can be quite noticeable if you fail to conceal the transition area in some compositional element in the scene—for example, placing the transition area in the tree line between the sky and the ground. Camera movement can also reveal the use of this filter.

Just as with all craft aspects of film production, when properly used, camera filters can be a powerful tool to refine the look of your film and establish the precise tone or emotional impression you want for your story (**Figure 13-45**). When unjustified or clumsily employed, however, filters make your footage look downright cheesy. When using camera filters always ask yourself why you've chosen a particular filter, what that filter helps you show or express, and then approach its use with some restraint at first.



■ **Figure 13-44** Grad filters gradually introduce a filter effect into a portion of the frame. Shown are (from left to right) ND 0.9 grad., ND 0.6 grad., and ND 0.3 grad.



■ **Figure 13-45** In Fassbinder's *Veronika Voss* (1982), the dazzling world of celebrated actress Veronika (Rosel Zech) is underlined by the exuberant use of a star filter effect.

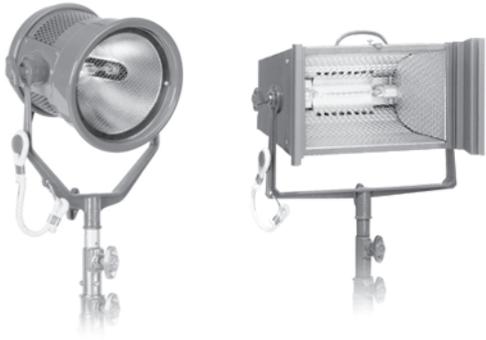
■ BASIC LIGHTING AND GRIP EQUIPMENT

As I mentioned previously, video sensors are increasingly capable of producing exceptional images in low-light situations. Because of this, the need for huge, bulky, and high-powered lighting units has greatly diminished. For most lighting situations, a student shooting with a digital camera with a native ISO somewhere between 600–800 really needn't employ any lights that consume more than 2,000 watts of power (if they even need that). But even if you eliminate the big guns, there is still a dizzying array of lights available for low-budget film production. It would be impossible to present them all in this book, but the following sections explore some lighting units that are commonly used by students and low-budget independent filmmakers.

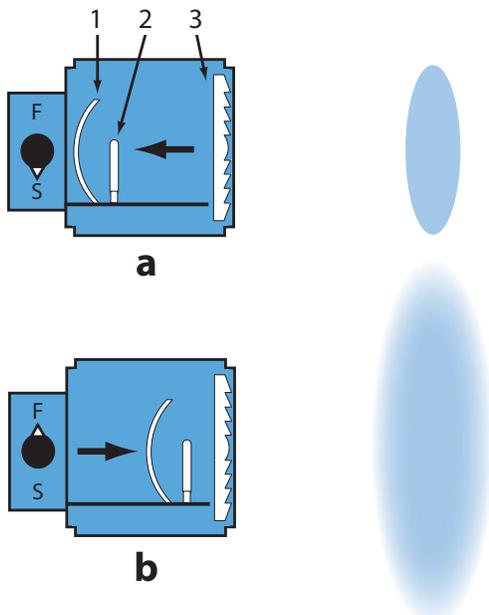
Lighting Units

Open-Faced Lights

Open-faced lights are units that consist of an open lamp (no lens) and a specular reflector system. Open-faced lights are a hard light source and act primarily as set lights (and occasionally as key lights) and are either used as a direct source or bounced to soften the beam. The **open-faced spot** is a common open-faced unit that has a movable lamp, allowing it to focus its throw somewhat from a broad to a more narrowly defined area. **Broads**, which are open-faced lights with no spotting capability, simply deliver a hard, efficiently bright



■ **Figure 13-46** The open-faced spot (*left*) has a movable lamp. Broads (*right*) are open-faced lights with no spotting capability. Both deliver a hard, efficient light.



■ **Figure 13-47** Fresnels have a lens (3) that focuses the beam more effectively than open-faced lights. In the spot position (a), the bulb (2) and the reflector (1) are farther from the lens, creating a sharp beam. When flooded (b), the bulb and reflector are brought closer to the lens, creating a wider throw.



■ **Figure 13-48** Fresnel lights come in a variety of sizes and intensities. Shown here are a 220-watt inkie (*left*) and a 1-K baby (*right*).

light. Both lights come in a variety of intensities from 250 watts to 2K and they are usually a tungsten instrument (**Figure 13-46**).

Fresnels

Fresnels are one of the most common and versatile lighting units on a film set. What distinguishes a Fresnel is its unique lens and its movable lamp, which allows it to spot its beam with fair precision. Fresnels are named after Augustin Jean Fresnel, the French physicist who designed the shape of the lens. It was already known that plano-convex lenses had the ability to focus light rays and maintain intensity, but they are quite heavy, delicate, and retain a great deal of heat. Monsieur Fresnel simply cut this lens almost in half, but maintained the plano-convex contour by cutting the duplicate curvature into a series of concentric circles. This made the lens lighter and cooler but maintained its ability to focus the beam (**Figure 13-47**). Fresnels are rather hard lights, so the beam is controllable with flags or barndoors, though the textured lens does soften the light somewhat.

Fresnels can be either tungsten or HMIs (see the following section). They also come in various sizes and wattages. The lower wattages (100w to 650w) and smaller lens sizes are used as specials and kickers. The medium wattages (650w to 2K) are commonly used to light people and can be a key light source. Large Fresnels (2K to 10K and large lenses) are used as large area key lights and set lights. Fresnels have specific nicknames depending on the intensity of their lamp and size of their lens. Some Fresnel units commonly used by students and independent filmmakers are: **inkie** (100w to 200w, small lens), **midget** (500w, small lens), **tweenie** (650w, small lens), **baby** (1K, medium lens, also called **ace**) and **junior** (2K, medium or large lens, also called **deuce**). These terms are widely used, so you need to know them. On a professional set you'll rarely hear someone say, "Go to the truck and get me 650-watt light with a small lens." They just ask for a tweenie (**Figure 13-48**).

HMI Lights

HMI (Hydrargyrum Medium-arc Iodide) lights are mercury vapor lamps that were developed as an alternative to tungsten lighting. HMIs emit a light that matches daylight color temperature, 5,600 K, and are commonly Fresnel lights or PAR (Parabolic Aluminized Reflector) lights, which throw a very strong and focused beam over distance. Because they match daylight color temperature, large HMIs (5K, 10K) are often used to light broad exteriors locations. However, HMIs require a heavy power ballast in addition to the lighting unit itself. This additional encumbrance along with a higher rental price makes the HMI primarily a professional lighting unit.

Soft Lights

Soft lights are units that do not throw the light beam directly from the lamp; rather, they emit reflected light. In a soft light, the lamp is nestled in a lamp housing and the beam reflects off the white interior of a **reflector shell**, creating an even and soft source. The larger the reflector shell, the more diffuse the light will be. Very diffuse soft lights are not practical for location shooting because of their girth. The output of a soft light is not particularly efficient, and they are used primarily as fill lights and occasionally as soft keys. Soft lights come in a variety of intensities (**Figure 13-49**); common wattages for small-scale shoots are 750w, 1K, and 2K. Because of the large size

of the reflector shell, soft lights can be cumbersome for small crews or tight spaces. When trying to stay light and agile, some filmmakers prefer to create their own soft light source by bouncing light from a hard light unit off a reflector umbrella, a bounce board, or a white wall.

The **Chinese lantern** and **Soft-box** are specialized soft light rigs that are used exclusively as fill light. Both of these units are simply foldable light enclosures that surround a low wattage lamp with light-diffusing material. The design of the Chinese lantern is based on the popular collapsible paper lanterns, but the lighting rig that mimics that design is made from flame-resistant material (like the Chimera brand Chinese lantern). *If you try using a real paper lantern, it will burn!* In both cases, you have a highly portable, light-weight soft light that can be positioned nearly anywhere, notably much closer to the camera than a stand-alone soft light unit. Chinese lanterns and soft-boxes provide a very soft fill that is especially useful for close-ups on faces (Figure 13-50).

Fluorescent Lights

Fluorescent lights are relative newcomers to the shooter's lighting arsenal. Instead of heating a filament to a white-hot point source, fluorescent lights generate their illumination by passing an electric charge through mercury gas trapped within a hollow tube, causing it to glow. Because of this construction, fluorescent lamps give off a very soft, flattering light. In addition, they are lightweight and draw very little power. Fluorescent units come in a wide variety of sizes, from large banks holding ten 48-inch fluorescent tubes, to tiny nook fixtures holding a single 9-inch fluorescent lamp capable of being tucked under a sun visor for night shots in cars (Figure 13-51). Fluorescent lights have many great advantages: they give off a lovely soft light, they burn cool, they draw very little power, and the units are lightweight and collapsible. Fluorescent lighting units can also be re-bulbed with lamps of various color temperatures, including 3,200 K and 5,600 K. The downside is that they are very delicate.



■ **Figure 13-49** Many soft lights illuminate by bouncing light off some form of diffusing reflector. This Mole-Richardson 750-watt baby-soft has a matte white shell reflecting the light from a recessed lamp.



■ **Figure 13-50** "Chinese lantern" globes provide a source of soft light, especially for close-ups on faces.



■ **Figure 13-51** Fluorescent light banks (left) offer an extremely soft light source, which can be used as a fill light or a soft key. Small, battery-powered fluorescent tubes, like these miniflo lights (right) are often tucked into a car to replicate dashboard lights and provide illumination for a good exposure at night.



■ **Figure 13-52** This 12" × 12" LED light can operate on batteries or AC current, and provides a cool, soft, and controllable fill light.



■ **Figure 13-53** Reflectors are as essential as any artificial lighting unit. This daylight exterior shot under the hot African sun (and far from any electricity) gets much needed fill from a reflector. Pictured here is cinematographer Mike Kambalame for Story Workshop's production *Okoma Atani* (2010).

LED Lights

LED (Light Emitter Diode) lights are relative newcomers to the world of lighting, but they are becoming very popular in a variety of situations. LEDs are built from sets of tiny individual cells, which are highly efficient and run on DC power, which means they can be powered with batteries. LED lights can be found in a huge variety of configurations, from tiny units designed to be mounted on a camera to large light panels that generate a soft even light (**Figure 13-52**). These units are also highly controllable, typically offering both a dimmer switch and a color temperature control. Their portability, versatility, and ease of use guarantee that, as their cost comes down, LEDs will play a larger and larger role in the world of film lighting.

Reflectors

Reflectors are not artificial lighting units per se, but I'm discussing them here because, as an illumination tool, they are as essential to a cinematographer as is any instrument that contains a lamp. As mentioned previously, reflectors are lightweight, portable surfaces that bounce light. Reflectors can be a board or a flexible fabric disk used to bounce light from a source (artificial or sunlight) onto your scene. Reflectors usually have two sides with different reflective qualities: a diffused surface (white) that simultaneously bounces and diffuses a hard light source and a specular side (silver or gold to warm the bounced light) that reflects and maintains the hard quality of the source (**Figure 13-53**). **Bounce board** reflectors are often simply lightweight foam-core. Bounce boards work well when you want to position a bounce surface, on a C-stand, in front of a lighting unit. A **collapsible reflector** is a disc of reflective fabric held taught inside flexible ring. These reflectors can be folded into a fraction of their full diameter and whipped out as needed, for instance to fill shadows in daylight exterior situations.

Basic Grip Gear

Throughout the history of film, grips have been the people who make it all happen. The grips are the muscle behind the movie, and after spending enough time on professional sets you come to realize that phrases like "Sorry, but that can't be done" simply do not exist for a professional grip. If something must be lifted, held, propped up, moved, adjusted, or rigged, grips do it. Whatever it takes to

accomplish the shot the way the director sees it, the grip will pull it off. Over time an entire arsenal of grip equipment has developed, often by inventive grips themselves, in order to make their jobs more efficient and the set safer. There is so much specialized grip equipment that it would be impossible to cover all of it here, but knowing some of the basic gear is important for knowing what your rigging possibilities are on a set.

Stands

Light stands are what we usually position lighting units on, especially in field production. They are collapsible tripod units that have a telescoping center pole to raise and lower the angle of the light as necessary. **C-stands** are your all-purpose holder, used for hanging,

Whether you're a director, a cinematographer, or a gaffer, contemporary filmmaking requires that you be conversant with a wide range of lighting equipment and techniques that can achieve a range of aesthetic results. This doesn't always mean *more* stuff, often it means working successfully with less. Cinematographer Maryse Alberti is an example of a D.P. with consummate technical and aesthetic versatility. Her shooting credits include run 'n' gun documentaries like Terry Zwigoff's *Crumb* (1994) and heavily stylized (heavily lit) narratives like Todd Haynes' *Velvet Goldmine* (1998). It was exactly this visual adaptability that made Darren Aronofsky seek her out to shoot *The Wrestler*; his 2008 film about an aging professional wrestler at the rock bottom of his career. The overall style of the film is starkly realistic and to achieve that effect Alberti shot with fast 16mm film for what she calls an "edgier" look than HD. She also went with 16mm because the lightweight cameras allowed her to shoot the film entirely handheld, giving the actors great freedom of movement. Even though much of the film is shot documentary style with available light, augmented by only a few or no additional lighting, some of the scenes, in fact, involved a great deal of theatrical style lighting (Figure 13-54):



■ **Figure 13-54** Cinematographer Maryse Alberti shot *The Wrestler* under a variety of lighting situations, including available fluorescents (*top*), heavy artificial lighting (*center*), and just one flashlight (*bottom*).

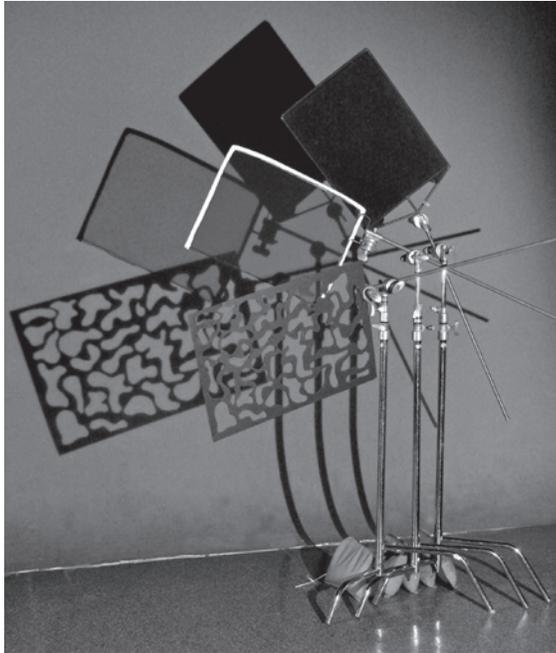
Darren was interested that I could do a movie like Velvet Goldmine, which was all about style, and I could really light, but also do a documentary, which I could light with very few tools. So applying that, I could really light a sequence if I had to, like the strip club. But the exteriors, I was not afraid to go with minimal lighting. In the supermarket, or the auto-graph signing, I just changed a few bulbs. That comes from the world of documentary. Sometimes you're in a place and you say, it looks good, you just have to change a bulb there, or turn something off there, and that's it, we're ready. There's a lightness, you're less encumbered by machines, so it's easier to go with an idea.

(From "Making *The Wrestler* Real" by David Schwartz, 2009)

Early in the film, the central character, Randy "The Ram," is locked out of his trailer home after a match and must spend the night in his van. The scene was lit and shot entirely with a flashlight. That's the sort of bold choice which infuses *The Wrestler* not only with a sense of realism but also with great visual energy and immediacy. It is this sort of versatility and creative daring that makes Alberti such a sought after collaborator.

You have to master your tools and stay in the creative zone. It begins with knowing what you want your images to look like and why. We lit with everything from an 18K to just a flashlight that The Ram turns on after entering his van. That was the only light in that shot.

(From "Cinematographers in Action," by Paulette Brandis, Kodak: 1000 Words, 2009)



■ **Figure 13-55** C-stands are all-purpose holders used on virtually all film shoots. Pictured: a cookie, a net, and a flag attached to three C-stands with the use of gobo arms and gobo heads.



■ **Figure 13-56** Foldable barndoors like these are mounted on the front of most movie lights and help control where the unit's light falls.

holding, or positioning just about anything (**Figure 13-55**). They are heavy and stable and their three legs are at different heights, allowing you to place several C-stands, overlapping, side by side. Combined with a **gobo head** and **gobo arm** (or multiple gobo arms), C-stands become infinitely adjustable and versatile and can firmly hold virtually anything that is fairly light-weight, at any angle and at a wide range of heights.

Light Control: Trimming

It should be apparent by now that, when lighting, we want to be able to carefully control where the light falls and where it does not. Blocking light to keep it from falling where you don't want it is called **trimming** the light, and it's easy to do with hard light units. Soft light, on the other hand, is difficult to trim. With the light rays scattering in all directions, soft light will not create the sharply defined shadow edge necessary for precise trimming. Light that falls where it should not is called **light spill**, and soft light tends to spill.

Barndoors are a standard addition to almost every lighting unit and are designed to help control the coverage of the beam. Barndoors fit onto the front of the lighting unit and consist of two, or usually four, foldable black metal leaves (**Figure 13-56**). Two leaves control the vertical and horizontal limits of the beam throw. When precise trimming is called for, we often used **flags**, which are free-standing frames covered with black felt, to sharply define where the light falls and where it doesn't (see **Fig. 13-55**).

Gobo is the general name given to anything that comes between a light source and the scene—that is, anything that throws a shadow pattern. One specific kind of gobo is a **cookie** (short for **cucoloris**), which is metal or foam core that has had shapes cut into it to create patterns on a wall, floor, or other surface (see **Fig. 13-55**). Once I found myself shooting a scene with a single character against a white wall. The bare white wall appeared severe, overly bright, and flat, so I needed to throw some sort of vague, diffused shadow pattern against it to break up the glare and give the image some dimension. With time running short I simply grabbed a C-stand, clamped a plastic milk crate (used to carry power cables) to it, and placed this in front of a slightly diffused light. The mesh of the milk-crate bottom cast a very soft criss-cross pattern onto the wall. That's a gobo too, and one that worked well to improve the shot.

Light Control: Reducing Intensity

Right behind barndoors on a lighting unit, you will often find a slot for a scrim. **Scrims** are wire mesh screens that fit directly in front of the lighting unit and their function is simply to reduce the intensity of light. The denser the wire mesh, the more light it cuts. A single scrim cuts the output of the unit by half a stop and a double scrim cuts it by 1 full stop. You can use multiple scrims to achieve the intensity you need. Be careful using scrims as they get very, very hot.

Nets are netting material stretched across a frame and, like scrims, are used purely to cut the intensity of light (see **Fig. 13-55**). Nets are designed to cut light by 1, 2, or 3 stops. Obviously you can reduce the intensity of light simply by moving it, but by placing the net over *part* of the beam, you can cut intensity on only a part of the scene. **Silks** are like nets, but the material is partly opaque, which not only cuts the light intensity, but diffuses it as well.

in practice

Like all specialized professions, film production has specific and often colorful terminology for its tools. The jargon isn't just to be cute: using the proper language, names, and common terms is essential to getting things done quickly and precisely. We certainly wouldn't want our heart surgeon to ask the nurse, "Uh, could you hand me that . . . thing . . . you know it's yea-long and has a hook-like end on it and it holds stuff." So, too, on the film set you shouldn't be vague by saying things like, "Could you point a light over there?" With a little reading and experience you'll soon be telling your grips, "Grab a stinger and set up that tweenie on a polecat. And let's lose the cookie and go with some spun, so make sure you have enough C-47s" (Figure 13-57).



■ **Figure 13-57** Although these may look like wooden clothespins and an extension cord, filmmakers know them as "C-47s" and a "stinger."

Clamps

There are all sorts of clamps used to hold stuff on a film set, but there are two that can be of special use when it comes to placing lights. **Gator clamps** are heavy-duty spring clamps with rubber teeth to ensure a very tight grip on things like doors and tables, and **mafer clamps** are designed to lock onto pipes. Both clamps are built with posts to which you can attach a small light, like an inkie or a tweenie. These clamps allow you to position or hide small lights in uncommon places. **Polecats** are spring-tension, expandable poles, like a shower curtain rod, that are often used with mafer clamps for hanging lights in window frames, doorways, or narrow hallways (Figure 13-58).

Miscellaneous Grip Gear

A few of the other important items in a grip package would include the **stinger**, which is the on-set name for extension cord; **sandbags**, which are placed over the legs of C-stands and light stands to keep them from toppling over; and, of course, the indispensable gaffer's tape. **Gaffer's tape** is the all-purpose utility tape on a film set. Gaffer's tape rips easily into any width and length strip you need, it holds well, and it leaves no adhesive residue behind. It is especially useful for taping down cables (called **dressing cables**) to prevent people from tripping (Figure 13-59). Do not substitute common duct tape for gaffer's tape—even though it is much less expensive. Duct tape is designed to be permanent and will leave gum all over your equipment, and anything else it touches.

Given that lighting and grip personnel routinely deal with heavy equipment and thousands of watts of electricity, safety matters are a particular and constant concern. One should never set up a light, rig a jib arm, lay a cable, add a gel, or plug in a stinger without considering all the safety issues involved. Please see Chapter 18 for a discussion of safety on the set, including lighting and grip safety.



■ **Figure 13-58** Polecats let you position lights in places where a light stand cannot be used.



■ **Figure 13-59** Securing cables with gaffer's tape prevents people from tripping on them.

■ THE DITTY BAG

A **ditty bag** is a filmmaker's general utility tool kit and is filled with this, that, and the other thing that you might find useful on the set (**Figure 13-60**). Ditty

bags are built over time, but here are a few standard items to get you started:

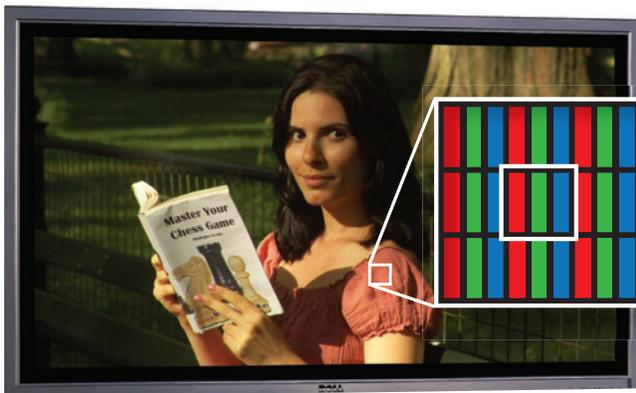
Camera tape	Sharpies
Paper tape	Leather grip gloves
Gaffer's tape	Jeweler's screwdriver set
Lens cleaning fluid/tissues	Pliers: regular and needle nose
Canned air	Screwdrivers: various sizes, regular and Phillips
Magnifying glass	Allen wrench set
Tweezers	AC plug adaptors (three-prong-to-two-prong with ground loop)
Small scissors	Circuit tester
Tape measure	Leatherman tool or Swiss Army knife
Cable ties	Nylon cord
Small clamps	Extra batteries (AA, 9-volt, and whatever your microphones use)
Flashlight	Emergency SD memory cards
Pencils and small note pad	Third edition of <i>Voice & Vision!</i>



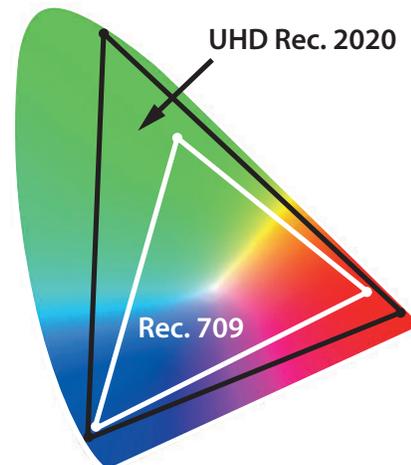
■ **Figure 13-60** A camera grip carrying almost everything he needs for a shoot—including tape, markers, gloves, and clamps—right on his hip.



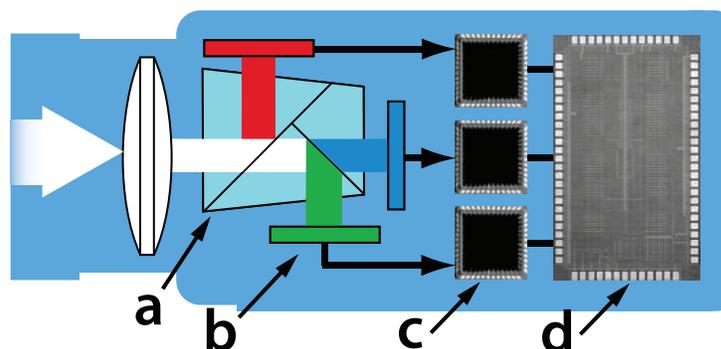
■ **Figure 3-1** The opening image from Aronofsky's *The Wrestler* (2008). The mise-en-scène reveals much about the central character Randy "The Ram" (Mickey Rourke) in just a few seconds.



■ **Figure 8-15** Just like camera sensors, color flat-screen displays (LCD or plasma) are made up of millions of pixels. Each individual pixel contains red, green, and blue subpixels (*outlined*).



■ **Figure 8-16** A comparison of the HD standard Rec. 709 color space (inner triangle) with the UHDTV Rec. 2020 color space (outer triangle) reveals the greatly expanded range of colors that the new system can reproduce.



■ **Figure 9-19** A three-chip video camera divides the light entering the lens into primary colors with a prism block (a), which are read by three sensors (b), their signal outputs are converted into digital data by dedicated off chip ADCs (c), and then processed by the DSP (d) which integrates the R, G, B signals.



a

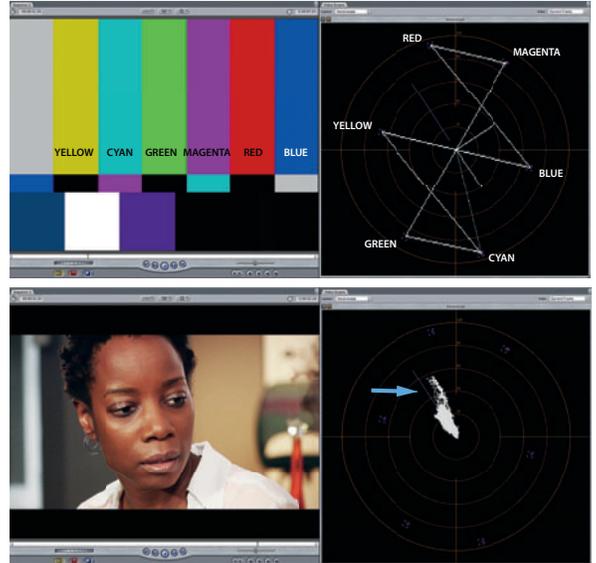


b

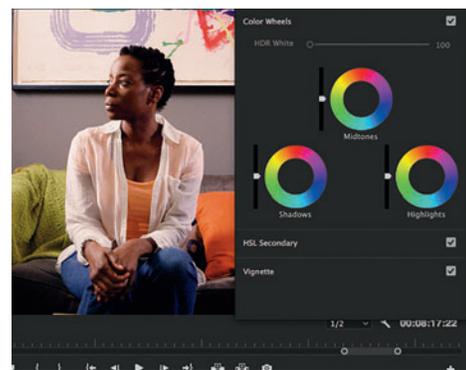


c

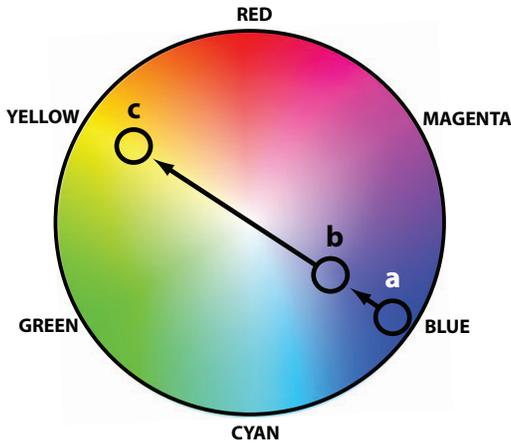
■ **Figure 24-3** Most color correction adjustments are quite subtle. The original image (a) appears somewhat flat and pale. By adjusting luminance values we can create sharper contrast and more depth to the image (b). Adjusting the color further refines the image. In this case increasing saturation and adding a slight amber hue provides a sense of the heat of the summer sun (c).



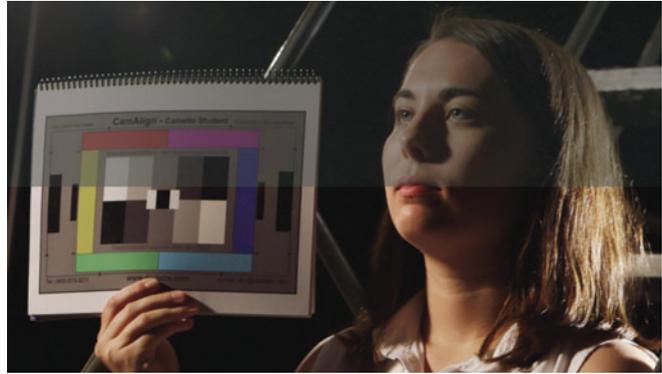
■ **Figure 24-4** The vectorscope graticule shows small boxes that correspond to the three primary colors—red, green, and blue—and their complementary colors—cyan, magenta, and yellow (top). All skin tones should fall along the skin tone line (arrow) when corrected accurately (bottom).



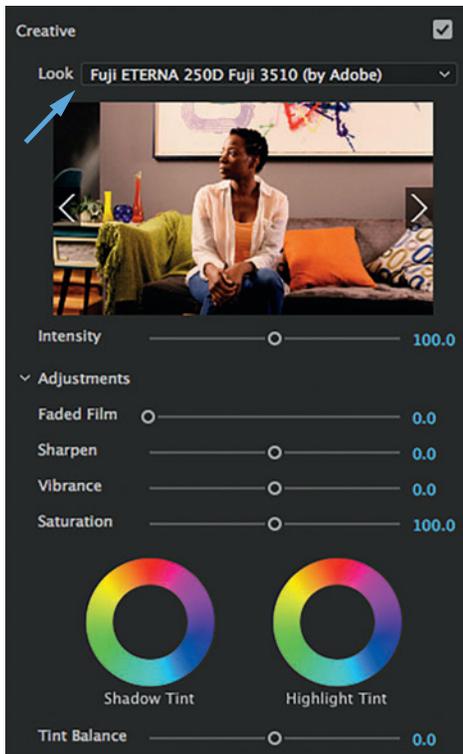
■ **Figure 24-5** The curve level (top) and the color wheel level (bottom) of the Lumetri color tool in Premiere Pro add greater precision to your NLE color grading capabilities, allowing you to isolate specific color channels or brightness ranges for adjustment.



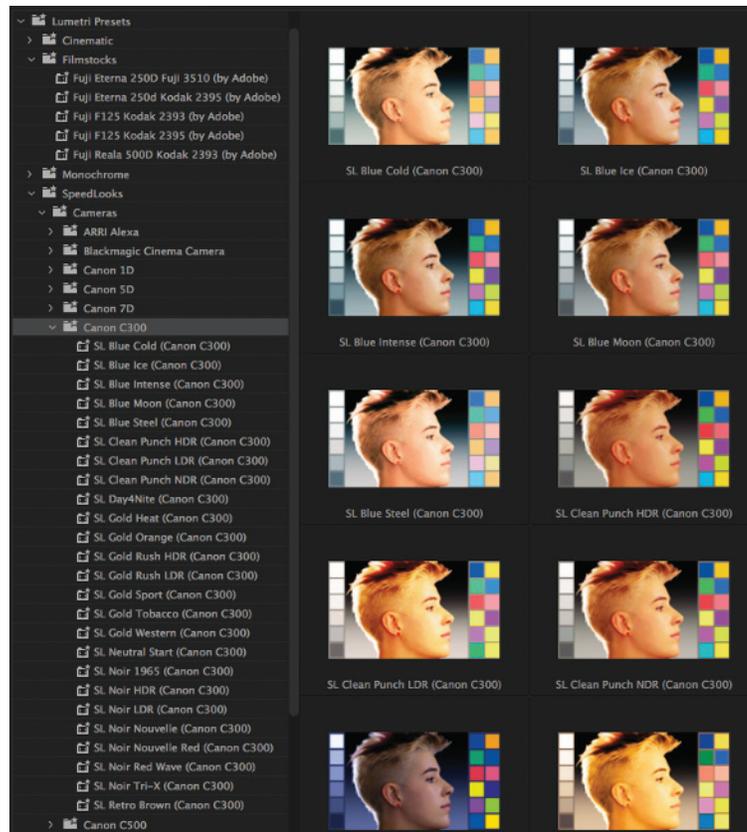
■ **Figure 24-8** Dragging the balance indicator into a specific area of the color wheel balances the image toward that particular color. The closer to the edge you go, the more intense the color becomes: (a) intense blue; (b) lighter blue; (c) intense yellow.



■ **Figure 24-9** The basic color grading process on Log footage begins by correcting a color chip chart and flesh tones that were recorded at the head of each roll. Shown here is the original Log footage (*top half*) compared to the graded footage (*bottom half*). If you haven't shot a color chart, use a representative frame that includes flesh tones from a scene.



■ **Figure 24-10** Using the Lumetri Creative level, a built-in film style LUT (Fuji ETERNA 250D) was applied to this clip by simply dragging the LUT onto the clip in the timeline.



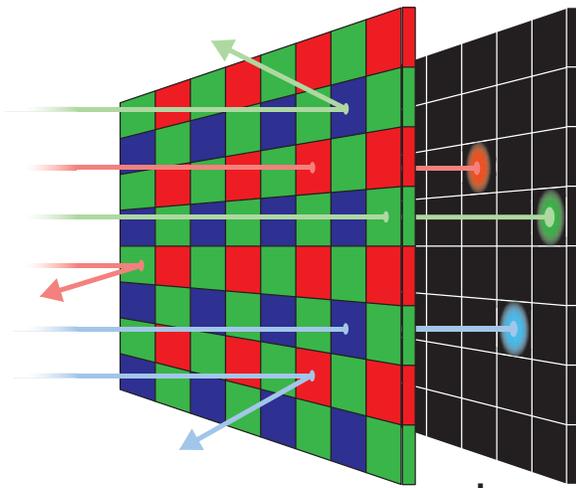
■ **Figure 24-11** Both Premiere Pro and Media Composer offer a fairly broad variety of pre-set LUTs built right in to the program.



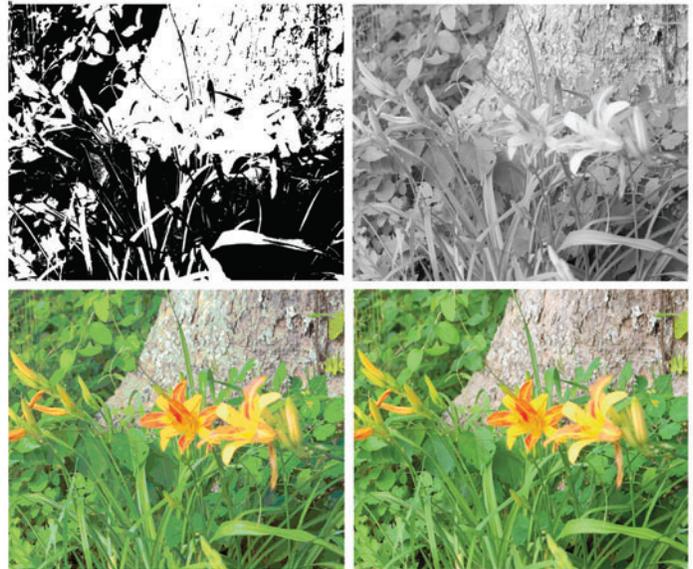
■ **Figure 24-12** For Jenkins' *Moonlight*, cinematographer James Laxton and colorist Alex Bickel created three different custom LUTs, each with unique color characteristics, to represent the three stages in the protagonist's life.



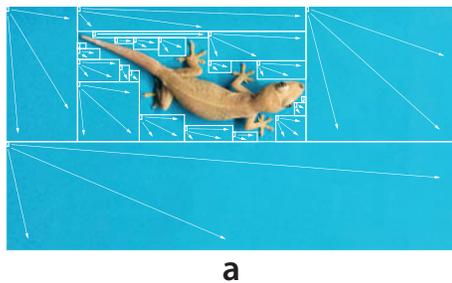
■ **Figure 24-14** Titling tools can create professional looking text, but sometimes a more creative approach to a title sequence will better set the tone of your film, like this droll title sequence from *Napoleon Dynamite* (2004) which uses grim food and mundane items from the life of a high school misfit.



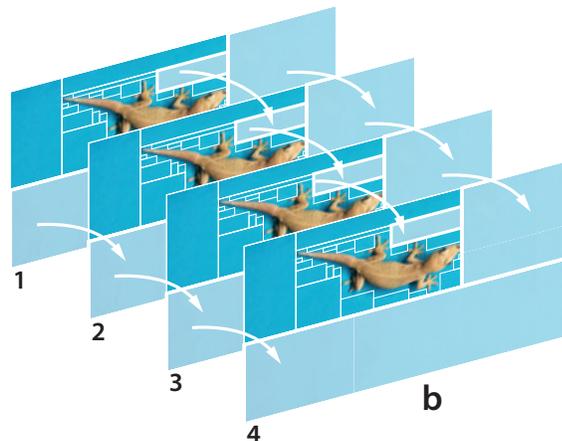
■ **Figure 9-20** A Bayer Pattern Filter (a) separates the light falling onto a sensor into the three primary colors in a mosaic pattern. This assures that each pixel on the sensor registers only one color (b). The separated colors are later merged by the Digital Signal Processor in a process called demosaicing, to create the full color image.



■ **Figure 9-22** Bit depth is an important aspect of digital image quality. A 2-bit black-and-white image (top-L); a 4-bit image with 16 values of gray (top-R); an 8-bit image with 256 values per color (bottom-L); and a 14-bit image with 16 thousand colors per channel (bottom-R).



a

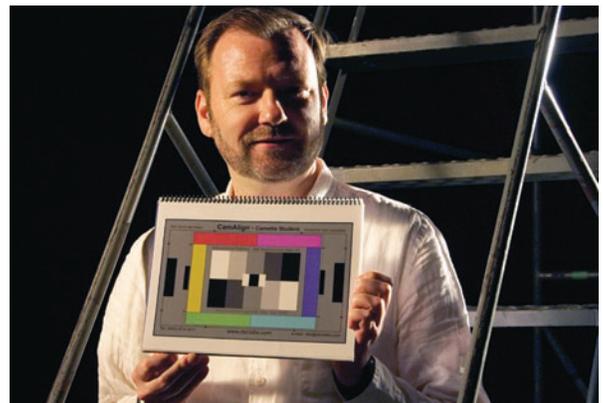


b

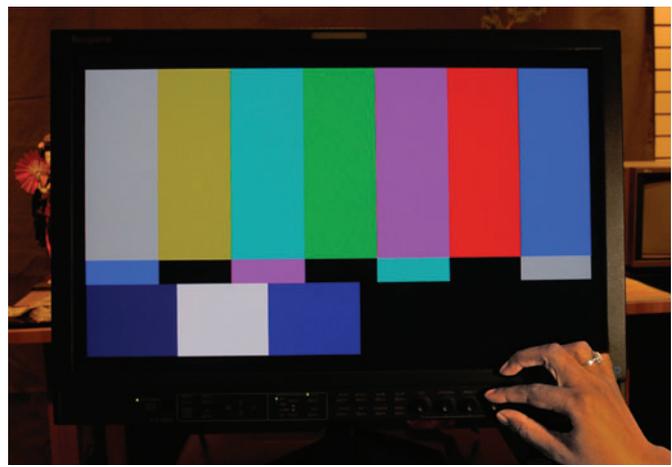
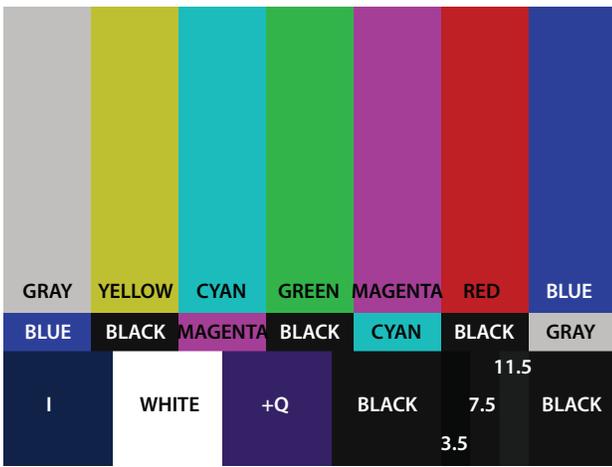
■ **Figure 9-23** Spatial compression (*left*) identifies blocks within a frame that contain identical color information and will record only one pixel's color value to share across the block while tossing out the redundant visual data. Temporal compression (*right*) will record the color values of the first frame in a shot, and will then duplicate that data across subsequent frames in areas that do not change, allowing the codec to eliminate redundant information that is repeated frame, after frame, after frame.



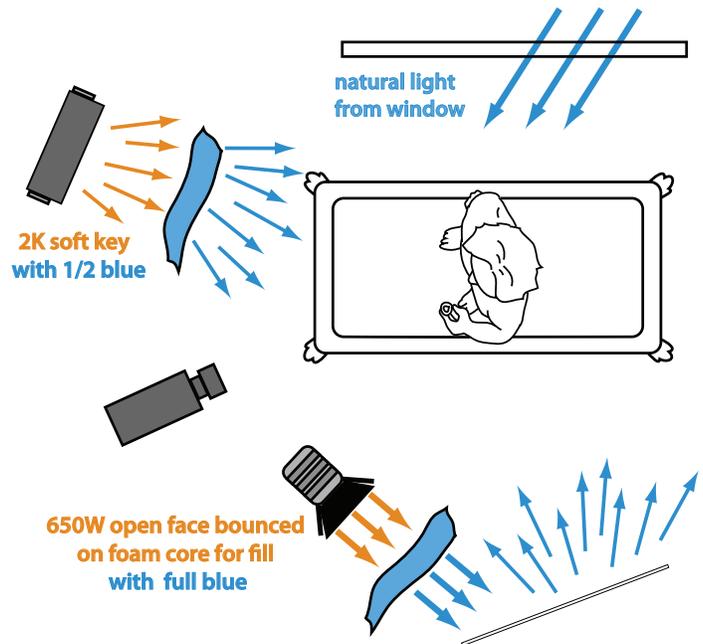
■ **Figure 9-27** The flat gamma profile of the Log format makes the original footage appear dull and gray (*bottom*) but with color grading, or the application of a LUT, the Log format will yield improved color opportunities over standard HD Rec. 709.



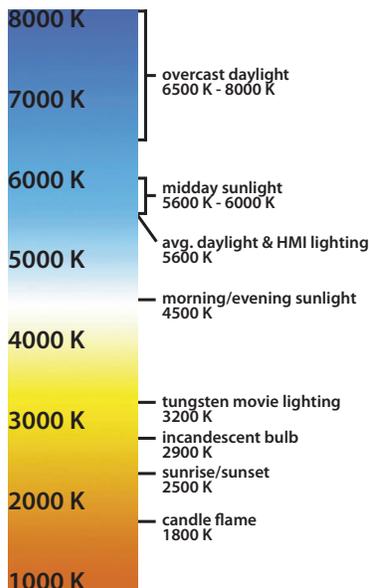
■ **Figure 9-30** To speed up the color correction process in postproduction it's recommended that you shoot a color chart with flesh tones at the head of every card for reference.



■ **Figure 12-17** Monitors should always be carefully calibrated to color bars for luminance, contrast, hue, and saturation, providing an accurate rendition of the video signal from the camera.



■ **Figure 13-3** In this scene, from Katherine Hurbis-Cherrier's *Ode to a Bar of Soap*, mixed lighting (artificial and sunlight) has been balanced for color temperature and quality.



■ **Figure 13-31** Gels come in hundreds of colors and intensities, including color correcting, neutral density, and diffusion media.

■ **Figure 13-10** This chart shows the color temperatures of various common light sources measured in degrees Kelvin.

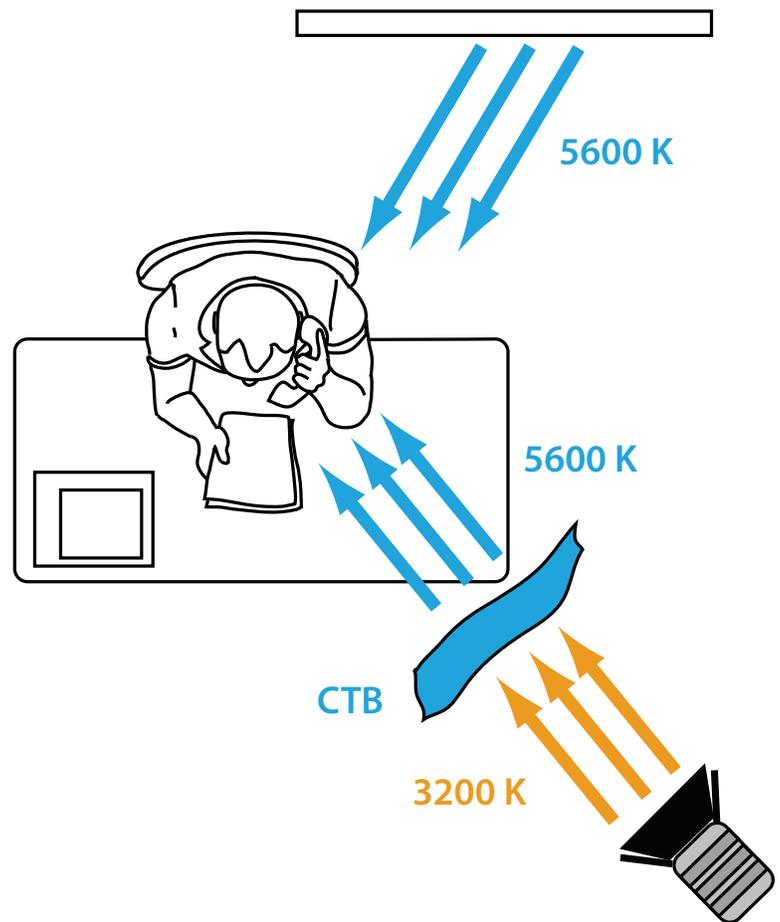


a



b

■ **Figure 13-32** CTO and CTB gels are used to correct the color temperature of a light source. CTBs are placed on movie lights to make them “daylight,” (a), and CTOs are placed on windows to make them “tungsten” (b).



■ **Figure 13-33** With your white balance set for daylight (5,600 K) the sunlight coming through the window will be correct, but the tungsten light (3,200 K) will appear excessively orange (*top*). Placing a CTB gel over the tungsten unit changes it to daylight (*center*), matching the color temperature of all sources (*bottom*).



■ **Figure 13-39** Diffusion filters are used to soften the image while maintaining sharp focus. Notice in this shot, from Sluser's *Path Lights*, the glow on the metal highlights and hair and the softness added to Bobby's (John Hawkes) face.



■ **Figure 14-12** A LUT is a small piece of color correction code that, when applied to Log footage, reverses the flat gamma. There are a wide variety of LUTs available in your NLE, and each will give your footage a different visual look. Pictured here are the Fuji Eterna 50D and Lumetri Cinescape LUTs applied to the same S-Log footage. Notice the different color and contrast qualities each brings to the image.



■ **Figure 14-13** Built-in camera or monitor LUTs are usually very basic video looks. But you can download creative LUTs from commercial websites and load them into your camera or monitor. Pictured is Filmconvert's Fuji Eterna Vivid 8543 film stock emulation LUT (*left*) applied to Log footage (*right*).



■ **Figure 14-29** The hyperstylized look created by the masterful interplay of light, shadow, and color in Powell and Pressburger's *Black Narcissus* serves to visualize the intense emotions felt by a group of Anglican nuns stationed in the Himalayan mountains (cinematography by Jack Cardiff).



■ **Figure 14-30** Both Chazelle's *La La Land* (*left*) and Refn's *The Neon Demon* (*right*) employ heavily stylized lighting to create an exaggerated and vivid impression of Los Angeles, but with very different emotional and thematic intentions.



■ **Figure 14-31** Lee's *Do the Right Thing* uses discretely stylized lighting to emphasize the heat of a particularly intense summer day in Brooklyn (cinematography by Ernest Dickerson, *top*). D.P. Emmanuel Lubezki tempered the theatrical tone of this ghost story with some naturalistic approaches to create a look for Burton's *Sleepy Hollow*, which was both believable and fantastic (*bottom*).



■ **Figure 14-33** These two frames from *Slumdog Millionaire* reveal a highly stylized visual approach, despite the use of available light, nonactors and real locations. The D.P. Anthony Dod Mantle was awarded an Oscar for Best Cinematography—the first given to a film shot primarily on digital video.



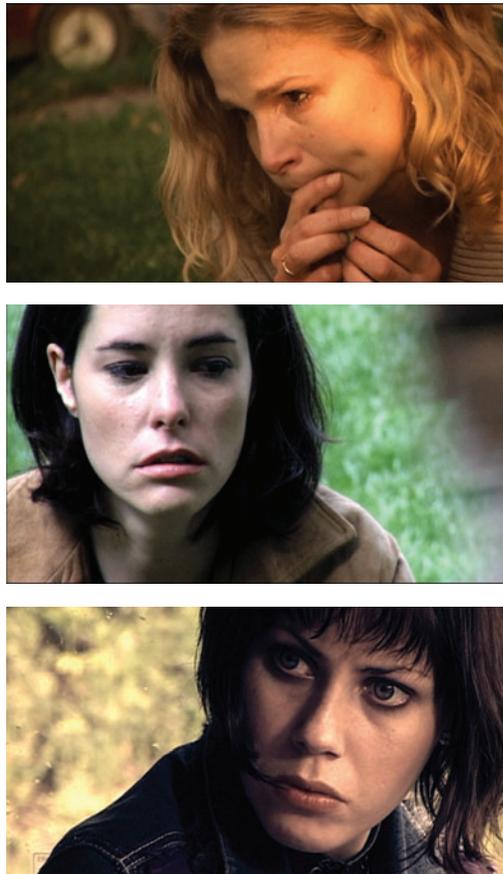
■ **Figure 14-34** Cinematographer Ernest Dickerson lights Bleek (Denzel Washington) using colors that stand for his two main interests, jazz (blue) and women (red), in Lee's *Mo' Better Blues*.



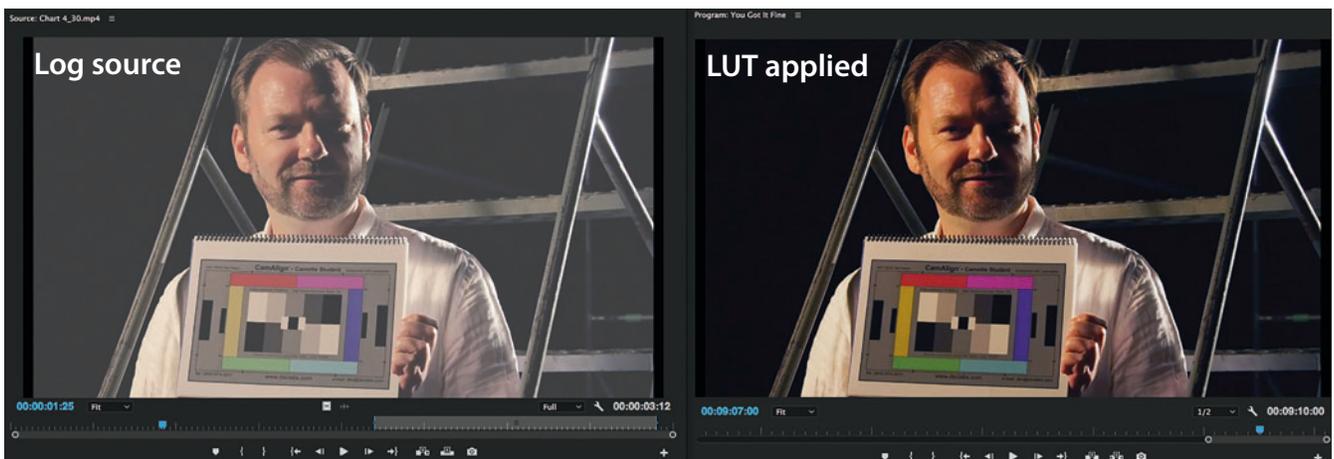
■ **Figure 14-36** For their 2018 film *Mudbound* (*left*), Rees and Morrison did extensive research into a range of works dealing with pre- and post-war rural southern culture; including the public domain photographs produced by the Farm Security Administration. The *right* image is a rare color photo of sharecroppers cutting cotton on rented land in Georgia, taken by Jack Delano for the FSA (1941).



■ **Figure 14-37** As part of my visual research for lighting *Flesh & Blade* (left and right frames), I looked at paintings like *An Experiment on a Bird in an Airpump* (1768), by Joseph Wright of Derby (center).



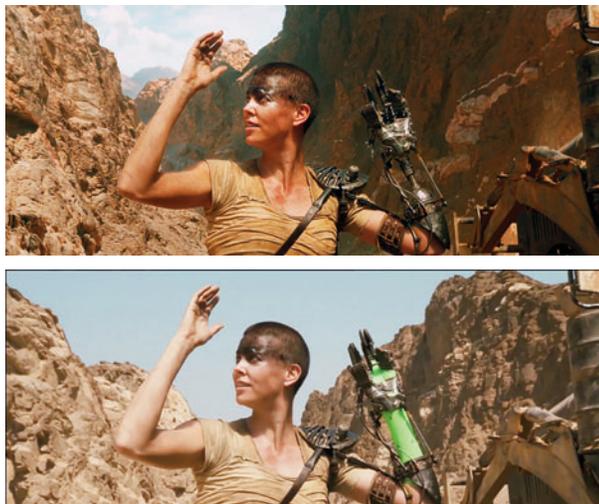
■ **Figure 14-38** Shooting on SD video, one of the most unforgiving formats ever, did not deter Ellen Kuras from devising a complex, effective, and stunning visual strategy, creating three distinct color palettes for the three characters in Miller's *Personal Velocity*.



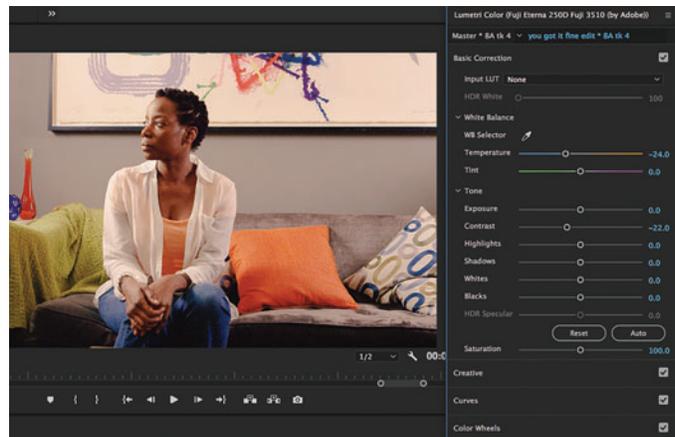
■ **Figure 19-5** This NLE preview window (left) shows the original Log footage clip and the sequence window (right) shows the same clip from the sequence timeline after a built-in LUT has been applied.



■ **Figure 19-12** Duncan Jones used a simple green screen effect in *Source Code* to create a moving background for a stationary train set built on a sound stage.



■ **Figure 19-13** In Miller's *Mad Max: Fury Road*, Imperator Furiosa's left arm could be digitally removed in post thanks to the green screen sleeve worn over Theron's arm.¹



■ **Figure 24-1** The Basic Correction level in Premiere Pro's Lumetri Color panel. With slider controls for color temperatures, exposure correction, contrast, and highlights and shadow adjustment, this "basic" level is already a powerful color correction tool.

Lighting and Exposure: Beyond the Basics

Now that you are familiar with the fundamental concepts and techniques of exposure and lighting, we can turn our attention to slightly more intricate issues related to image control. In this chapter we look a little deeper at how a video sensor responds to light, and the various options that cameras offer for pushing the video signal beyond the limits of Rec. 709 standards. We'll also look at two advanced metering options commonly used on professional film sets. The information in this chapter might seem a bit intimidating at first, but honestly, there is nothing terribly complex here. The essential thing is to take this material off the page and get it into your hands and practice. It only takes a bit of hands-on experience with a camera, working and experimenting with these concepts, tools, and techniques, to get them firmly into your image control arsenal. So ... let's get started.

■ CONTRAST RANGE AND DYNAMIC RANGE

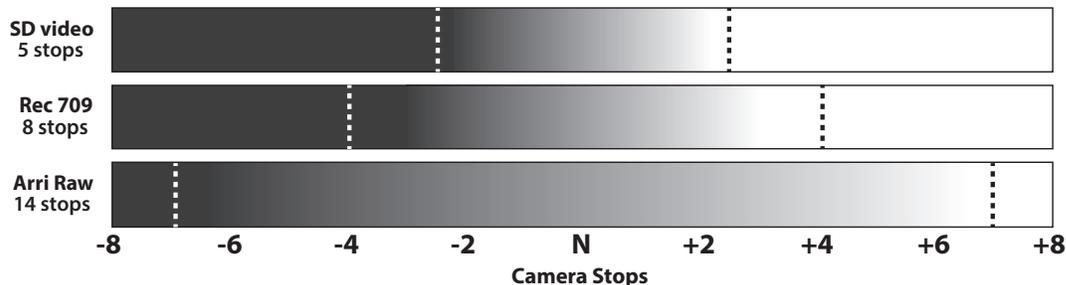
One of the most important questions we must consider when lighting and exposing our shots is: How much of any given scene can the video sensor actually see and how much can it render accurately? In considering this question, we're primarily thinking about the extreme ends of the video image—darkest blacks and brightest whites—and then the number of luminance values between those poles. There are two concepts that we must be familiar with in order to understand and answer this question: Contrast Range and Dynamic Range.

Contrast Range

Contrast range (also called **luminance range** or **brightness range**) is the difference between the brightest and the darkest significant areas of your scene. This range in brightness values can be very wide or quite narrow, depending on how the scene is lit ([Figure 14-1](#), and see figures on pages 269 and 271). Contrast range can be expressed



■ **Figure 14-1** In these shots from Godard's *Masculin/Féminin* (1966) we have examples of a wide contrast range (*left*), where the street outside the café is extremely bright compared to the darker areas inside, and narrow contrast range where there is very little variation between the tonalities throughout the kitchen (*right*).



■ **Figure 14-2** Dynamic range is the total range of luminance values a video sensor can render with detail before falling off into pure white or total black (represented by the dotted lines). SD video had a dynamic range around 5–6 stops (top). HD video Rec.709 improved that range to around 8 stops (center), and these days it's not uncommon to find sensors with 12–14 stops of dynamic range (bottom).

either in terms of a ratio or in terms of the f-stops difference between the two luminance extremes. For example, let's say that, through taking multiple light meter readings, a scene's lightest area is 16 times brighter than its darkest area. We can express this as a ratio of 16:1 or as a contrast range of 4 f-stops. Why 4 f-stops? Remember that each stop is a halving or doubling of brightness, so 4 stops from darkest to brightest is $2 \times 2 \times 2 \times 2 = 16$. It should be noted that 4 stops is a relatively narrow contrast range. In a complexly lit scene, it's not uncommon to have a contrast ratio of 256:1 (8-stop contrast range). And at locations where you're mixing bright sunlight with areas cast in dark shadows, it's not unusual to have a contrast range of 1,024:1 (10-stop difference between the brightest areas and darkest areas on the scene). Now the next central question concerns how much of this contrast range our video sensor can faithfully reproduce.

Dynamic Range

Broadly defined, **dynamic range** is the total range of luminance values, from dark to bright, your specific imaging device can render with some detail before falling off into complete overexposure (**clipped whites**) or complete underexposure (**crushed blacks**), where no image detail is visible. Dynamic range is expressed in terms of stops (i.e., the range of stops within which the imaging device will see detail). The first video camera I ever owned (years ago) was a standard definition (SD) camera that had a dynamic range of about 5 to 6 stops. The HD format standard (Rec. 709) has an increased dynamic range of around 8 stops, and today's digital cameras, using various gamma settings or uncompressed formats, boast dynamic ranges between 10 and 14 stops (Figure 14-2). In any case, it's not uncommon that the contrast range of a scene exceeds the exposure range of your imaging device, which means that visual detail will be lost in the brightest or darkest parts of your scene, or both, depending on where you place your exposure.

Shooting with Dynamic Range in Mind

When looking at a real situation, if your contrast range exceeds your camera's dynamic range, you will have to make choices about what is important to you in the scene. Do you care about the shadow detail, like the folds and texture of a dark garment, or the curls in someone's dark hair, or an object hidden in the shadows beneath a table? If so, you can open up your aperture to capture detail in the dark areas of the scene and let the highlights overexpose. If what is happening in the brighter parts of the image are important to you, like how the clouds look in the sky, or the details outside a window, then you can stop down and sacrifice the detail in the shadow areas. The image in Figure 14-3 is a common exterior situation with a very broad dynamic range. The challenge here is that the sky is very bright, and the street level is in dark shadows. Notice how the sky overexposes when we set our exposure for the signs in the shadows on the street level (left). But if we choose to get a good exposure for the building in the middle and reveal the clouds in the sky, notice how the street level is plunged into darkness and loses detail (right). The broader your camera's dynamic range, the more detail you will see in the darkest and brightest areas of the frame before they fall into pure black or pure white, giving you more exposure setting options.



■ **Figure 14-3** When the contrast range of a scene exceeds the dynamic range of the camera, exposures must be carefully chosen. The image on the *left* exposes the street level signs correctly, but the brighter areas (like the sky and the center building) become overexposed. The image on the *right* exposes the center building correctly, which plunges the street level into dark shadows with little detail.

Luckily, in narrative filmmaking we often have another option. If you have a situation where you can control light, you can use the tools and techniques of cinema lighting (as we explored in Chapter 13), in conjunction with aperture settings, to bring the extreme ends of the scene’s contrast range within the dynamic range of the camera without it looking too artificial; like adding light to boost exposures in shadow areas or gel windows to reduce the intensity of the sunlight outside. In the situation in **Figure 14-3**, we might try a graduated ND filter on the lens to reduce the brightness of the sky (see page 317). Also, it’s important to remember that even though your contrast range may not exceed your camera’s dynamic range, depending on where you set your f-stop, elements of the image can still fall into over or underexposure—as you will see in the example on page 342.

If you want to truly control your complete image, it’s important to know both the contrast range of the scene you are shooting and the specific dynamic range of your camera. Once you know this, you can use lighting to selectively place areas of your scene anywhere along the exposure range of the image sensor, or even beyond the dynamic range, to create the most visually and emotionally effective image possible.¹

in practice

■ DEALING WITH WIDE CONTRAST RANGE

Working with scenes that contain a contrast range that exceeds your camera’s dynamic range can be challenging, but it’s not uncommon. By now, having read Chapters 12 and 13, you should already have a sense for the tools that cinematographers use to control both lighting and exposure—but the most important tool we work with is our creativity. The vast majority of the time we don’t want significant areas of our frame to fall out of our camera’s dynamic range either into overexposure (clipping) or under-

exposure (crushed black), however, there are times when these extremes can create emotionally compelling and narratively powerful images.

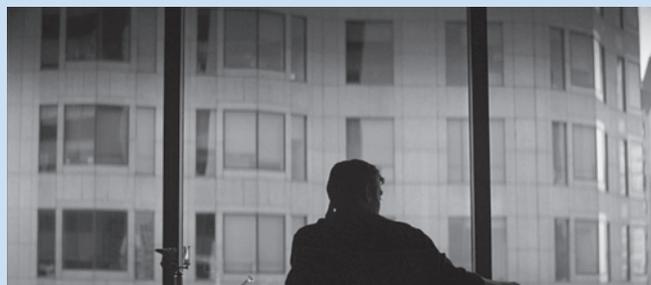
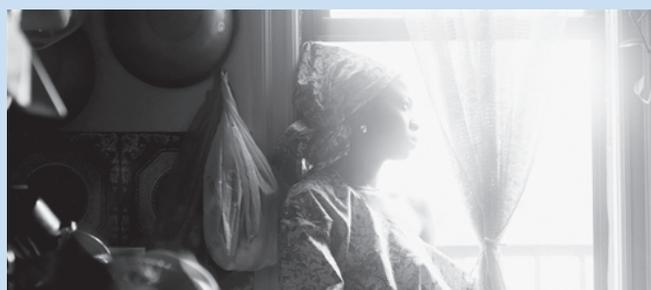
One of the most common extreme contrast range situations you’ll find yourself in involves shooting against windows; happens regularly. On a bright sunny day, the contrast range between a sunny exterior and the dark interior is often well beyond the dynamic range of the camera. **Figure 14-4** (*top*) shows a common way to deal with this challenge. In this scene from J.C. Chandor’s *Margin Call* (2011), D.P.



¹ Information on celluloid film stock latitude and exposure characteristics can be found on the *Voice & Vision* companion website under “Celluloid System” tab.

Frank DeMarco covered all of the windows visible in the shot with neutral density gel to bring the exterior exposure values down several stops (see page 313). Then he added some soft fill lighting to bring up the exposure values of the interior a few stops. Together, the gels and the fill pull the entire scene within the sensor's dynamic range. Now, we can see clear detail in the view over New York City and this gives us a sense of the elevated status of the executives at this powerful investment banking firm and it also reminds us of the huge scale of the impending financial crisis they are about to unleash on all those people down there. However, we can also see detail throughout the interior areas of the frame, like in the character's camera-side faces, the flowers, the table cloth, and the floor. Not only have interior and exterior exposure values been carefully manipulated to fit within the camera's dynamic range, but the selected exposure is between the two; the exterior is just a little overexposed and interior is just a little underexposed maintaining the completely natural look of two men who are backlit by a bright window. The vast majority of the time, this is how shooting against a window is handled—but it's not the only way.

One scene in Andrew Dosunmu's film *Mother of George* (2013) uses a slightly radical, yet visually evocative, solution to working with (actually embracing) extreme contrast range (Figure 14-4 middle). The central character, Andenike Balogun (Danai Gurira), faces a profound conflict; she is trapped between her desire to have a child, her inability to become pregnant, and the expectations of her Nigerian culture. Although it's unclear why she can't become pregnant, she faces enormous pressure and judgment from her mother-in-law, husband, and community. In this scene, her independent spirit breaks through and in a phone call with her mother-in-law, she loudly protests the assumption that it's always the woman's fault. After she hangs up, she opens the window in her kitchen and sits on the sill to think. The contrast range is extreme between interior and exterior spaces, but rather than evening them out with gels and lights, cinematographer Bradford Young simply exposed for the interior location (notice the visible detail of the kitchen walls and counters and her camera-side face) and allowed the window to blow out. The brightness of the window bathes Andenike in sunlight as she contemplates her predicament. She looks outside, but there is nothing there to see, literally and figuratively.



■ **Figure 14-4** Three ways to deal with bright windows in shots: In Chandor's *Margin Call* the windows were covered with ND gel and lights were added in the room (top). Dosunmu exposed for the kitchen, allowing the exterior to blow out in *Mother of George* (middle). In *Solaris*, Soderbergh exposed for the exterior, allowing the subject to become a silhouette (bottom).

She will find no answers there and the lack of connection to the outside further isolates Andenike in her little kitchen with her troubles. And yet, a bit of Andenike's strength and determination is also present in that radiant light that wraps around her.

Taking the exact opposite extreme is this shot from Steven Soderbergh's *Solaris* (2002) (Figure 14-4 bottom). Soderbergh (also the cinematographer) decided in this situation to expose for the exterior through the windows (notice how we can see exterior details with accuracy) and simply let Dr. Chris Kelvin (George Clooney) fall into deep underexposure, creating a featureless silhouette. This visual strategy perfectly reflects the deep emotional dependency of a man who is just getting through the routines of each day since his wife's suicide.

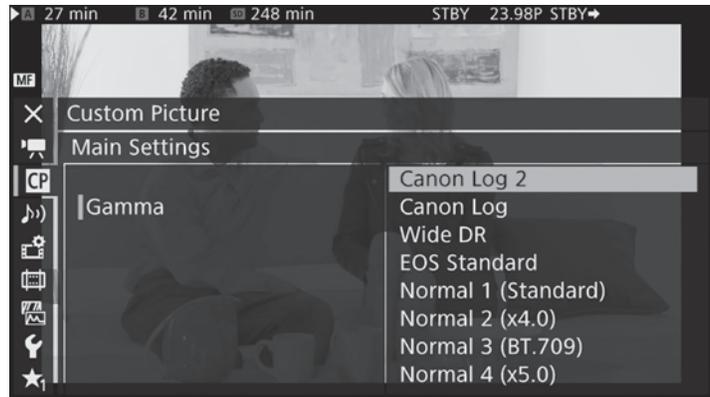
Multiple Dynamic Ranges

What is the actual dynamic range of a video sensor? It's a little more complicated than knowing the general sensitivity of the sensor to light, in fact, we should actually refer to a camera's dynamic range as a plural—dynamic ranges—because most cameras these days offer various picture settings that can extend that range (Figure 14-5). However, to truly understand our options we must first understand video gamma.

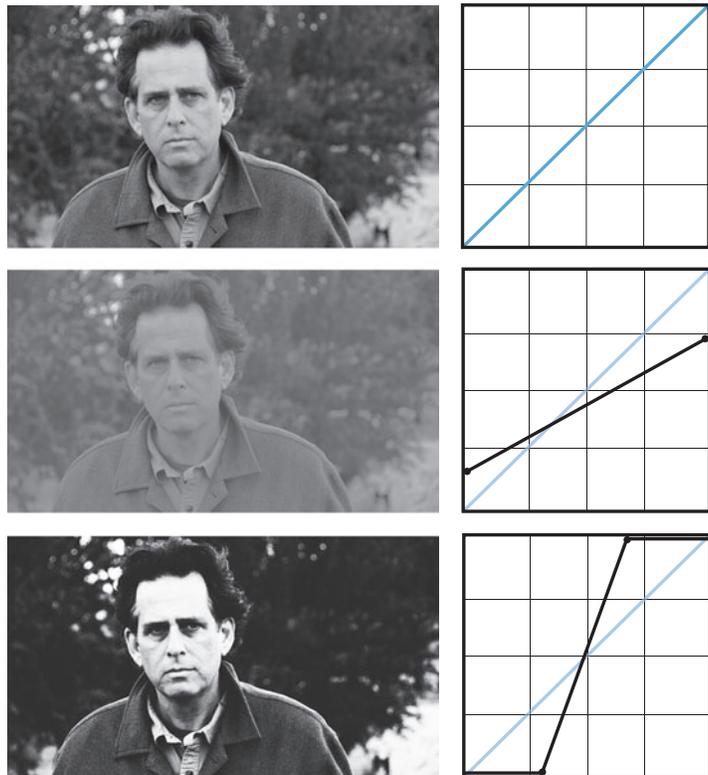
VIDEO GAMMA

Video gamma concerns the way a camera encodes luminance values and it helps define the camera's effective dynamic range. **Gamma** can be defined as the capacity of an imager to differentiate between the various luminance tonalities in a scene before falling off into pure white (no detail data) and pure black (no detail data). Gamma is represented by the familiar **gamma curve** graph. The first and simplest thing to understand about gamma curves is that the angle of the gamma curve represents image contrast. The steeper the angle, the harder the contrast, and the flatter the angle the less contrast you'll see (Figure 14-6). In theory, the ideal angle for a gamma curve would be a perfect 45°, meaning a perfectly proportional increase in contrast response to exposure. This would faithfully duplicate all of the subtle shifts in the gray scale; however, neither the human eye nor a video sensor quite works that way. Depending on the sensor and the shooting format, gamma curves are, well, curved here and there to represent how they will actually respond to luminance values in the scene. Importantly, a camera's gamma response is not entirely fixed, it can be manipulated to respond in various ways; altering the way the image looks in the black areas, the mid-tone areas, and the bright areas. This is why real gamma curves are never perfectly straight lines. Camera preset gammas are commonly modified specifically to extend dynamic range, allowing the sensor to see deeper into shadows and render details in bright highlights.

In many respects, the modifications made to a gamma curve represent the personality of that particular camera and that preset. For example, on some cameras Canon offers nine different gamma settings, and describes them like this: "Cine 1 softens the contrast in darker regions and emphasizes gradation changes in lighter regions," and "Cine 3 provides a stronger contrast between light and dark regions, and greater emphasis on black gradation changes," and so on. Obviously, it's not possible to discuss every permutation of gamma here, so this overview will examine common preset gamma curve types rather than all the possible curves you might encounter.



■ **Figure 14-5** Today's video cameras offer a number of picture profile options that can expand a sensor's dynamic range to a greater or lesser extent. Above is a screen grab from Canon USA's YouTube tutorial on the EOS 300 Mark II showing some of the Custom Picture gamma options. It's important to become familiar with (and test) the capabilities of each picture profile option.



■ **Figure 14-6** With the gamma curve graph from Premiere Pro's Lumetri color grading tool, we can see how changing gamma angle effects an image. A gamma angle of 45° represents a perfectly proportional increase in contrast response to exposure (*top*). Flattening the gamma curve angle reduces contrast (*center*) and a steeper angle emphasizes contrast (*bottom*). Cameras contain multiple built-in picture presets in which the sensor's gamma curve has been intricately tweaked to achieve a variety of looks.

Gamma Options

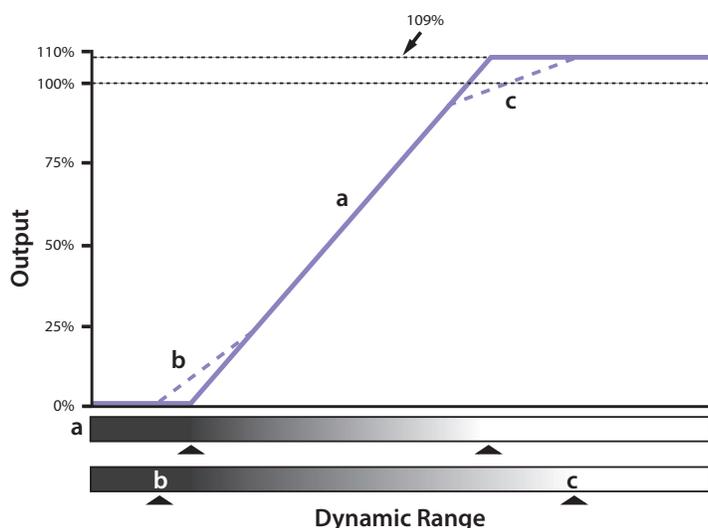
Most cine cameras offer a range of preset gamma options called **gamma profiles** (or **scene profiles**, or **picture profiles**, **picture styles**, or **look files**, etc.). Commonly available gamma profiles fall into three general categories, within which there can be various “levels” of a particular profile. The three main gamma profile categories are **Standard (Rec. 709 based)**, **Cine Gamma**, and **Log Gamma**. In general, Cine Gamma and Log Gamma increase your dynamic range (more f-stops to work with) and increase picture information. There are other proprietary profiles out there like **hypergamma** (Sony) and **Wide DR** (Canon) but again, you’ll need to explore the gamma options of your own particular camera.

Standard Gammas (Rec. 709 based)

The digital video standard color space is Rec. 709 (see page 194). The gamma response of Rec. 709 has a linear progression (input levels to output levels) which is why the curve



■ **Figure 14-7** Standard Rec. 709 is susceptible to severe and sudden clipping in very bright areas like windows and skin highlights. Frame from Mercado’s *Becoming* (2007).



■ **Figure 14-8** Rec. 709 clips hard as it reaches its dark and bright exposure limits (solid line a). But most standard picture profile settings include slight plus black gamma (b) and video knee compression (c) allowing for more visible detail in the dark and bright areas. This effectively extends dynamic range a stop or 2.

appears nearly straight. But Rec. 709 is rather notorious for three major shortcomings: the inability to see detail in shadows without video noise, a rather brutal tendency for clipping in the highlights, and a limited dynamic range (**Figure 14-7**). Technically, Rec. 709 should only have about 5 stops of dynamic range between black (0 IRE) and white (100 IRE)—that’s quite narrow. For these reasons, most camera manufacturers tweak the Rec. 709 curve for their **standard picture profile** presets (**Figure 14-8**). Principally, in order to soften the roll off into pure white somewhat, they add a knee. **Video knee** is a signal compression adjustment that attenuates extreme white levels starting around 90% white. This not only allows more detail to be visible as you approach total overexposure but it effectively adds an extra stop or 2 to your dynamic range. The precipitous drop off in the blacks is handled through a modification of the gamma curve’s black gamma (**Figure 14-9**). Increasing the **Black Gamma** levels (plus black gamma) will boost black levels, allowing the sensor to see somewhat more detail in the shadow areas of the shot (**Figure 14-10**). Conversely, decreasing Black Gamma (minus black gamma) causes blacks to crush more quickly, creating greater contrast (usually a modification best done in postproduction). Standard profile presets regularly boost black gamma just a little and this adds about a stop of useable dynamic range. Because of the knee and black gamma modifications, the Rec. 709 dynamic range of 5 stops has now become a dynamic range of approximately 7 or 8 stops in most standard HD preset modes.² If 2 stops seems like no big deal, keep in mind that 5 stops can resolve a 62:1 contrast range while 7 stops can resolve a 128:1 contrast range—that’s a significant difference.

² One can also manually modify video knee and black gamma levels, but this should be left to experienced video engineers. The rest of us should stick to the standard presets, and then tweak in postproduction if necessary.



■ **Figure 14-9** Video knee compression can extend the seeing range of the sensor into the brightest areas of the scene. Note how more detail is visible outside the window after video knee is engaged (*right*).
 Go to the companion website to see this figure in high res.

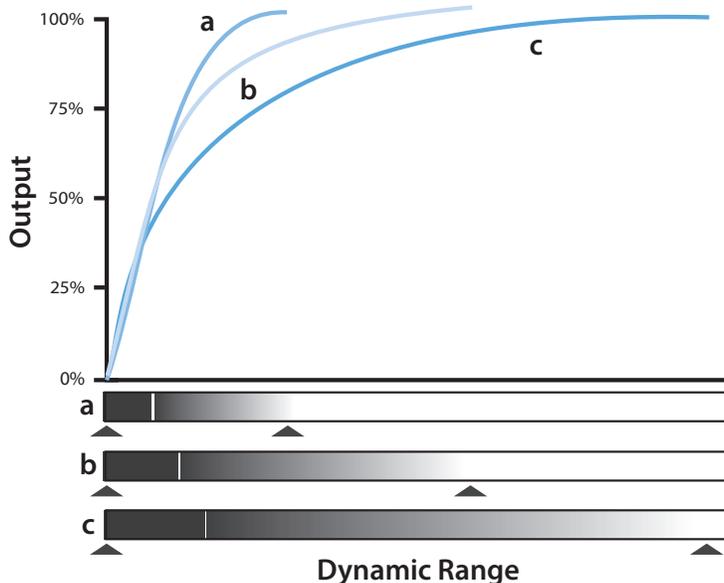


■ **Figure 14-10** Plus black gamma can boost the darkest areas of a scene, pulling more detail out of the shadows, practically creating an artificial toe; note how, after the black stretch option is engaged, some detail can be seen inside the arch (*right*).
 Go to the companion website to see this figure in high res.

Many people refer to HD standard presets (based on Rec. 709) as WYSIWYG formats, meaning that what you see is what you get. With all standard gamma presets the footage is useable right out of the camera, so you can go from camera to display instantly and seamlessly.

Cine Gamma

Cine Gamma (a.k.a. Cine Styles, Film Rec) is a very common preset gamma modification on digital cameras. Cine Gammas attempt to replicate a more “filmic” look by flattening nearly half the straight-line portion of the gamma curve introducing a long roll off to the highlight areas before clipping occurs (**Figure 14-11**). This accomplishes two things simultaneously: it extends the dynamic range of the camera to 9 or 10 stops (!) and it also reduces the contrast of the image, thus ameliorating that “crispy” electronic look that some people associate with Rec. 709. With Cine Gamma, you’ll see detail somewhat deeper into the shadows and significantly more in the highlights. The drawback of this setting is that, depending on the level of the effect, the overall reduced contrast of the image can create washed out mid-tones and colors. For this reason, many people suggest that you should only shoot high levels of Cine Gamma if you plan to do color grading in post-production. In this circumstance, Cine Gamma is great because you have more visual information in the blacks and whites to work with, and you can also tweak the mid-tones



■ **Figure 14-11** Comparing the generic gamma curves for Rec. 709 (a), Cine Gamma (b), and Log Gamma (c) reveals how by flattening the contrast of the image, the dynamic range of the sensor is extended. This gives you more latitude when shooting, but it also requires color grading.



■ **Figure 14-12** A LUT is a small piece of color correction code that, when applied to Log footage, reverses the flat gamma. There are a wide variety of LUTs available in your NLE, and each will give your footage a different visual look. Pictured here are the Fuji Eterna 50D and Lumetri Cinescape LUTs applied to the same S-Log footage. Notice the different color and contrast qualities each brings to the image. See the color insert.

in postproduction to precisely where you'd like them because there is plenty of video information to work with. So, depending on the level of Cine Gamma you employ, this can be a WYSIWYG format, or it may require some degree of color grading to realize its full visual capacity.

Log Gamma

Log Gamma (logarithmic encoded gamma) is an extreme flattening of the gamma curve—which is why people refer to Log format as “shooting flat” (see Fig. 14-11). Rec. 709 gamma reflects the linear output of a sensor (input levels to output levels); however, because of the limits of the Rec. 709 color space, the full response of a sensor is never fully utilized. Log Gamma attempts to change this situation by using a logarithmic sampling of video data. On page 217, I stated that Log Gamma is designed to record as *much of the available color and luminance response of the sensor as possible*, recording much more detail in the brightest and darkest areas of the scene. Because of this, Log Gamma produces an extremely broad dynamic range—up to 12 or 13 stops! However, what you should also notice from the extreme compression of the gamma curve is that Log Gamma actually records footage that is very flat, gray, and dull, which is why it's referred to as a “flat color profile.”

The benefit to Log Gamma is that while it looks flat, it actually contains much more color and brightness data than Rec 709. This translates into greater visual latitude, flexibility, and creative opportunity when color grading in postproduction, allowing a filmmaker to dial in very precise looks (exposure, contrast, color hue, saturation, and so on). But to get all that visual data, it flattens all values within a very limited luminance range. In fact, you cannot display or edit this footage as-is. And unless you're a fairly experienced cinematographer, it's difficult to directly monitor Log footage for critical lighting and exposure considerations. Log is definitely *not* a WYSIWYG format; it is a “shoot for post” format. To realize the full visual potential of the footage, the Log workflow requires either extensive postproduction color grading, or the application of a small piece of software called a LUT. A **LUT** (short for Look-Up Table) is simply a collection of customized color calibration instructions that reverse the Log Gamma modifications, so that you can see a more accurate representation of the image (Figure 14-12). LUTs can be used in postproduction (see page 573) and they are also routinely used during production (see “Viewing LUTs for Log Shooting” box).



On the *Voice & Vision* companion website you can see a variety of LUTs applied to the same Log footage to create different looks.

Dynamic Range versus Useable Dynamic Range

We already know that dynamic range is the total range of brightness values that a sensor can resolve *with some detail* before falling into total overexposure (clipped whites) or pure overexposure (crushed black). But that doesn't necessarily mean that the extreme ends of this range yield useable images. The bright end after the knee and the dark end around the plus-black stretch do contain *some* detail to help taper the effects of clipping and crushing, but they do not contain complete image data and detail, and the shadow range especially can also contain video noise (see **Figs 14-9** and **14-10**). It's good to know not just the total dynamic range of your camera, but the useable dynamic range as well. The **useable dynamic range**, which is often called **latitude**, is the range of stops where you can expose an image and still get complete, useable detail (not partial detail as the sensor approaches clipping or crushing). Obviously, latitude is always slightly narrower than dynamic range, but it's different from camera to camera; some can see deeper into blacks, while others provide more details in the highlights. In any case, because a sensor's latitude will yield acceptable results anywhere within that range, it also determines the degree to which you can underexpose or overexpose and still get satisfactory results. By "satisfactory results" I mean that an acceptable image (not partial detail) can be realized when color grading in postproduction (bringing overexposed images back down, or making underexposed images brighter).

This leads us to the idea of **exposure latitude**, which is a combination of the sensor's inherent latitude and the contrast range in the scene. For example, let's say your sensor latitude is 8 stops and you are shooting an image with a super narrow contrast range of 1 stop (say a middle gray card taped to a middle gray wall), you can underexpose that shot 4 stops or overexpose 4 stops (each side of normal) and you will be able to "fix" the exposure error in postproduction. In this case you have an exposure latitude of 8 stops. But if you are shooting a scene with a wider contrast range of 6 stops (say a couple under the shade of a gazebo on a bright day), then you will only have 2 stops of exposure latitude (1 stop under and 1 stop over) before you exceed the ability of the sensor to render image detail. Finally, let's say you are shooting a scene with a contrast range of 12 stops (say inside a dark room with a window overlooking sunny hills). Since this exceeds even the sensor's dynamic range, you have no exposure latitude because no matter what you do you will lose detail in either the highlights (clipped window) or the shadows (crushed blacks in the corners of the room). Of course in this situation you may opt to use lighting techniques to tame the brightness range of the scene so that it fits within your dynamic range (e.g., add light to the interior space and/or use ND gel over the window) as we saw in the *Margin Call* example on page 328.



VIEWING LUTS FOR LOG SHOOTING

The common Log format workflow often involves the use of **LUTs (Look-Up Table)**. LUTs are pieces of software code that modify the color profile (luminance, color, and gamma values) in a video image to create a specific look. LUTs are often used in the postproduction color grading process (see page 573) but in the context of production, we often apply a **viewing LUT** to our flat Log camera output so that we can more easily evaluate lighting, exposures, color, composition, and scene details. A viewing LUT only temporarily changes the color profile of the image for

viewing purposes, without altering the original, flat Log file recording in any way. In other words, LUT settings are not "baked in" to the recorded footage, they are simply applied to help you monitor your setups. LUTs can be loaded into your camera or into your field monitor (if your monitor offers this option).

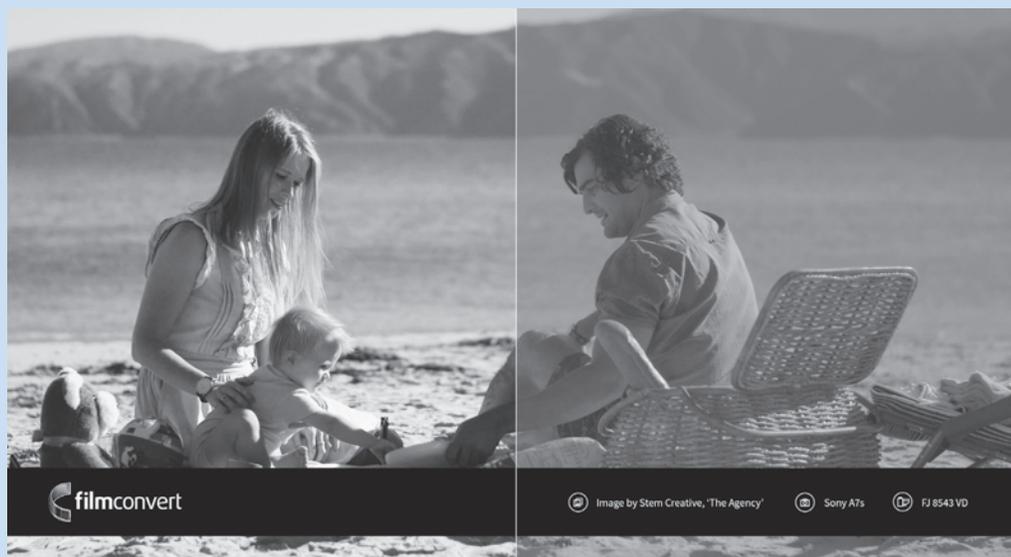
So, where do LUTs come from? There are many options these days. Most camera manufacturers offer simple **Preset LUTs** either built into a LUT menu, or that can be downloaded from their websites and loaded into the camera. These are free, but depending on your camera they can be fairly utilitarian, designed to convert Log footage to the legal

Besides recording a flat, gray image, there are a few tricky aspects to keep in mind with Log Gamma. The first is that Log formats are highly proprietary; every camera manufacturer has their own version with their own particular encoding method: C-Log (Canon), S-Log (Sony), V-Log (Panasonic). They are different enough that you should not assume similar response—do tests. Another tricky issue, related to this, is that the expansion of the dynamic range is not symmetrical, meaning that those extra stops are not distributed evenly between the dark areas and bright areas (and this is also different from camera maker to camera maker). Remember from Chapter 12 how important middle gray was for our exposures, and how, with Rec. 709, we placed it at 50% on the waveform monitor (WFM)? Well, each different proprietary Log format flattens the gamma curve slightly differently which therefore places the luminance value for middle gray at a different IRE on the waveform (generally somewhere between 32% and 40%). Luckily camera manuals provide a recommended middle gray value for their specific camera. Finally, more than a few cinematographers claim that Log Gamma is not optimal for shooting in low-light situations, where you have limited dynamic range anyway. The argument has to do with the amount of image data necessary for a 12 stop dynamic range vs. a 7 stop Rec. 709 dynamic range and conserving all your visual data within the narrow contrast range of the scene (say 5 to 7 stops), rather than spreading it out over an unnecessarily broad sensor response. If you anticipate shooting a scene in a low-light location, run some tests beforehand in both Log and Standard Gamma to see what works best for your film.

in practice

Rec. 709 color space with a bit of aesthetic tweaking involved. **Monitor LUTs** are similar, but they can be a bit more creative with looks. **Creative LUTs**, like those from FilmConvert or other commercial LUT websites, can be downloaded from a website (usually for a price) and loaded into the camera or monitor (**Figure 14-13**). There are many looks you can choose from, the most popular will emulate specific film stocks, and these LUTs are designed to work with specific camera profiles; you'll even see LUTs designed by guest cinematographers. Creative LUTs are fun, but they are only useful if you know, going into production, that your final look will be somewhat based on that LUT. It doesn't help to make creative decisions

in the field based on a visual look that won't follow the footage into postproduction. Finally, you can create your own **custom LUT** by color grading some test footage (in your NLE or DaVinci Resolve), saving your color grade settings as a LUT, and then exporting them via SD card. This method is especially advantageous because you can be assured that the LUT you're using to view footage in the field will be close to the look you'll be dialing in during postproduction color grading. Designing custom LUTs in preproduction is a common workflow step on professional shoots, and it involves the collaboration of the D.P., the Colorist, and the Digital Imaging Technician (see "The DIT" box later).



■ **Figure 14-13** Built-in camera or monitor LUTs are usually very basic video looks. But you can download creative LUTs from commercial websites and load them into your camera or monitor. Pictured is Filmconvert's Fuji Eterna Vivid 8543 film stock emulation LUT (*left*) applied to Log footage (*right*). See the color insert.

■ ADVANCED EXPOSURE TOOLS

In Chapter 12 we explored two quick methods for finding exposures using your camera's built-in, through-the-lens (TTL) reflected meter. While these methods work fine, they are not necessarily the best or most precise option for narrative filmmaking which values total control of the exposures across the entire frame. One huge shortcoming with those methods is that they rely on the camera zooming and panning around to find exposure and then re-framing the shot for the final composition. Well, if you have to do this multiple times while you adjust the lights and blocking in your scene it can be a real pain in the tuchas. It's far preferable to simply establish your composition and start lighting and metering without moving the camera at all, and this is one of the primary reasons that professional D.P.s usually do not use the built-in camera meter. Instead, it is common to keep the camera in manual mode and use a handheld light meter and/or a WFM to determine exposures. I've included these two tools here in "Advanced Exposures" not because they are all that difficult to use—in fact the mobility of a handheld incident meter makes it simpler in many ways—but because many schools do not include light meters or WFMs in the equipment packages for introductory courses.

The basic metering sequence for both light meters and WFMs is the same as we discussed on page 302:

1. Take initial readings off the key light to establish both the key light setup and the first f-stop setting.
2. Add fill light, paying attention to the desired lighting ratios, and make f-stop adjustments based on key-plus-fill meter readings.
3. Set the final f-stop, in effect pegging the exposure.
4. Add all other lighting sources and evaluate luminance values relative to that setting.

Handheld Light Meters

The Incident Light Meter

The **incident light meter** is the most common and versatile meter used in film production (Figure 14-14). It measures the intensity of light falling on a scene and calculates a "correct" aperture setting taking into account all the exposure variables (see "Setting Up a Light Meter" later). This meter is simple to use and gives a consistent reading from shot to shot. All incident meters have a half-globe light diffuser, called a **photosphere** (also called a **lumisphere**), which fits over the **photosensitive cell**. When the photosphere is *held at the subject and pointed toward the camera*, it gathers the light falling on the subject from the front and sides and averages out these light intensities to arrive at an overall incident light intensity reading (Figure 14-15). The final exposure calculation of an incident light meter is determined specifically for the middle gray tone. In other words, the suggested aperture ensures that, given the intensity of the light falling on the subject, objects with a luminance value of 18% (middle gray) will be exposed correctly (i.e., will be rendered exactly as middle gray by the sensor). It then follows that objects that are lighter and darker (more or less reflective) will appear exactly as they should relative to the middle gray tone, thus duplicating the actual range of brightness values in the scene.

For example, in the case of our laundry photo (see Fig. 12-2 top), everything is equally lit by the same source, so a single incident meter reading (taken at the laundry line, with lumisphere pointed at the camera) assures that middle gray will be exposed correctly and, therefore, all of the tones for each article of clothing (white pants, black towel, and gray shirt) will be rendered correctly as well, despite the fact that there is nothing in the shot that is actually middle gray. It is often



■ **Figure 14-14** The most common handheld meter for film production is the incident meter, like this affordable Sekonic L-308DC which is designed for use with video cameras (left). A spot meter is a reflected light meter and can be useful for measuring exposure values from a distance or for objects that emit light. Shown here is a Sekonic combination incident/spot meter (right).



■ **Figure 14-15** An incident light meter should be positioned at the subject with the photosphere pointing toward the lens of the camera.

said that incident meters have middle gray “built in,” which means, unlike a camera’s reflected light meter, we don’t literally need a middle gray tone in the scene for the meter to make the proper calculation. And this guarantees uniformity from reading to reading.

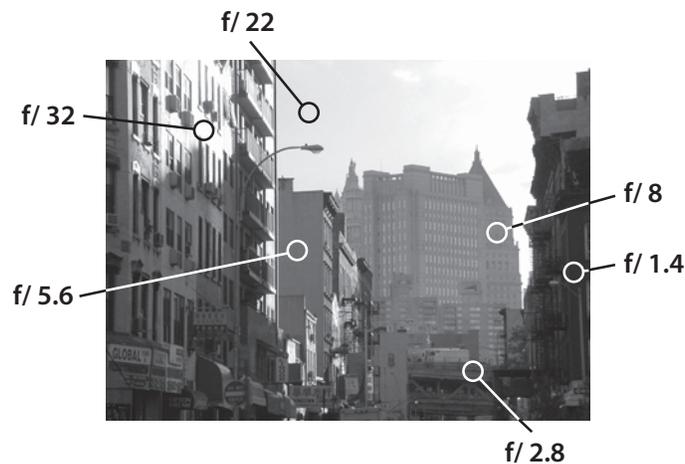
The mobility of a handheld meter is especially handy when there is more than one light level to meter, like in **Fig. 12-11**. Rather than using the camera to zoom in and meter different areas, you can leave the composition in place and simply take the handheld meter to each area and take your readings; one for the sunny side (pointing the lumisphere toward the camera) and another for the shadow side (also pointing the lumisphere toward the camera) and compare the two results to make your final exposure decision. Even with the shot from *No Country for Old Men* in **Fig. 12-12 bottom** you can easily use a handheld incident meter to measure the incident light of the sun falling on the desert, and then take a second

reading for the light intensity under the brim of the Sheriff’s hat, and decide where you want to set your f-stop. It’s easy to make three, four, or however many readings you need to get a sense for the light values throughout your scene.

Similarly, incident meters are valuable for determining lighting ratios—you can take a key-plus-fill reading and compare it to the key light only reading without touching the camera (see pages 303–304). In fact, you can measure lighting ratios and exposures without a camera involved at all, for example in situations where you’re pre-lighting a scene at the following location or while location scouting. Cinematographers also love handheld incident meters in situations where perfectly even light intensity throughout a scene is critical, like lighting a green screen surface. You can hold the metering button down, keeping the meter active, and meter through the entire scene looking for incident light dips or spikes.

The Spot Meter

We already looked at the spot meter function available on some digital cameras on page 278; a handheld **spot meter** is very similar, but a bit more precise. Like the built-in camera variety, handheld spot meters are reflected light meters with a very narrow angle of acceptance, usually around 1° (see **Fig. 14-14**). A spot meter can pinpoint a small area from a distance. This is useful in measuring a variety of areas to determine the different light reflectance values of various objects in a single scene. It also allows us to take meter readings of areas that are not easily accessible. For example, we can take multiple readings of a city skyline, where some buildings are lit by bright sunlight and others fall into the shadows, from one location on the sidewalk, and get a very accurate assessment of the relative exposure values of each area in the shot (**Figure 14-16**). Spot meters are also useful when a detail within the scene itself emits light, like a computer monitor or a neon sign.



■ **Figure 14-16** Taking readings from subjects far away from the camera is an easy task with a spot meter, but the readings have to be interpreted before setting the f-stop. Setting the aperture for the sky at f/22, for instance, will darken it to middle gray and underexpose everything else. Can you tell what f-stop was chosen to record this image?

Being a reflected light meter, however, a spot meter reading needs to be interpreted because it calculates an f-stop setting to render the metered area middle gray (see box “Reflected Light Meter Limitations” on

page 277). However, unlike an averaging reflected meter that calculates from a broader range of scene reflectance values, the precision of the spot meter makes interpretation mandatory.



For more detail on how to use handheld spot meters please look under the “Celluloid System” tab on the *Voice & Vision* website and check out both the *Spot Meter* and the *Zone System* sections.

Setting Up a Light Meter

To be an effective tool, the light meter must first be set up to match the exact same exposure variables that the camera is using to record the image (see page 272) and then the light meter must be tested against the camera to ensure total accuracy between the two devices.

The setup includes manually entering:

1. ISO (the same ISO that the camera is set to, usually the native ISO)
2. Frame rate (usually 24p fps for narrative production)
3. Shutter speed (usually 1/50th for narrative productions)
4. Shutter angle (usually 180° for narrative productions)

Next, you should always cross-check the meter against the camera to ensure accuracy. Most of the time you will be fine, but occasionally there is an issue where a camera ISO rating isn't exactly the same sensitivity as the light meter's ISO rating and if this is the case, it must be adjusted.

Testing the light meter against the camera:

Make sure all the exposure variables are identical between the light meter and camera (and that the camera has been white balanced and has no filters):

1. Light a middle gray card with flat light and set the camera about 6 feet away (if you're outside, you can do this in a diffused, shade area).
2. Fill the frame with the gray card, engage the auto-exposure button, let the camera choose its f-stop, and then put it back into manual exposure to lock the f-stop in place (you can also use a WFM and manually adjust the aperture until middle gray is at 50% for Rec. 709, or 38% for Log).
3. It's best if you can adjust the light itself so that the camera gives you a whole f-stop (like f/5.6 or f/8). It just makes this easier.
4. Note the f-stop the camera gives you for a correct middle gray exposure.
5. Place your incident meter in front of the gray card and take an incident reading (for spot meters take a reflected reading off the gray card).
6. You should get the same f-stop on your light meter as on the camera. If you do, then you're all set and you can use the handheld light meter in lieu of the camera meter.
7. If you do not get the same f-stop reading, take note of the exact difference between camera and light meter (it's often just a fraction of a stop). You must compensate for this difference on the light meter.
8. Offset the meter's ISO (more or less sensitive as needed) until the f-stops match (effectively matching the meter to *true* sensitivity of the sensor). As you tweak the ISO, you should see the f-stop changing. You've arrived at the proper ISO offset when the f-stops match.³

Once your meter and your camera are matched, you're ready to use the meter throughout your production.

³ Some meters offer a built in auto offset (or compensation) function where you can simply enter the exposure difference (e.g., + or - 1/3 stop) and all subsequent readings will reflect that offset.

■ THE MEASURE OF LIGHT

Unless we are quite advanced in our cinematography science, we don't commonly use the actual scale units that measure incident and reflected light in our exposure decisions—light meters take care of this calculation work for us and present us with simple f-stop options. Still, it's helpful to know the scale of measure by which light is quantified because you will come across these terms from time to time—and you will definitely use them if your creative path leads you toward the camera department.

The unit of measure for *incident light* in the United States is footcandles. One **footcandle** is equal to the light generated by an “international standard candle” 1 foot away from the center of the flame. Yeah, okay.

If this reference point sounds a bit, well, arbitrary, just remember that the inch was derived from the width of someone's “average” thumb. Metric countries use a different illumination scale; the light unit of measure in the SI system is **lux**, and one lux equals 0.093 footcandles (or you could say 1 footcandle = 10.76 lux). The unit of measure for *reflected light* in the United States is **footlamberts** and in metric countries it is **candela/meter²** (1 footlambert = 3.426 candela/meter²). Of all of these, the most common you will likely see or use are footcandles, which can be useful when measuring the light output of individual lights to determine lighting ratios (see page 302) and lux, which you'll see in camera specifications for assessing the light sensitivity of sensors. So there you go . . . FYI.

The Waveform Monitor

You have already been introduced to the waveform monitor and its basic functions in Chapter 12 (starting on page 281). This discussion builds on that section to explore specifically how we use a WFM to determine scene exposures. If you have not read the WFM introduction, please do so before continuing here. If you read the introduction carefully, you should already have some idea for how the WFM can be not only a powerful exposure tool, but maybe the only tool you need.

The remarkable thing about a WFM is that it is a real-time, complete evaluation of all the luminance values in your shot as seen by the sensor itself. No multiple readings are necessary because *every* exposure value is displayed right on the monitor screen all the time. While you light your scene and adjust your aperture, you can actually see at a glance the shifting exposure values of your entire frame. A field monitor is, of course, an essential evaluation tool to have on the set, but it's not nearly as precise as a WFM which will show you immediately and definitively when your whites clip, when your blacks crush, and when you have the proper f-stop to render middle gray accurately. And this is how many people use the WFM as an exposure tool. Conveniently, many field monitors come with a WFM function built in as well (**Figure 14-17**). Here is one simple step-by-step method, but, of



■ **Figure 14-17** The waveform monitor is an important exposure tool on a set. Many external field monitors come with a built-in WFM function, like this Atomos, that can display an image, or the waveform, or even overlay the waveform onto the image as seen here. Notice the bare light bulb clip above 100 IRE (*top arrow*) and the middle gray card expose at 50 IRE (*bottom arrow*).

course, the WFM only becomes more flexible and useful as you become more sophisticated and experienced with it:

1. Make sure your camera is setup properly (gamma, native ISO, frame rate, shutter speed, shutter angle) and white balanced. Keep the camera on manual exposure (manual iris).
2. Frame your shot and do a rough lighting setup with key and fill lights.
3. Put your external field monitor in waveform mode (or hook up a stand-alone WFM).
4. Place a middle gray card in the area you want to expose correctly. This is usually the key light at your subject, but not always. Make sure the gray card is flat to the camera and not angled up or down or side to side.
5. You should see the gray card in the waveform, but if it's difficult to locate, move it around and you'll see the movement on the scope.
6. Adjust your aperture to expose middle gray correctly:
 - Rec. 709 Gammas (or using viewing LUTs)*: bring middle gray card to 50 IRE.
 - Log Gamma and monitoring Log*: bring middle gray to around 35–40 IRE (see camera Log Gamma specs for exact middle gray value).
7. Check whites and blacks on waveform:
 - Rec. 709 Gammas (or using viewing LUTs)*: whites should fall between 85 IRE and 100 IRE (and no higher) and blacks between 10 and 0 IRE (and no lower).
 - Log Gamma and monitoring Log*: bright whites should fall between 60 and 65 IRE (and no higher) and dark blacks between 12 and 7 IRE (and no lower) (see camera Log Gamma specs for exact white and black values).
8. Now, you have your exposure and you can see where all the other luminance values in the scene fall on your waveform. From here you can selectively add or subtract light anywhere in the scene as necessary. Switching back and forth between the HD field monitor and the WFM as you “paint with light.”

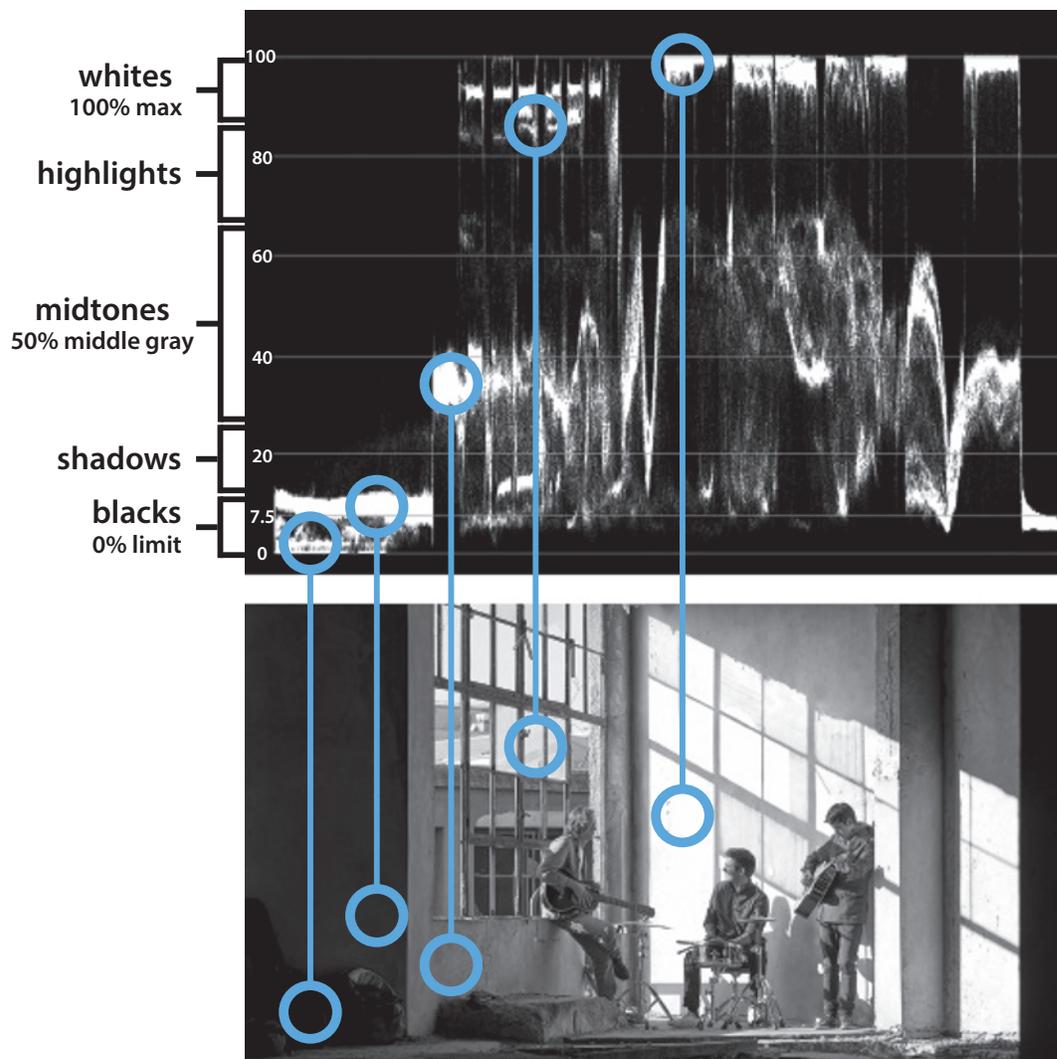
The display of luminance values on a waveform can seem at first to be rather abstract, but with some practice you'll start to notice exactly where all the brightness values in a scene are falling on the scale. Beyond just the parameters for white, black, and middle gray, it's helpful to break down the IRE scale into approximate luminance “zones” (Figure 14-18).

	REC. 709 IRE Values
Pure white (no detail)	100%
Highlights (whites with detail)	70–100% (80–95%)
Mid-tones	35–70%
Shadows	10–35%
Blacks with detail	5–10%
Pure black (no detail)	0%

Additional WFM Considerations

An image waveform is a fairly complex display, and while many cameras have the ability to overlay a tiny waveform on the little LCD screen, that's really too small for you to make any sort of accurate reading or interpretation. Much better is to use a large HD field monitor that can toggle between image and WFM modes. Better still is to have two displays on the set, one for your image and another exclusively for the WFM.

The IRE parameters I mentioned earlier are for legal video, but keep in mind that it's not uncommon to have very bright details in your frame that naturally clip above 100%, like a bare light bulb in the scene, or a super bright window that you want to blow out. Occasionally an intentionally clipped white detail can be fine; it can even be an aesthetic element to the shot (see Fig. 14-4). But keep in mind that a clipped white area has utterly



■ **Figure 14-18** Beyond knowing the parameters for white, black, and middle gray, it's helpful to break down the IRE scale into broader luminance “zones,” like highlights (with detail), mid-tone range, and shadows (with detail).

no visual data except “pure white.” You cannot pull image detail out of it later in postproduction color grading—there is simply nothing there.

When shooting Log Gamma you have a choice of monitoring the flat Log image directly or monitoring with a viewing LUT. It takes quite a bit of experience to actually make exposure decisions based on the flat gamma profile as it appears in either a picture monitor or a WFM. I recommend using a Rec. 709 based viewing LUT when exposing Log footage (using standard gamma IRE values). However, I also recommend toggling to the actual Log output just as a comparison and to get your eye used to looking at and exposing the flat profile. As you become more familiar with how luminance range appears in Log format, you'll eventually gain enough experience that you won't necessarily need a viewing LUT in the field. However, always remember that each proprietary Log format (C-Log, S-Log, V-Log, etc.) will have a unique set of luminance values for white, middle gray, and black, but generically speaking, the **Log Gamma IRE values are: White \approx 63%; Mid Gray \approx 35%; Blk. \approx 7%.**

Putting Dynamic Range, Exposures, and Lighting to Work

Now that we know what contrast range and dynamic range are, and we know how to meter our scene for its various luminance values, how do we use this exposure information,

The DIT

The newest addition to the camera department creative team is the **Digital Imaging Technician (DIT)**. The DIT works closely with the D.P. and is responsible for the on-set digital workflow, sound and video file management (data wrangling), and supervising image quality and consistency during a shoot (**Figure 14-19**). The DIT's job includes constant image and exposure evaluation with picture and WFMs and all other video scopes (vectorscope, RGB Parade, etc.). DITs are also responsible for applying LUTs for viewing and producing dailies. Sometimes, they may collaborate with the D.P. and the colorist to develop LUTs that will follow the footage from production (viewing) into postproduction (grading). Where LUTs are not used, a DIT will have color correction software (like DaVinci Resolve or Adobe Speed grade) to apply quick color grading on sample clips to determine the full visual capacity of each lighting



■ **Figure 14-19** The DIT is responsible for the on-set digital workflow, sound and video file management, and supervising image quality and consistency during a shoot. Pictured is DIT Alan Gitlin at his workstation with D.P. John Inwood on the set of *American Woman* (2017).

setup. The workflow and color grading aspects of the DIT's job are critical on projects that are shooting in RAW or Log formats.

along with lighting techniques, to create the image we're seeking? Let's work step-by-step on an interior scene that contains a range of brightness intensities that challenges our camera's dynamic range.

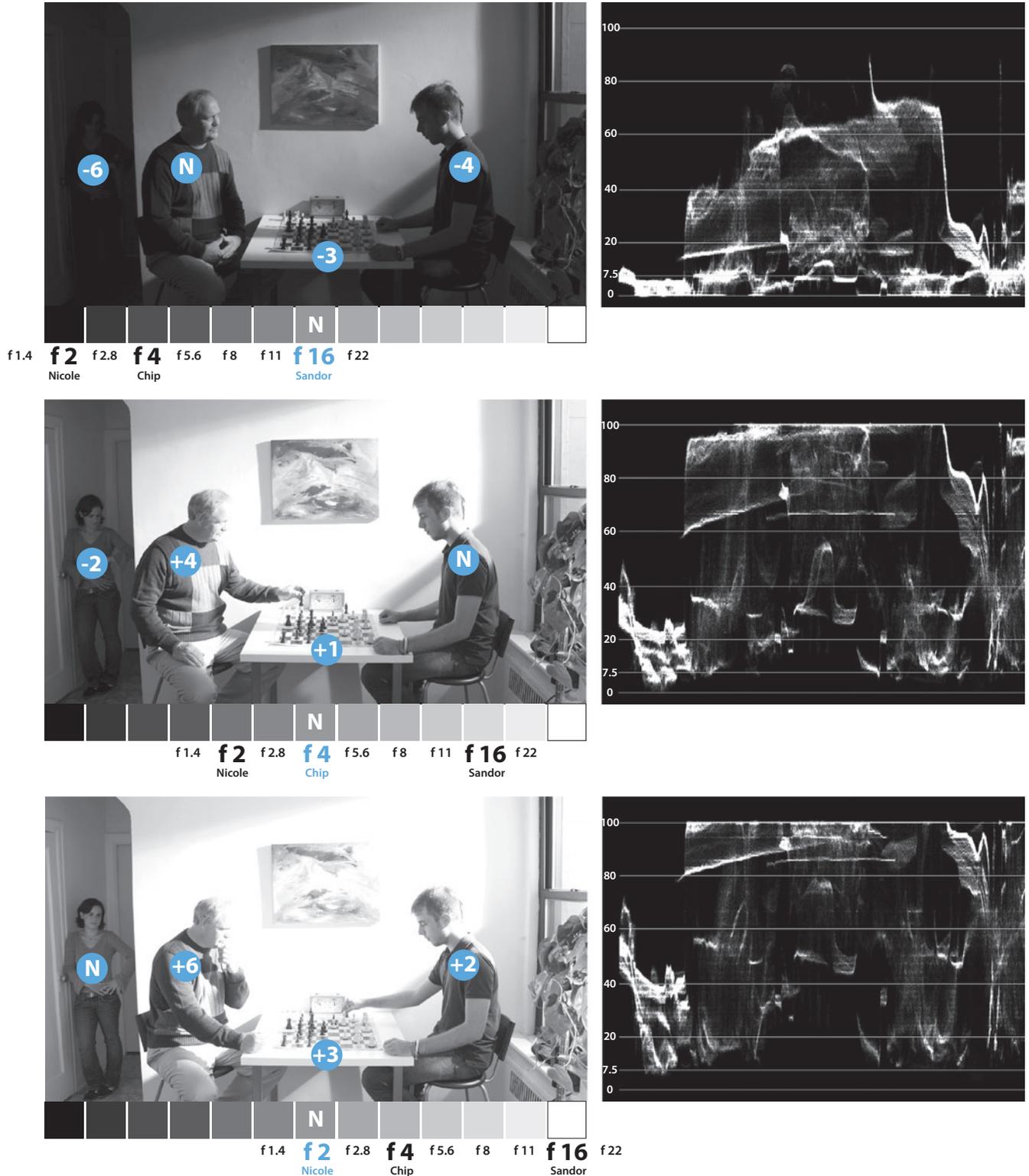
To begin, we are shooting with a Cine Gamma that has a published dynamic range of 10 stops. Typically the 2 stops at either extreme offer only partial detail, so our useable dynamic range is about 8½ stops (see "Dynamic Range versus Useable Dynamic Range," page 333). We will be use a combination of a handheld incident meter and a WFM to determine exposures (the camera will remain in manual exposure mode throughout).

There are five basic steps to lighting a scene after the director and D.P. have established the framing and composition. It doesn't always go exactly in this order, but it's usually pretty close: (1) consider the narrative, emotional, and stylistic context of the scene you're lighting; (2) rough-in the essential lights (usually key and fill); (3) measure exposure values throughout the frame (special attention to scene focal points, highlights, and blacks); (4) establish "normal" exposure for the scene; (5) complete the lighting for the rest of the scene relative to your pegged exposure.

So let's get to it. The very first step is to consider the story and the purpose of the scene itself ...

Story Context

The scene I'm lighting in **Figure 14-20** is an intense chess match between Sandor Latzko (*middle*), the great-grandson of chess Grandmaster and legend György Latzko, and Chip (*right*), the sweet, dopey boyfriend of Sandor's daughter Nicole (*left*). Chip has stopped by to pick Nicole up for a date when a dubious Sandor challenges him to a game of chess, forcing Nicole to wait. In this master shot, Chip is playing some cunning moves, while Sandor feels the pressure of an impending loss to a boy he thinks isn't good enough for his daughter. Before lighting any scene, ask yourself: Who and what are important in the scene? Where do I want to place visual emphasis? What do I want to expose "normally?" What's the tone and stylistic approach to the film? Sandor is the central character here, as it's his authority as a chess player and parent at



■ **Figure 14-20** Most scenes comprise a range of exposure values. In this shot, the darkest area reads $f/2$, and brightest reads $f/16$, giving us a contrast range of six stops. How this scene will be recorded depends on the sensor's dynamic range and our f-stop selection. Setting the aperture to expose correctly for Sandor (*top*), Chip (*center*), or Nicole (*bottom*) causes other areas in the image to fall outside the sensor's dynamic range. Go to the companion website to see this figure in high resolution.

stake, so he is the focus of the scene. But the boy's guileless expression and Nicole's impatience are also important because they add extra pressure to Sandor's situation. So with these three focal points in mind (Sandor, Nicole, and Chip), let's go through the next steps:

Rough in Essential Lights

A roughed-in lighting setup is usually little more than the key light and maybe some quick fill (done with stand-ins rather than the actors). Other lights are set up later in relation to the key light and its exposure value. In this case my key is natural light that is already there, the sun streaming into the room through a window (though it could easily be a 2 K Fresnel set up just outside the window). The walls of the room are cream colored, so they provide some natural fill on their own, but the vestibule where Nicole stands gets none of the direct light and very little of the bounced illumination.

Measure Exposure Values

My next step is to measure the scene thoroughly with a light meter to determine the **contrast range**, paying particular attention to the compositional focal points (Sandor, Chip, Nicole, and the chessboard). The brightest areas of the scene are Sandor's face (focal point), the wall, and the back of Chip's neck, which are all illuminated by the same key source. These areas will be "properly exposed" at $f/16$ according to my light meter. *Alternatively, if I use only my waveform monitor for exposures, I would place a middle gray card in the key light and adjust the aperture until that gray card registers at 50 IRE, which will take me to $f/16$.*

The darkest area of the scene is the shadowy vestibule where Nicole waits (focal point), which yields an exposure reading of $f/2$ on my light meter (*or if I use my waveform and gray card*). There is a difference of 6 stops between these two readings, so the contrast range in this scene is 6 stops.

All of the other exposure values fall between these poles, like Chip's face (focal point), which is on the shadow side of the key light and reads $f/4$. The chessboard, which is mostly in Chip's shadow, but getting bounced light from the wall, reads $f/5.6$.

The Range: Sandor = $f/16$ (brightest); chessboard = $f/5.6$; Chip = $f/4$; Nicole = $f/2$ (darkest)

Establish "Normal" Exposure

Setting "**Normal**" exposure (**N**) simply means deciding which part of the frame you want to expose correctly and using middle gray as your reference to set your f-stop. From there, all luminance values in the scene are exposed relative to that. Some people also call this **pegging the aperture**.

I already know that Sandor is the main focus of this scene, so I'll probably set my exposure there, but ...

As an exercise, let's take a look at what happens to the image when I try to expose for each one of my three focal points, meaning exposing for middle gray at Sandor, then at Chip, and then at Nicole. Keep in mind that I have only 5 stops on either side of "normal" exposure. This will illustrate the ramifications of exposure latitude (useable dynamic range + contrast range) and pegging your aperture at one spot or another.

Expose for Sandor at $f/16$ (Figure 14-20 top):

- *Sandor:* Shooting at $f/16$ will expose Sandor's face "correctly" and there is definitely no clipping in the image anywhere. This is good, but I lose some of the sense of a brilliantly bright sunny day. This f-stop is close, but I think I can do a bit better.
- *Chip:* Chip's face is in shadows created by the sun behind his back and $f/16$ puts Chip's face 4 stops underexposed, near the limit of my useable dynamic range. His face is quite dark and facial detail could be murky. Keeping him this dark adds a degree of dark mystery about him, which is definitely not part of my scenario. Not good.

- *Nicole*: Standing in the darkest area of the scene Nicole is 6 stops underexposed, that's beyond my sensor's dynamic range so she is in crushed black (0 IRE). I won't be able to see her and the vestibule turns into a dark and ominous void. Not good.
- *Chessboard*: The chessboard is 3 stops underexposed. This is within my dynamic range so there is full detail, but it's kind of dark which might not be so good because they're playing chess and the actions could get lost. Passable, but not best.

Expose for Chip at $f/4$ (Figure 14-20 center):

- Sandor is 4 stops overexposed, right at the edge of my useable dynamic range. That's too bright. I'll lose some detail in his face and the hot spots on his forehead will clip and blend in with the wall. The wall as well (dead center in my composition and hitting 100% white) will scream. Not good.
- Chip's face is exposed correctly. But he's secondary to Sandor in terms of dramatic emphasis. It also might look strange for the shadow side of his face to be perfectly exposed while the back of his neck nearly clips into extreme overexposure. Passable, but not so good.
- I can see Nicole! At 2 stops underexposed (well within the dynamic range) she's a little dark, but that's what we'd expect in a vestibule sheltered from the sun. I like this. Good.
- The chessboard is 1 stop overexposed and starting to glow quite bright. Meh.

Expose for Nicole at $f/2$ (Figure 14-20 bottom):

- This option is bad all around. Shooting at $f/2$ makes Sandor 6 stops overexposed, out of my dynamic range. His face and forehead are clipping badly and blending with the wall, also plateauing at 100% and now a huge solid white mass. Chip's face is only 2 stops overexposed, but the back of his neck is also clipping. I even start to bleach out the tabletop and painting which are in the extreme brights of my dynamic range where the image starts to lose detail. Not good at all.

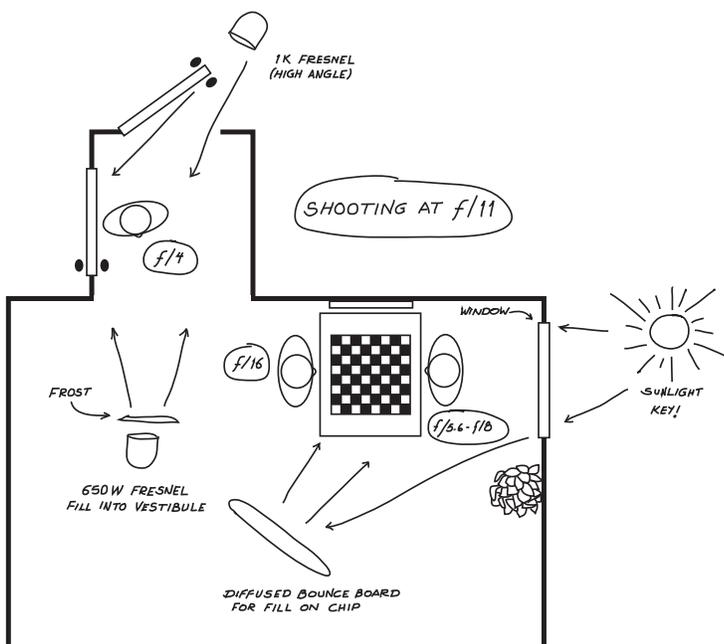
So, with all this information, where will I set my exposure? The main character in the scene is Sandor, so I start with exposing "correctly" for him. But I'm going to open my aperture up 1 stop and shoot at $f/11$. It's the f -stop that brings my overall scene closest to what I'm after and best utilizes my lovely natural key light making it appear bright and strong,

but not blinding. Shooting at $f/11$ puts Sandor 1 stop overexposed. With sunlight pouring right on him, I think it feels right for him (and the wall) to be slightly hot in the scene; it will also accentuate the notion that he's "sweatin' it" in this surprisingly tough game against the kid.

Once I establish my exposure, I can easily identify the areas that need some lighting work. At $f/11$ both Chip and Nicole are too dark. I want to see more of Chip's goofy expression and Nicole waiting impatiently in order to realize the pressure that Sandor is under. Now I can go about fixing those problem areas, consulting both my waveform and picture monitors as I add or subtract lights. Let's take a look.

Complete the Lighting

My approach to lighting this scene will be to maintain a naturalistic feel, meaning I'll work with the motivation of my strong natural key light and the soft light that would naturally be bouncing around the room. So I'll be using artificial lights to augment the natural. It's the kind of thing we do all the time in film (Figure 14-21).



■ **Figure 14-21** This overhead shows the lighting strategy that addresses the exposure problems with the shot. We now can shoot our scene with the knowledge that all critical areas will fall within the film's latitude.

The problem areas are Chip (now 3 stops underexposed) and Nicole in the vestibule (now 5 stops underexposed and at the far limit of my dynamic range where much detail is lost). The chessboard is only 2 stops underexposed, which I think is appropriate for being in Chip's shadow.

To “fix” this scene, I first add a very soft fill on Chip's face to bring his exposure up $1\frac{1}{2}$ stops to an $f/5.6$ – 8 split ($1\frac{1}{2}$ stops under normal exposure, but $2\frac{1}{2}$ stops under Sandor's brightness). This will give me more facial detail but keep him on the dark side as we would expect given the direction of the key light. Adding any more light than that would seem artificial, because we expect his face to be somewhat in shadow. This soft fill is motivated by the off-white walls of the room. I could use a small soft light unit, but with such nice sunlight streaming in I can simply use a diffused bounce board off-screen to kick some sunlight back at Chip. In either case, I must be careful not to cast shadows behind Chip or spill more light onto Sandor, because I don't want to boost his exposure level.

Similarly, with Nicole, I'll need a soft fill to boost the vestibule as if she's getting some of the bounced sunlight as well. I definitely want to bring her well into my exposure range so I can see her, but I do not want her too bright because (1) she's in a shadowy corner and (2) if I equalize the exposures I flatten the image and lose the nice depth that the dark vestibule gives the composition. So I'm going to add enough soft fill to bring Nicole up 2 stops, to $f/4$. At the pegged f -stop of $f/11$, this makes her 3 stops underexposed which is well within my dynamic range, so her figure and details will be visible, but she'll appear to be in shadows, as we expect. I accomplish this with a 1K baby soft light off-screen.

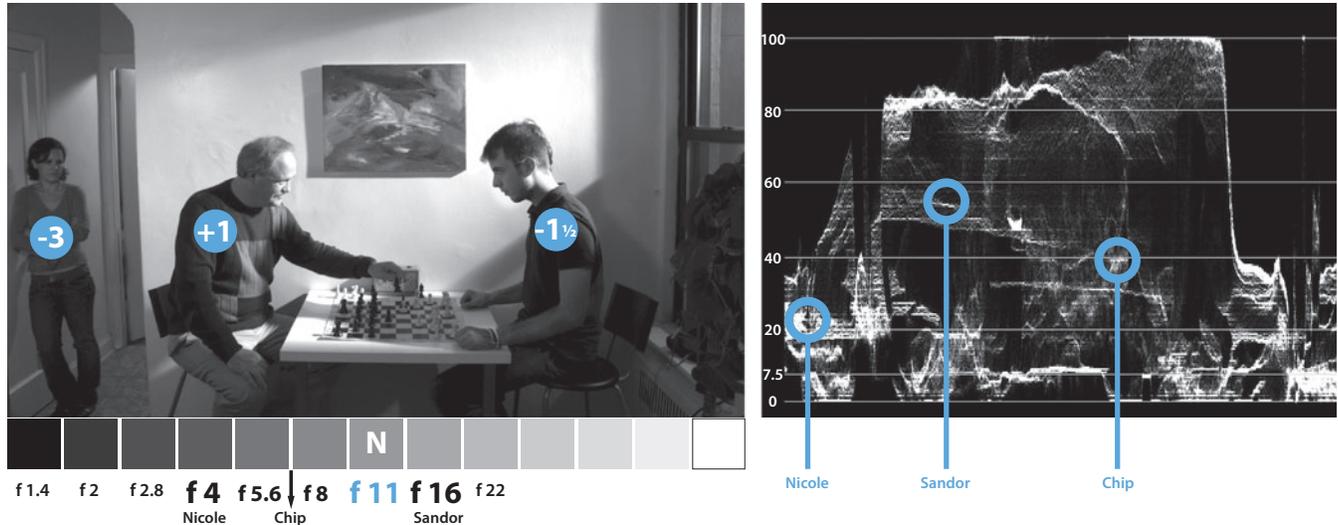
Okay, exposures are all good, but I still have a problem: Nicole and the vestibule are lit only with fill and it's flat and uninteresting. So I look at my space and I notice a door behind Nicole leading to another room. If I open that door, the same sunlight that is illuminating the main room will spill into the vestibule. This will give Nicole's shoulders a nice rim light and the light falling on the wall behind her will provide some dimensionality to her side of the composition. So I open the door and discover that there are no windows in the room behind her. No problem, I set up a 1K Fresnel, keep the light hard, add CTB gel to match the daylight streaming in, and create the “sunlight spill” as if a window were in there. This light must be up fairly high so that it appears to be coming from the same angle as the key light. It looks great ... but wait! Now when I take a reading off Nicole it reads $f/5.6$ (too bright). What happened? The additional light I set up behind her has also created additional fill in the vestibule, so I place a layer of frost diffusion in front of the off-screen baby soft light to lower its intensity and bring her exposure back down to $f/4$. *Always keep in mind that adding or subtracting light can have repercussions for the other lights already set up.*

Final “fixed” range: **Normal** = $f/11$; **Sandor** = $f/16$; **chessboard** = $f/5.6$; **Chip** = $f/5.6$ – 8 split; **Nicole** = $f/4$.

With all lighting problems solved, I double check my waveform and see that everything is legal and I'm ready to shoot (**Figure 14-22**). I laid this little example out in a very methodical way, but in reality, when you're lighting a scene, it's usually not quite this neat; there is a lot of back and forth, metering, checking the waveform, adjusting exposure values, and checking the monitor. You might add lights that don't work aesthetically, or in fixing one area you might spill light into another area, or you might get new ideas as you go along. It's kind of like painting with light, and solving a puzzle—and it's really, really fun.

Reflectance and Exposure Range

In the preceding example, I used an incident meter extensively. This is a common metering instrument on film sets, however, from Chapter 12, we know that the true luminance value of an object in a scene is a combination of (1) the intensity of the incident light (variable), (2) the object's reflectance (fixed value), and (3) the aperture (variable). A middle gray card, for example, will always reflect 18% of the incident light, but it can appear more or



■ **Figure 14-22** The final scene shot at $f/11$ and incorporating some simple lighting, which keeps Sandor, Chip, and Nicole within the film's latitude, yet with a range of appropriate exposures for a naturalistic look.



Go to the companion website to see this figure in high resolution.

in practice

■ LIGHTING FOR A FIXED APERTURE

Most of the time aperture remains fairly flexible as we light a scene and decide on our exposure. But, it's not uncommon to light in a situation where the aperture is not variable at all—instead it's a fixed setting. In these situations we need to use our lights to get the scene to that fixed exposure.

An obvious example is when we require a specific depth of field (DOF) in a shot. If a composition relies on having a deep DOF, then we might fix our aperture at $f/16$ or $f/22$ and light specifically for that, or if we must have shallow DOF, then we would peg the exposure at $f/2$ and light accordingly. It's also not uncommon for D.P.s to shoot at a specific lens' "sweet spot" (especially when using old Cine lenses on new digital cameras). The **sweet spot** is the aperture setting for a specific lens that delivers optimum performance,

meaning the fewest optical aberrations and the sharpest image possible. A D.P. friend of mine considers his set of old Cooke prime lenses his most cherished possessions. He knows from experience (and tests) that the sweet spot for these lenses is $f/5.6$, and he much prefers to shoot at $f/5.6$ whenever he can. On set, he'll routinely set up the camera, find his frame, and set the exposure to $f/5.6$. And only then does he start lighting.

Finally, there is a philosophy of lighting that says you should not change f-stops when taking the various shots in a single scene. Once you establish your principle exposure (say $f/11$ on your master shot) then, when you move in for reverse shots and cutaways, you should tweak lights if necessary to remain on the same f-stop. Why? Because if you change the f-stop, you change exposures on background and other scene details and this could make for awkward matching from cut to cut.

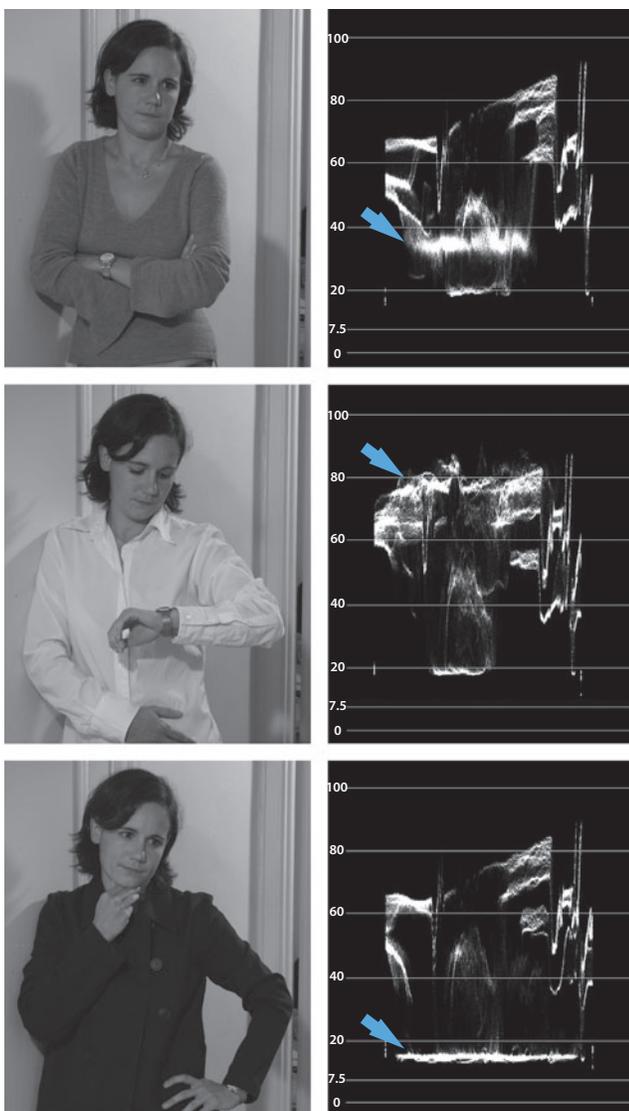
less bright on screen depending on the other factors. This is where the waveform monitor is especially helpful because it converts all three factors into IRE values.

Let's look at Nicole in the vestibule again. Appropriately, she remains the darkest area of our frame and we're intentionally underexposing her 3 stops. This is within my useable dynamic range, but toward the edge. In this situation, where detail starts to get indistinct, the reflectance value of her wardrobe can have a huge impact on how well she stands out and what details we actually see. The choice of a white shirt, a gray sweater, or black jacket will end up looking quite different even given the same incident light reading.

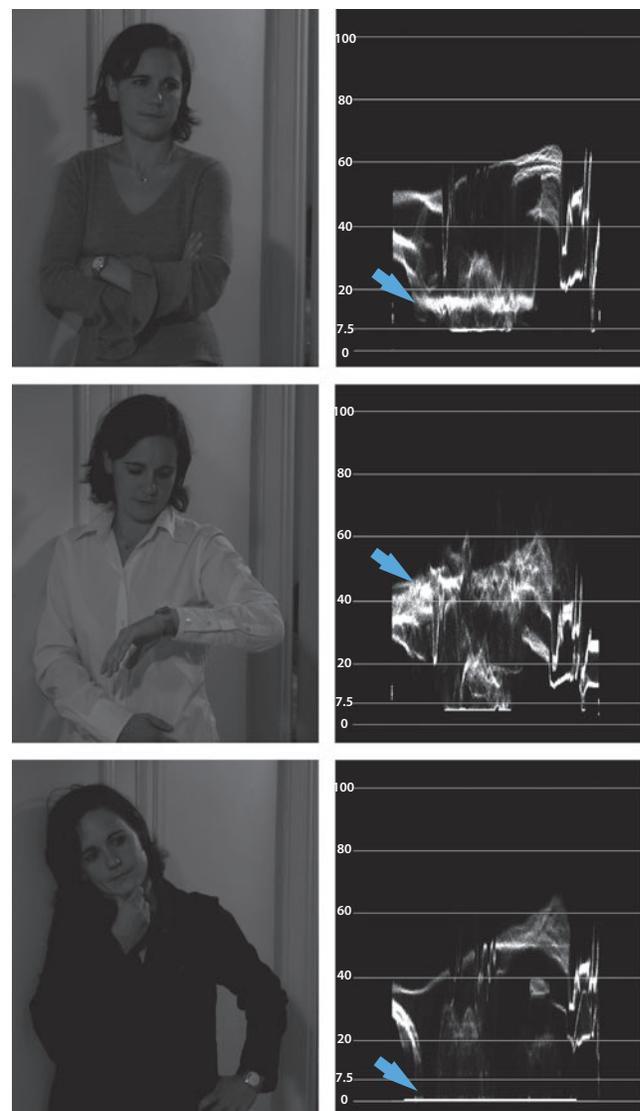
First let's explore how Nicole's wardrobe options look if we were to set our "normal" exposure for inside the vestibule (at $f/4$) (**Figure 14-23**). When Nicole wears the sweater that is

a little *darker than* middle gray, her sweater falls between 35% and 40% on the waveform monitor, which is where it belongs. However, if we switch her wardrobe to a white shirt, it would register around 80%; it's bright, but not clipped at all so there is plenty of visual information. And if we dressed her in a black jacket, her wardrobe falls to around 10–15%, meaning the jacket is dark, but it's not crushed and detail is still visible. Exposing “correctly” for the incident light in the vestibule allows all of the luminance values to fall where we'd expect and with visible detail.

However, the final exposure of our “fixed” scene was $f/11$ which *intentionally* underexposes the vestibule and Nicole by 3 stops. Therefore all these luminance values shift, and this is where wardrobe choice can really make a difference (Figure 14-24). Now, the gray sweater falls to around 18% on the waveform, and the white shirt registers just above 40%. And that black jacket crushes at 0 IRE because it's now out of our dynamic range. Notice how the “white” shirt, though underexposed, retains visual detail at $f/11$, and so



■ **Figure 14-23** Exposing “correctly” for the incident light in the vestibule allows all of the luminance values to fall where we'd expect and with visible detail from white to black. The gray sweater reads between 35 and 40 IRE (*top*), the white shirt registers around 80 IRE (*center*), and the black jacket falls around 10–15 IRE (*bottom*).



■ **Figure 14-24** In our “fixed” scene the final exposure is $f/11$ (*intentionally* underexposing Nicole by 3 stops). Now, the gray sweater falls to around 18 IRE (*top*), the white shirt registers just above 40 IRE (*center*), and that black jacket crushes at 0 IRE out of our dynamic range (*bottom*). Though underexposed, the “white” shirt and gray sweater retain detail, but the black jacket contains no visual information at all.

does the gray sweater, however, there is no detail in the jacket whatsoever; we can't even detect where her arm crosses her body. This also means that we will not be able to retrieve detail in this area during color grading. The important lesson here is that, it is not just the incident light intensity that has pushed her out of the sensor's dynamic range, but the reflectance value of her jacket as well.

An understanding of reflectance values plays an important role in questions of art direction and exposure; it's possible to have an incident reading that remains within your exposure range, but the reflectance value of an object can nonetheless fall outside that range or at least show up in a different way than you had expected. Waveform monitors are valuable in determining the true luminance values of all the areas and details in your scene.⁴

in practice

■ TO ETTR OR NOT TO ETTR?

When shooting Log (or RAW format), there is a school of thought that came to digital filmmaking through still photography that recommends routinely overexposing your image around 2 stops or so—*without clipping your whites*. This philosophy is known as **ETTR** (for **Expose To The Right**, referencing the right end of the histogram commonly used by still photographers). The theory is that the data in the brighter end of a sensor's dynamic range contains far less video noise than the darker end, so by placing as much visual data as possible in the highlight range, you ultimately create a less noisy video image (especially in the blacks).

Naturally, this requires that you pull exposures back to normal in postproduction color grading. This philosophy of exposure is somewhat controversial. Many D.P.s, citing the already extended latitude of the RAW and Log formats, prefer to simply expose correctly; and this is my position as well. However, I mention it because ETTR is definitely out there and has its passionate advocates. If you're interested, you should do more research and experiment with it to see if ETTR is something of value for you. It's your choice—**BUT** the important thing to remember is to develop your method and *remain consistent* for the duration of the project. Don't mix it up.

Camera Tests

Before embarking on any significant project, it's recommended that you do camera tests ahead of time. Camera testing goes beyond simply getting familiar with your gear. The purpose of camera tests is to determine your specific camera's ability to create the images and aesthetic look you want for the film. Naturally, you are testing the camera's format settings, ISO settings, picture profiles, dynamic range, and special effects capacity (like slow motion) if your project requires it. But every camera test should include bringing the test footage into your NLE (or a stand-alone color grading application like Adobe Speed Grade or DaVinci Resolve) and testing its potential for dialing in precise looks through color grading. Camera tests are especially important when shooting Log to explore the true performance of that particular Log Gamma in production and color grading. Log tests allow you to apply a variety of preset LUTs to the footage or do color grading from scratch. You can even create a custom viewing LUT specific to your film before you ever step onto the set.

To do camera tests, you should try to put the camera in situations similar to what you expect in production. Try to replicate the lighting, visual approach, and color palette of the film as much as possible, and it's crucial that you include people in your test footage to allow you to evaluate flesh tones.

For example, if you're doing a film that mostly takes place inside a home and will have a high key look, bring stand-ins into a studio, and create a simple setup with some furniture

⁴ A handheld spot meter is also excellent for determining reflectance values in a scene.



More details on spot metering can be found under the "Celluloid System" tab on the *Voice & Vision* companion website.

and high key lighting. If the film is a thriller with lots of low key lighting and dark shadows, try to replicate that look in a simple location or studio. If the look also includes lots of wide-angle shots, use short lenses. If you know that the film's visual palette involves lots of primary colors, go buy some red, yellow, and blue fabric and drape it around your makeshift set. Perhaps the film's compositions require shots with deep focus, or shallow depth of field; try various options (f/stops, ND filters, ISO, lenses) to create the look. Always try out a variety of options, keep a log and take notes.

Camera tests are especially critical when you anticipate shooting in challenging conditions. For example, if you know the film involves extensive exterior nighttime scenes on city streets (without movie lights), then you definitely need to get the camera out onto the streets, shoot someone in different situations (e.g., standing near different available light sources), and you should experiment with different ISO settings and picture profiles to see which works best for this situation.

In the days of celluloid film it was nearly impossible for a film student to do tests except at the most advanced levels because of the costs and time involved in shooting, processing, and transferring footage. But things are much simpler in the digital age for shooting tests. Still, I do sympathize that if you're a student working on a tight deadline and relying on the school's check-out equipment, it can be very difficult. But if you're in an intermediate or advanced level production course and your program policy is that they cannot loan equipment out for tests (which is sometimes the case), show your professor this paragraph and say, "See, the book says I must do camera tests." I hope that'll work for you.

Don't Forget What It's All About

The first half of this chapter is pretty thick with technology and procedure. It's geeky stuff but utterly indispensable to the cinematographer's craft. You simply can't do what you need to do without knowing the "how" of it. But, the technology of cinematography is perpetually in the state of unremitting evolution and it's very easy for an emerging shooter to become so completely consumed with resolutions, gammas, LUTs, IREs, and ETTR, that they overlook the important creative thinking and aesthetic judgments that are at the heart of making a film truly expressive. Simply put, a cinematographer cannot allow themselves to sink into the technology tar pit. Compounding this issue is the increasing power of post-production color grading and effects tools which can seem like a panacea for all image making challenges; but the "fix it in post" mentality is simply an invitation to lazy cinematography which, in the end, can never be resuscitated in postproduction.

Balancing the art of expressive image making with the technology of the craft is an issue that all cinematographers contend with. Rachel Morrison is one of the new generation of cinematography superstars (Figure 14-25). Her résumé includes shooting films like *Fruitvale Station* (2013), *Cake* (2014), *Mudbound* (2017), and *Black Panther* (2018). And she knows her technology to be sure; she's worked with celluloid film of all gauges, digital video in multiple formats, and budgets ranging from small scale indie to mega superhero blockbusters. Morrison can do it all, and has done it all, and here is what she has to say about artistry, technology, and cinematography:

I think if you go too far to one side or the other, it ends up inhibiting your job. I try to control as much optically in-camera as I can, not relying on post-effects, which is almost an old school philosophy at this point. But getting completely caught up in the technical suddenly makes you a



■ **Figure 14-25** Cinematographer Rachel Morrison (left) consulting with director Ryan Coogler (right) on the set of *Fruitvale Station* (2013).

mathematician, not an artist. It's a delicate balance between getting close to what you want but not taking out the poetry or the dance with the actors by being married to waveform monitors and vectorscopes.

(From "5 Female Directors of Photography Talk About the Role of the Cinematographer," by Joe Marine, No Film School, 2015)

■ LIGHTING APPROACHES AND STYLES

As director of photography I am in charge of whatever goes into the making of the image so I am head of the camera, grip, and electric departments. I'm number two to the director so one of the most exciting parts of my job is conceptualizing the visual language that goes into the image. During prep, I sit down with the director and talk about what their visual and narrative influences are. I try to get into the director's mind's eye in order to be able to enhance and execute that vision. It becomes, for me, a collaborative vision.

Ellen Kuras, D.P. (From "Cinematography as Poetry," interview by Erin Torneo, *indieWIRE*, 2002)

The domain of cinematography is the interpretation of story and character through images and involves composition, color, lighting, and exposure as the primary tools of expression. By now it should be clear that film lighting isn't just a matter of throwing light onto a scene so that we can simply make out the physical subject. Lighting is communicating visual ideas and inflecting the story with a mood, a tone, a visual context, and a narrative meaning. Lighting can help establish a historical era, a season, or even a time of day. It can provide insight into the psychological state of a character or add an ironic edge to the events in the film. Lighting can evoke any mood from ominous to cheerful. But the name of the game with lighting and exposure is "control." Once you have learned to control your image through lighting and exposure, countless expressive possibilities become available to you, and the more you work, the greater your technical and aesthetic repertoire becomes—so much so that the textbooks become irrelevant. At that point it becomes essential to watch movies, study what cinematographers are actually doing in the field, read the trade magazine interviews, and attend screenings where the director and crew make an appearance. Whenever you watch a movie, try to figure out where the lights are placed and what sources are being used, where the D.P. has pegged the exposure, how they handle the camera, and what lenses they have chosen. Consider the quality of the various sources of light and their relationship to the other lights and to the fictive world. And always think about the story and ask yourself why this particular lighting and camera approach was used in this particular film.

Broadly speaking, cinematic lighting approaches break down into naturalistic and stylized designs. But you must always keep in mind that these are not strictly delineated approaches or distinct choices—in fact, naturalistic and stylized lighting designs exist along a highly flexible continuum of aesthetic possibilities for your film. These approaches are often also mixed within the same film. That said, for our introduction we'll discuss the unique principles of each lighting philosophy in discrete terms.

Naturalism and Lighting

Naturalism is a stylistic approach that attempts to make the locations, images, sounds, and actions of the cinematic universe appear as closely as possible like the world we inhabit in everyday life; in other words, naturalism tries to make things look natural. Naturalistic lighting, therefore, strives to appear as plausible and harmonious with the real environment as possible. Lighting direction and sources are always motivated, lighting continuity is observed, and the relationship between the various light sources duplicates what we would expect in a real life situation. Cinematographer Maryse Alberti said in a radio blog interview with *Movie Geeks United* (January 30, 2009) that a naturalistic

approach “keeps the world as real as possible. It must work for the drama of the film [but should remain] as real as possible, so you feel that you are in a real place.” For this reason, the impact of naturalistic lighting is subtle, unobtrusive, and realistic. In fact, the terms naturalistic and **realistic** are often used interchangeably. Obviously, one way to obtain a raw, naturalistic look is to use no artificial lighting but, rather, to use only available light. Many films have been shot this way, primarily those that try to evoke a documentary look to draw the audience into the realism of the story. A list of recent notable naturalistic films would include *Tangerine* (2015), *Fruitvale Station* (2013), *Ballast* (2008), *Frozen River* (2008), *Chop Shop* (2007), and *The Death of Mr. Lazarescu* (2005). However, the modern masters of this form are the Dardenne Brothers who shoot their socially conscious films in a gritty, direct, documentary manner that places very few technical or stylistic layers between the audience and the subjects of their films (Figure 14-26). The Dardennes try to remain as free from artifice as possible and they consciously use all of the codes of documentary filmmaking. They shoot exclusively in real locations and primarily with available light; when artificial light is used it’s always motivated and unobtrusive. Their camerawork is usually handheld and often feels as if the camera isn’t in the right place to capture all the action—like a documentary that’s being shot on the fly. Their visual approach creates the strong impression that they are not making this stuff up, they are merely reporting on actual human experience from the field. All of this is, of course, an intentional and carefully crafted style.



■ **Figure 14-26** In keeping with the documentary style of their cinematography, the Dardenne Brothers shot *Rosetta* (1999) using mostly available light in real locations (cinematography by Alain Marcoen).



■ **Figure 14-27** Zonca’s *The Dreamlife of Angels*, shot by Agnès Godard, used bounced HMI lights to maintain the illusion of a typical overcast winter day.

Naturalistic lighting, however, does not necessarily mean that a filmmaker uses only available light, although many films have been made this way. In fact, naturalistic lighting often requires a lot of artifice, careful light placement, and exposure control in order to look natural. The use of strictly available light does not always translate into what the human eye “naturally” sees because no film stock or digital sensor sees light, as is, quite the way the human eye does. So in an effort to duplicate what an audience expects to see naturally, films sometimes employ considerable and careful technique in lighting.

A good example of this can be seen in Erick Zonca’s feature film debut, *The Dreamlife of Angels* (1999), which was photographed by Agnès Godard (Figure 14-27). The film takes place in the northern French industrial town of Lille during the wintertime, when the skies are overcast and the light is diffused through a blanket of thick, low clouds. The quality of light during this season is especially thin, gray, and somber, and Godard produced the same quality with the artificial lights to maintain a highly naturalistic feel. For example, the apartment that the two protagonists share in the film had windows that allowed the cold, diffused light to spill in, but Godard nonetheless needed to augment the available light: “Outside it was wintertime, and sometimes we were shooting quite early in the morning—the quantity of light was not high.” So she used several HMI lights reflected off bounce boards to bring up the exposures indoors in a way that “duplicated” the natural light of the season. “They were used as a reflecting light, not direct. With the size of the room they



■ **Figure 14-28** All the lighting in “Life Lessons,” Scorsese’s episode in *New York Stories* (1989), is motivated by where sources would be in the real world, a practice favored by the film’s cinematographer, Néstor Almendros.

were too rude to be used directly.”⁵ Godard also used Chinese lanterns for a very soft and subtle source that was more mobile and could be used in tight spaces.

The legendary D.P. Néstor Almendros summed up the naturalistic approach (**Figure 14-28**) with this statement of his lighting philosophy:

I start from realism. My way of lighting and seeing is realistic; I don’t use imagination. I use research. I go to a location and see where the light falls normally and I just try to catch it as it is or reinforce it if it is insufficient; that’s on a natural set. On an artificial set, I suppose that there would be a sun outside the house and then I see how the light would come through the windows and I reconstruct it. The source of light should always be justified.

(From *Masters of Light*, by D. Schaefer and L. Salvato, 1986)

Stylized Lighting

Stylized (or **non-naturalistic**) lighting approaches, on the other hand, are designed to draw attention to the aesthetic by being overt or exaggerated in ways that make a specific narrative or thematic point. Lighting placement and exposures can be unmotivated or motivated by a logic other than the plausible illumination of the particular physical environment. For example, a stylized lighting scheme might be motivated by the dramatic logic of a scene, by character psychology and point of view, or by the need to create an additional thematic or ironic story layer.

Stylized lighting is often associated with nonrealistic film genres, like fantasy films, fables, horror, film noir, musicals, or films that intentionally invoke an overtly theatrical, hyperbolic, or expressionistic tone.

A classic example of a theatrical approach to lighting and colors can be seen in Michael Powell and Emeric Pressburger’s *Black Narcissus* (1947), which was photographed in Technicolor by Jack Cardiff (**Figure 14-29**). *Black Narcissus* creates a dream world on an operatic scale. The story revolves around the tale of five Anglican nuns who are trying to establish an order in colonial India’s Himalayan Mountains. But the surreally exotic atmosphere of the remote location causes the nuns to succumb to emotional disorder, sexual desire, and even madness.



■ **Figure 14-29** The hyperstylized look created by the masterful interplay of light, shadow, and color in Powell and Pressburger’s *Black Narcissus* serves to visualize the intense emotions felt by a group of Anglican nuns stationed in the Himalayan mountains (cinematography by Jack Cardiff). See the color insert.

⁵ Agnès Godard, from “Photographing Angels,” John Calhoun, *Live Design Online*, April 1999.



■ **Figure 14-30** Both Chazelle's *La La Land* (left) and Refn's *The Neon Demon* (right) employ heavily stylized lighting to create an exaggerated and vivid impression of Los Angeles, but with very different emotional and thematic intentions. See the color insert.

Cardiff would freely mix colors in his lighting approach—for example, using green gels over the fill lights and pink gels in his key light (ostensibly the sun) and blue gels over his set lights—in an effort to represent through color the wild mix of emotions that are overwhelming the Sisters of the order. His virtuosic use of various light qualities—soft, hard, and shadows—adds to a world where dramatic mood and character psychology motivate the quality of light. There is no chance that a viewer could take the intense colors and theatrical lighting for anything resembling realism—that encourages us to look beneath the narrative surface for what all this vibrant imagery could mean. The visual style seems to emerge from, and in turn points the audience toward, the surreal internal landscape of human desire, dreams, and fantasy.

More recent examples of stylized lighting can be seen in Damien Chazelle's *La La Land* (2016) and Nicolas Winding Refn's *The Neon Demon* (2016), which both use vibrant colors, the mixing of colors, and unexpected light sources to evoke a particular feeling about Los Angeles and the people who aspire to succeed in one of its glamour industries—but to very different effect. In *La La Land*, cinematographer Linus Sandgren uses rich colors (including extensive shooting during magic hour) to give Los Angeles the magical tone that is crucial for the musical genre and elevating it to a land where impossible dreams can come true. For *The Neon Demon*, cinematographer Natasha Braier's overtly stylized use of light and strong colors imparts a markedly different tone and meaning, yet no less appropriate. In this film Los Angeles in general, and the fashion industry in particular, becomes a nightmarish landscape, where glitz and glamour create a fantastically stylish surface that belies the horrors and violence of an industry driven by narcissism, jealousy, and cruelty (Figure 14-30).

Not an Either/or Choice

It's important to understand that naturalistic lighting and stylized lighting do not present an either/or choice for a filmmaker. There is a sliding scale between these two poles, and most filmmakers find themselves working somewhere between strict naturalism and overt stylization. Most films use primarily motivated lighting sources, but the look is just a bit more vivid and picturesque than anything we'd ordinarily come across in real life—this is what we call **cinema realism**. The film appears real and believable in the context of a dramatic narrative. In addition, the visual style of the film may occasionally incorporate discrete stylized touches here and there, especially where character psychology motivates it.

Working with Tim Burton, a master of stylized film technique, the cinematographer Emmanuel Lubezki was free to use a nonrealistic lighting approach for the mythic horror/fantasy film *Sleepy Hollow* (1999), but in the end his approach was somewhere in between, but leaning toward the stylized end of the spectrum (Figure 14-31 bottom):

[The screenplay] was a wonderful fantasy with a mixture of horror, romance, drama, and humor. . . . What is great is to take something unreal and make it “real”—or, at least, believable—to create a certain reality with material so completely theatrical. [The lighting style] was between naturalism and pictorialism. The aim of pictorialism is to create



■ **Figure 14-31** Lee's *Do the Right Thing* uses discretely stylized lighting to emphasize the heat of a particularly intense summer day in Brooklyn (cinematography by Ernest Dickerson, *top*). D.P. Emmanuel Lubezki tempered the theatrical tone of this ghost story with some naturalistic approaches to create a look for Burton's *Sleepy Hollow*, which was both believable and fantastic (*bottom*). See the color insert.



■ **Figure 14-32** Stylized lighting can be mixed with naturalistic lighting to effectively emphasize key moments in a film, as Polanski did in *Repulsion* to plunge us into Carol's violent delirium (cinematography by Gilbert Taylor).

photographs that are similar to paintings and to establish photography as a valid art form. In this case, [the purpose was] to make images that felt like illustrations from an old book. ... We were going to enhance the reality and make it more beautiful, but still believable.

Emmanuel Lubezki (From *Headless Horror*, by P. Rogers, 2009)

More subtle is the stylized use of color and lighting in Spike Lee's *Do the Right Thing* (1989), which was shot by D.P. Ernest Dickerson. The setting for the film is the Bedford-Stuyvesant section of Brooklyn and the events take place over the course of one summer day—the hottest day of the year. Dickerson used extremely warm colors and hard lighting to evoke the brutal, oppressive heat of an inner-city heat wave in hyperbolic style. The look is both motivated and somewhat exaggerated. This visual style makes the audience really feel the intense sun, the heat, the inescapability of it, and it also transforms the literal heat of the weather into a metaphor for the smoldering, inescapable, and explosive racial tensions between the people in the neighborhood (**Figure 14-31 top**).

It is also extremely common for films that are more or less naturalistic in their lighting approach to incorporate scenes and moments with more stylized visual approaches, in order to elevate a particular dramatic moment or bring us into the perspective or psychology of a character. A perfect example can be seen in Roman Polanski's *Repulsion* (1965), the story of Carol (Catherine Deneuve), a mentally vulnerable young woman who lives in London with her sister (**Figure 14-32**). When her sister leaves for a vacation, Carol is left alone and her fears become nightmares, then hallucinations, as she falls tragically into madness. Although the film is presented in a more or less naturalistic mode (albeit quite dark), the lighting approach for the scenes in which we are left alone in the apartment with Carol becomes highly stylized and low key. The starkness of the lighting is exaggerated and the high contrast plunges the audience into the dark shadows of Carol's madness. One cannot say the lighting style here is unmotivated, because Polanski and his D.P., Gilbert Taylor, wish to put us deeply into Carol's point of view, to see the hallucinations as she sees them, so in this case the lighting strategy is motivated by the visions and delusions of a mind in the state of total confusion.

Another film that brilliantly mixes naturalistic and stylized approaches in both lighting and camera work is *Slumdog Millionaire* (2008), which was directed by Danny Boyle and Loveleen Tandan and shot by the digital video pioneer Anthony Dod Mantle. *Slumdog Millionaire* traces the hard scrabble life of Jamal Malik, an orphan who was raised in the slums of Mumbai and who becomes a contestant on a TV game show with the potential to win millions. The film was shot on location with a mix of film, HD, and a DSLR camera on burst mode shooting 12 frames per second. As nearly two-thirds of the film was shot digitally, *Slumdog Millionaire* is the first film shot primarily on HD to receive the Academy

Award for best cinematography (Figure 14-33). Digital video was used especially in the Mumbai slums, where mobility was critical and available light was the only option. However, even though Mantle used natural light exclusively for extended sections, one would not say that *Slumdog Millionaire* necessarily has a naturalistic approach. The richness of the colors, range of exposure choices, creative use of focus, bold compositions, and high-energy camera movement all add up to a style that is too hyperbolic and too dazzling to be labeled “realism,” yet the visual style does indeed get at something truthful: the heightened experience of Mumbai and the way one *feels* when one is in the frenzied streets of the world’s most crowded city. To capture such visceral imagery in a location so fast paced and demanding, Mantle had to be completely expert in the expressive possibilities of both digital and film technologies and the images he could achieve with both:

I wanted to feel really involved in the city. [...] I wanted to be thrown right into the chaos as much as possible. I had to find a [DV] camera set up that would be ergonomic enough for me to throw myself around the slums chasing the children whilst, at the same time, with as much detail in the shadows and highlights. [...] needed a digital camera with enough latitude to hold highlights and something very small so we could enter the children’s world at their level.

(From Silicon Imaging Press Release, January 2009)

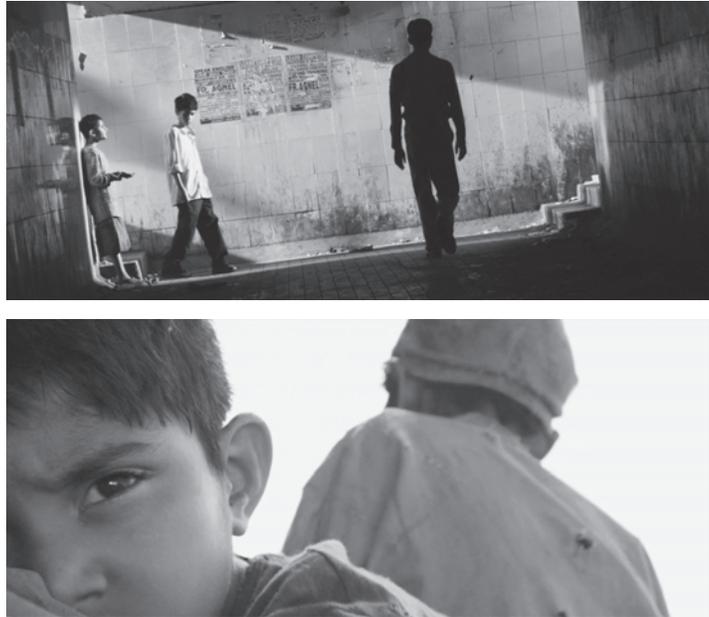
I worked mainly on Fujicolor colour negative ETERNA 500T and Realia 500D. ... [I] pushed a great deal of both of the 500 stocks one stop. The artistic reason for pushing the film was to try and attain as much of the local ambience of Mumbai as possible. I also like the effect on colours when the contrast curve of the neg is pushed a little. It somehow fitted my vision of the visceral buzz of the street and the people there.

(From Fujifilm Press Release, March 2008)

Even though the stylistic approaches of these cinematographers: Almendros and Cardiff, Godard and Dickerson, Alberti and Lubitzky, seem very different, all of them have the very same starting point for adopting a certain technology or applying a particular visual style to a film—they begin with story and character. Here is what Anthony Dod Mantle has to say about the shot in **Fig. 14-33** bottom:

I like to experiment, but I only ever experiment because of the story. We thought bringing him really close in the foreground would be good to create that distance between the two boys and create that dramatic comment. One of them is thinking about something else and the other is simply thinking about surviving and moving on. It’s a sad image too because you can’t help the connotation that these boys have lost their mom, you know. Generally speaking when you’re working with Danny, every shot feels as important as every other one. And that shot is an example of the way we work. He’d have an idea for a picture and I’m there to help him as a visually trained composer of images—that’s my job.

(From “The Top 10 Shots of 2008,” by K. Tapley, 2009)



■ **Figure 14-33** These two frames from *Slumdog Millionaire* reveal a highly stylized visual approach, despite the use of available light, nonactors and real locations. The D.P. Anthony Dod Mantle was awarded an Oscar for Best Cinematography—the first given to a film shot primarily on digital video. See the color insert.

■ FINDING THE APPROPRIATE LIGHTING STRATEGY

So where does one begin to consider the specific approach one should take to lighting a film? In preproduction, of course. The process of devising a lighting strategy is of paramount importance in a movie—even if you’re not using any artificial lights at all—and it emerges from the preproduction consultations between the director and cinematographer.

The Overall Look

During the previsualization process, the director and cinematographer examine the script to determine how to visualize the story in terms of lighting (and, of course, camerawork as well). Their first task is to determine the overall look of the film. The lighting strategy derives primarily from the story itself. During preproduction meetings, the director and cinematographer ask themselves questions like these:

- What is the film about?
- What is the director’s interpretive angle on the script—the central idea?
- What mood or tone is suggested by the events and locations in the movie?
- Does that mood evolve or change over the course of the film?
- What is the primary element driving this film? Dialogue? Character actions? Juxtaposition of images?
- From whose point of view are we shooting this film, and what is their state of mind?
- What is the historic era of the film?
- Does the film reference any existing film genres (screwball comedy, film noir, etc.) that themselves have certain lighting conventions?
- What elements in the script might suggest a lighting approach (i.e., location, season, time of day, set descriptions, character)?
- What might be the balance between natural light and artificial light sources?
- Generally, how can lighting support the tone and ideas of the script?

In answering these questions, the director and D.P. will come closer to figuring out not just a lighting strategy but also the appropriate visual approaches for that specific film expressed through lighting, shooting format, exposures, and camerawork that support the story and the director’s interpretive idea:

Each script is different. Each tells its own story with characters and emotions. It is that which determines the look of the film. This is why each film should look different.

Ernest Dickerson (From “Variations on the Mo’ Better Blues,”
by A. Herrell, 1990)



■ **Figure 14-34** Cinematographer Ernest Dickerson lights Bleek (Denzel Washington) using colors that stand for his two main interests, jazz (blue) and women (red), in Lee’s *Mo’ Better Blues*. See the color insert.

For *Mo’ Better Blues* (1990), their fourth feature film as a team, Lee and Dickerson derived the look of the film from the two competing elements in the life of the main character, jazz trumpeter Bleek Gilliam: “cool” jazz and “hot” personal relationships, especially with women. These are the central narrative elements driving the story. Throughout the film, Dickerson delineates these competing strands of Bleek’s life by using cool or warm light sources in various scenes (**Figure 14-34**). In several scenes he even mixes cool light sources with warm light sources in the same frame to create a stylized, thematic point. As Dickerson expresses it:

Hot against cool I felt was the best way to exemplify the music—jazz. It also symbolizes the life of

the main character, Bleek, and relationships with ladies and his fellow musicians. ... Whenever you play warm against cool light, these opposite wavelengths seem to vibrate against each other creating a visual tension. They pull against each other, just as Bleek was being emotionally pulled between two ladies.

Given the way Dickerson speaks about light and mixing colors to represent emotions, it comes as no surprise that he has often cited Jack Cardiff (and films like *Black Narcissus*) as a major influence on his work.

Visual Research

Often the process of discovering the appropriate lighting style involves some visual research on the part of both the director and the cinematographer. Obviously, as I mentioned on pages 288 and 297, the history of motion pictures provides cinematographers and directors with a wealth of resources and examples to consider when designing a visual approach to a film. However, beyond looking at movies for inspiration, the other art forms, like painting and photography, are also invaluable for visual research. For *Black Narcissus*, Jack Cardiff studied and used many of the lighting techniques from painters like Vermeer (soft directional lighting), Rembrandt (interplay of bright, golden light and deep shadow), and Van Gogh (expressive mix of colors, in shadows and in light sources).

Cinematographer Darius Khondji often acknowledges the extensive visual research he engages in before each film. When preparing to shoot *Delicatessen* (1991)—directed by Jean-Pierre Jeunet and Marc Caro, who themselves employ a unique visual style—Khondji’s research incorporated classic silent films and photography (**Figure 14-35**):

Quai des Brumes (Marcel Carné, 1938) and other French Poetic Realist films inspired Jean Pierre and Marc Caro and they showed me those films or selected clips in preparation for Delicatessen. I remember being much more inspired by the pure cinematic style of silent films. I would watch The Wind (1928) by Sjöström, L’Ange Bleu (1930) by Von Sternberg, Vampyr (1932) by Dreyer, Nosferatu (1922) and Sunrise (1927) by Murnau and Von Stroheim’s early films. I was also inspired by the paintings of George Bellows and their texture of black, brown, warm red, yellow, and golden colours. I looked at Pictorialists such as Heinrich Kuhn, early Edouard Steichen, Stieglitz, Cameron, and the illustrator, Martin Lewis. What I love in Pictorialist photographs is that they were like the “charnier” or “hinge” between painting and photography, neither painting nor photography, and I found that very inspiring for my early movies. Before photographing Delicatessen, I didn’t go to the cinema any more. I would only watch black-and-white silent films and avoid being influenced directly by recent movies.

Darius Khondji (From *New Cinematographers*, by A. Ballinger, 2004)



■ **Figure 14-35** Cinematographer Darius Khondji saw nothing but silent film masterpieces like Murnau’s *The Last Laugh* (1924, left), in his preparation for shooting Caro and Jeunet’s *Delicatessen* (1991, right).



■ **Figure 14-36** For their 2018 film *Mudbound* (left), Rees and Morrison did extensive research into a range of works dealing with pre- and post-war rural southern culture; including the public domain photographs produced by the Farm Security Administration. The right image is a rare color photo of sharecroppers cutting cotton on rented land in Georgia, taken by Jack Delano for the FSA (1941). See the color insert.

In the case of Dee Rees' 2018 film *Mudbound*, she and cinematographer Rachel Morrison did extensive research into a range of works dealing with rural southern culture during the pre- and post-war periods. Naturally, they turned their attention to the huge reservoir of public domain photographs of the depression era rural south produced by the Farm Security Administration (FSA) to reveal, explore, and combat poverty in America. These photographs, housed in the Library of Congress, provide a wealth of information on physical structures (houses, shacks, barns, general stores, etc.), objects (farm tools, tractors, furniture, etc.), and clothing; but many of the photographs so sensitively observed the daily lives of average and poor Americans that they are also valuable for gaining an impression of the broader ethos of the rural landscape. In many of these photographs, an astute observer can glean the feel, spirit, and atmosphere of the specific place during a specific era and the emotional struggles of the people of that time (**Figure 14-36**).

Dee and I had a number of references. As a jumping off point for tone, Dee referenced the artist Whitfield Lovell and specifically his portraiture on wood. We looked at “The Blues According to Lightning Hopkins” and other documentaries by Les Blank, which had a raw spontaneity to them and which also served as a reference for our color palette and texture. [...] And finally, the look of “Mudbound” was hugely influenced by the work of the FSA photographers ranging from Ben Shahn and Arthur Rothstein to Dorothea Lange and Gordon Parks. Their work in the 30s and early 40s was paramount to the design of the film and many compositional choices, but it was actually Parks’ later work “A Segregation Story,” which he shot for Time magazine in 1956, that really influenced our use of color.

Rachel Morrison (From “Cinematographer Rachel Morrison on Creating the Lush Realism of ‘Mudbound.’” Interview by Chris O’Falt, 2017)

Visual research is not just necessary on feature films—short films made on limited budgets can equally benefit from this process to inspire their visual style, including lighting and composition. In 2007 I was the cinematographer on the short film *Flesh & Blade* which is a dark, 19th-century gothic tale of love and science tragically entangled (**Figure 14-37**). I turned to the wonderful, frightening paintings of Joseph Wright, which depict both the process of scientific inquiry and the romanticized mysticism that characterized science in the 18th century, to help determine the overall look of a film that would take place primarily in a scientist’s laboratory.



■ **Figure 14-37** As part of my visual research for lighting *Flesh & Blade* (left and right frames), I looked at paintings like *An Experiment on a Bird in an Airpump* (1768), by Joseph Wright of Derby (center). See the color insert.

Other Considerations

As I discussed in the first chapter of this book, the aesthetic of a film, including the photographic look of the movie, is inextricably linked to the practical realities of film production, especially the resources available to the filmmaker. It doesn't do a project any good to imagine a style during preproduction if that style cannot be accomplished in the allotted time or with the resources available. This is a concern, of course, which should be anticipated and addressed during the very conception and scripting of the film. Again, when the director and cinematographer explore the screenplay in preproduction, they need to ask themselves practical questions:

- What is the budget of the film?
- What is the shooting format, and what is it capable of?
- How much time do we have for lighting (days and hours each day)?
- How large is the crew?
- How many and what sort of lighting units (and grip equipment) are available for the shoot?
- How controllable and accessible are the locations?
- How much power is at each location for artificial lights?
- What are the sources of natural light on the set, and how much artificial lighting do we actually need?

However, limited resources never means a lack of style; it means only that the filmmakers need to devise an intelligent, innovative, and resourceful visual approach, which, when perfectly matched with the script, can be as powerful as anything produced with larger budgets. Take the example of the feature film *Personal Velocity* (2002), directed by Rebecca Miller. Cinematographer Ellen Kuras recounts the day Miller approached her with the idea of shooting the film:

She wrote a book of short stories and she called me up and said, "Listen, I finally have some money and I can make a short film based on three of my short stories. Would you like to do it?" and I said, "Sure. I'll work with you any time." She said the only thing is "we only have \$150,000 and we have to shoot it in mini-DV." I said, "Okay. Well, why don't we shoot it in Super 16?" She said, "We can't, because part of the money is contingent on us shooting mini-DV." Kuras then told Miller, "I'll give you five weeks of my time for free and let's do it—let's make the movie."

(From "Where the Girls Are," by J. M. Wood, *MovieMaker*, 2007)

Even though the shooting format of the film, the most fundamental technical and expressive tool for a cinematographer, was determined by practical considerations, this didn't mean that Kuras was not able to devise an aesthetic and original interpretation of the project. In fact, she turned a limitation into an opportunity.



■ **Figure 14-38** Shooting on SD video, one of the most unforgiving formats ever, did not deter Ellen Kuras from devising a complex, effective, and stunning visual strategy, creating three distinct color palettes for the three characters in Miller's *Personal Velocity*. See the color insert.

Kuras first considered the broader concept of working with DV and with literary material and the freedom that allowed her:

I just said, you know what, I'm shooting with this mini-DV medium, I'm going to think of these as short stories and I'm going to make it look and feel like a poem. ... That means I'm not going to do what everybody says you're supposed to do. I'm just going to do what feels right for the movie.

(From "Taking the Digital Medium into Their Hands,"
by P. Bourke, 2002)

Then, in consultation with Miller, Kuras devised a specific lighting and color approach for each woman's story (**Figure 14-38**):

We had three distinct looks for each of the different narratives. The color palette for Delia's story was warm toned with more yellows and greens and browns. We tried to keep the skin tones neutral. ... Greta's story was cool and austere. The camera moves were on a tripod and were much more mannered. Paula's story was much more frenetic so for the color palette, I wanted to put this kind of blue purple to the shadow areas, and to have some cream colored highlights and then have the flashback sequences be a different color which would be in contrast to what the main color palette was. ... The contrast is very hard to control using DV unless you have an overcast lighting situation or you're inside. John [Kuras's gaffer John Nadeau] and I basically used the natural light and augmented it, giving it a style unto itself.

(From "Interview: Cinematography as Poetry,"
by E. Torneo, 2002)

Kuras has worked extensively on celluloid (35mm, Super 16) and digital formats (both SD and HD); she has worked with large budgets and minimal resources and has been supported by fully staffed professional and skeleton crews alike. Her work on *Personal Velocity* is testament to her versatility and artistic virtuosity.

A Final Word on Cinematography

There is no question that the latest revolution in digital filmmaking has been the development of expanded gamma curve production workflows (RAW and Log formats), along with easily accessible, and highly sophisticated grading tools (e.g., Avid's three-way color corrector, Premiere Pro's Lumetri Color Panel, and DaVinci Resolve). This workflow has greatly expanded the power of the postproduction color grading process and has even brought those tools right onto the set. On many professional shoots, the DIT is the cinematographer's closest collaborator.

Unfortunately, all of this postproduction power and flexibility has led more and more people to become rather sloppy and inexact with their cinematography, relying instead on postproduction correction and grading to fix nearly everything, from colors, to composition, to exposures. A great cinematographer cares about the images they produce on the set and bristles at the phrase "fix it in post." They know that you can never replace great cinematography with color correction tools. I'll leave the final word in this chapter on cinematography to the President of the ASC (American Society of Cinematographers) Kees van Oostrum:

In today's world of great the extended latitude and super sensitive capturing systems, you can, in most cases, shoot in available light. You can walk out into the world,

photograph it, and come home with an image. But the question remains whether that image fully expresses or uses to a great extent your abilities as a cinematographer.

How we light a scene is one of the most important choices we make in the expression of our artistry. It deals with density, color contrast, and the photographic reproduction of black and white. I am fully aware that we can arrive at these choices in post, but there is much to be said for making these decisions in the moment of creative inspiration, which largely exists on the set.

(From "President's Desk" column, *American Cinematographer*, 2017)



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Sound for Production

The digital revolution has not exclusively revolved around the shooting, editing, and presentation of images alone. Since the beginning of the 21st century, there has been a veritable sea change in the tools and techniques of recording, mixing, and replaying audio as well. There was a time when distribution on video or through broadcast TV meant that people would be listening to your film on little 3-inch built-in speakers. Today everyone is fast equipping their home theater units with super-high-fidelity, digital surround sound audio. What this means for the filmmaker is that the audience can hear everything vividly! So no matter what our budget or level of production, we all must produce highly polished audio to accompany our carefully composed and exposed images.

The first, and most important, step to this end is to gather the best possible sound in the field during production. Unfortunately, sound is often a blind spot for many filmmakers, especially those just starting out. All too often with inexperienced filmmakers, a lot of time, money, and preparation goes into the production of the images, but they begin to think seriously about sound only after they hear and try to work with the terrible audio they got during production. The production sound team—those people who record sound in the field—are the unsung heroes of the film world. When they do their job perfectly, no one notices them; when the sound is bad, they are cursed. Good sound people are invaluable, and smart filmmakers understand that getting good sound in production means a stronger sound design in postproduction, more creative options in editing, and saving time and money. This is why good sound people work a lot and why I've devoted two chapters to the craft of sound recording in the field, it's *that* important.

■ WHAT IS PRODUCTION AUDIO?

The final form of a movie's completed sound track consists of layering multiple tracks of sound, anywhere from two to dozens. Although many of the sound elements we hear in a final film are gathered during postproduction (e.g., music, sound effects, voice-overs), there are several crucial elements that are recorded in production while we shoot our images: synchronous sound, wild sound, and ambient sound. For many films, short or feature length, the sound elements recorded in the field, like dialogue, constitute the most crucial audio elements on the sound track. These are the elements we will be exploring in this chapter.

■ UNDERSTANDING SOUND

In space, no one can hear you scream.

(Tag line for Ridley Scott's *Alien*, 1979)

In Stanley Kubrick's *2001: A Space Odyssey* (1968), when HAL 9000 severs Poole's life support cable, sending Poole hurtling through space (**Figure 15-2**), the sound that accompanies his sure demise is—total silence. Why did Kubrick choose utter silence for this highly dramatic moment, even though Poole is struggling and likely screaming his head off? Because sound is produced by some vibrating source creating pressure and displacing air molecules. Much like the ripples in a pool of water when a pebble is thrown in, the displacement of the air molecules create acoustic sound waves, which move through the air. If, as in space, there is no air, then there is no sound.

in practice

Sounds that appear to be emanating from a single location at a single time are very often constructed from many different elements; some are recorded during production and others are collected later; then the different elements are mixed to create a precise aural impression. Here is a simple scene of two waitresses trying to have a conversation in a noisy coffee shop, just off a busy road, when an off-screen car accident interrupts them (Figure 15-1). This scene incorporates several distinct sound elements:

- Track 1. The waitresses' dialogue
- Track 2. The ambiance of the coffee shop (i.e., coffee machines, cups clattering, patrons' chatter)
- Track 3. The sounds of traffic just outside the coffee shop

Track 4. The sound of the car crash that interrupts them

Although it is theoretically possible to record all of these sounds in a single take with a single microphone, it would require a prohibitive amount of time and choreography. Instead, we record (or find) each of these elements separately and later, in post-production, construct a sound design by layering and mixing independent tracks. Each track can be synced to the picture with frame accuracy and also have the ability for independent volume and equalization adjustments. We will explore postproduction sound and working with multiple tracks in detail in Chapters 22 and 23.

Go to the *Voice & Vision* companion website for an interactive example of a scene with multiple tracks.

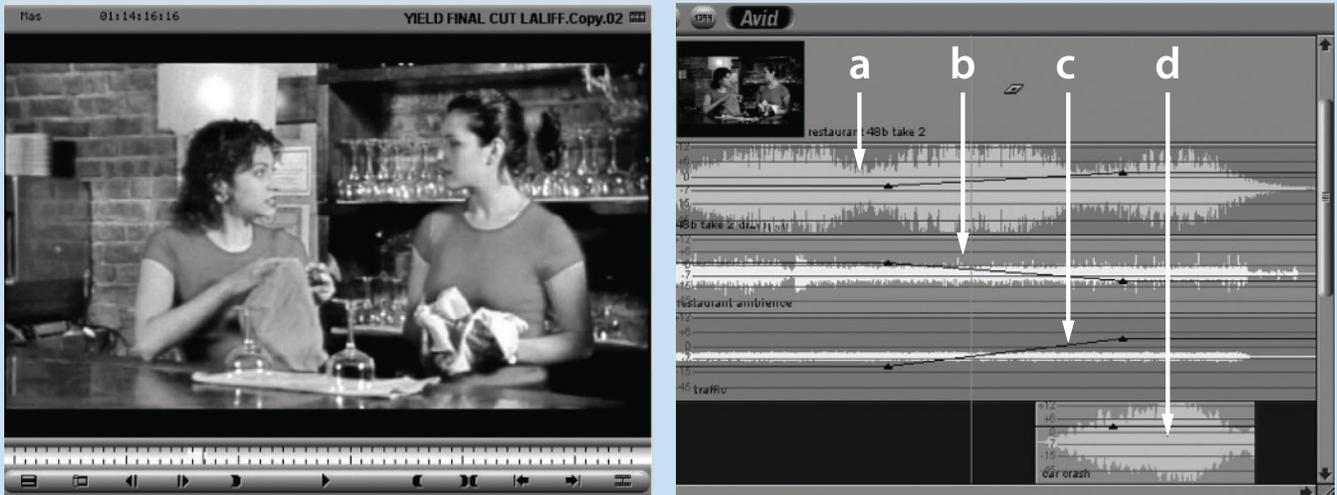


Figure 15-1 This seemingly simple conversation in a restaurant has a sound track that combines sync sound, sound effects recorded on location, and prerecorded elements from sound effects collections.



Figure 15-2 Poole's silent death from Kubrick's *2001: A Space Odyssey*.

A **sound wave** is in fact a pressure wave, consisting of an alternating pattern of high pressure (compression) and low pressure (rarefaction), traveling through the air. The vibrating source of this pressure can be a guitar string, a tuning fork, the contact between a baseball and a bat, or human vocal chords. These sound waves are eventually received by some sensitive membrane, like an eardrum or microphone diaphragm, which duplicates the vibration patterns of the original source. And what if there isn't a vibration-sensitive membrane to receive those sound waves? Well, you've probably already pondered the proverbial question of whether or not a tree falling in the woods makes a sound if there is no one there to hear it, right?

There are four basic properties of sound that are essential to understanding audio and the techniques of microphone placement and recording for film production:

- Pitch (frequency)
- Loudness (amplitude)
- Quality (timbre)
- Velocity (speed).

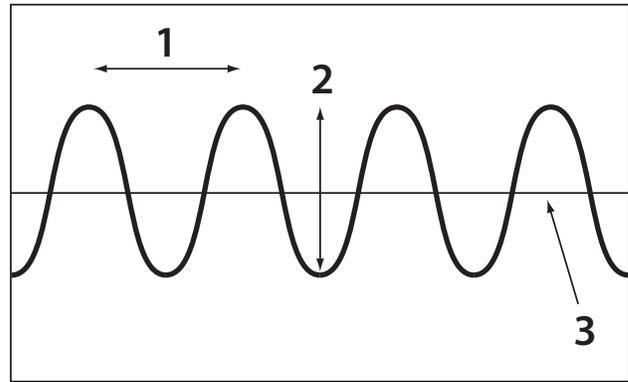
We plot these sound wave characteristics on the graph shown in **Figure 15-3**. This common sine wave graph measures the compression of the air molecules that are caused by a particular sound. With this graph we are able to see certain properties of a particular sound.

Frequency (Pitch)

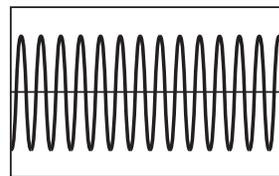
Sound waves travel in fairly consistent **wave cycles**. One **wavelength** is the length of one cycle, from peak to peak, which then repeats itself. A wavelength is plotted from one highest pressure point to the very next highest pressure point. The number of these waves that pass a fixed point over the course of one second is the measure of the frequency of the sound wave. This measure of **cycles per second** is referred to as **Hertz (Hz)** and is measured along the graph's x-axis.

A sound that generates 10,000 wave cycles every second has a frequency of 10,000Hz, also written 10kHz. This frequency of cycles per second is actually measuring the **pitch** of that particular sound. The fewer cycles per second, the lower the pitch of a sound; the more cycles per second, the higher the pitch (**Figure 15-4**).

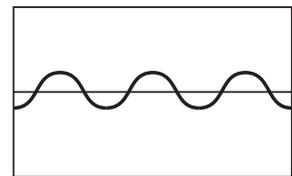
Neither the human ear nor a microphone can perceive all sound frequencies. The range of detectable pitches for a given apparatus is called the **frequency range**. An average, healthy human ear can distinguish pitches from 25Hz to 20kHz. Dogs can hear frequencies beyond 20kHz; this is why they can hear high-pitched dog whistles that humans cannot. The frequency range that a microphone or a sound recorder can pick up and duplicate is a common measure of equipment quality. The “hearing” range for a particular piece of gear is called its **frequency response**. Those old cassette decks (good ones!) had a frequency response around 30Hz to 12kHz, which is less than the range of human hearing. A typical professional digital audio recorder has a frequency response of 20Hz to 40kHz, which is greater than the range of human hearing—just one reason why the cassette tape disappeared.



a



b



c

■ **Figure 15-3** A simple sound (a) can be understood in terms of its wavelength (1), and its amplitude (2), or the degree to which it deviates from normal air pressure (3). The higher the number of cycles per second (b), also called Hertz, the higher the frequency or the sound. Sounds with very low frequencies have fewer cycles per second (c).



5200Hz



150Hz - 2000Hz



45Hz

■ **Figure 15-4** A piccolo (the highest pitched instrument in an orchestra, *left*) can reach a frequency of 5,200Hz. A tuba (the lowest pitched instrument, *right*), can create sounds as low as 45Hz. The human voice is located in the frequency midrange, from 150Hz to 2,000Hz.

Amplitude (Loudness)

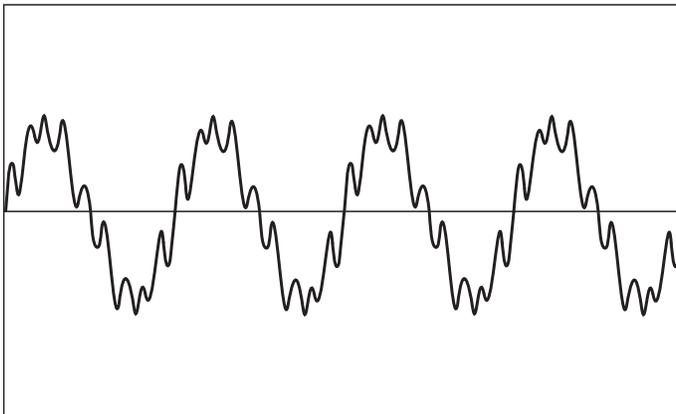
Each peak high and low pressure point along the graph's y-axis has a specific height or **amplitude**, which is a measure of the **loudness** of a sound (see **Fig. 15-3**). The higher the amplitude peak, the greater is the displacement pressure of the sound wave and the louder the sound. Loudness is measured in **decibels (dB)**. Decibels increase or decrease according to a logarithmic progression. I won't go into the complexities of logarithms; it's sufficient to simply understand that it takes an increase of three decibels (3dB) to double the loudness and a decrease of three decibels to halve loudness.

The loudness range that the human ear can distinguish falls between the **threshold of hearing** (0dB) on the lower end and the **threshold of pain** (120dB) on the upper end. A normal conversation tone is approximately 55dB. A whisper is around 25dB and a scream comes in at around 75dB. At 150dB, eardrums will rupture—you'll know when *that* happens.

In most recording situations the loudness of your source fluctuates. Sometimes the range of loudness levels is minor and other times it can be extreme. For example, listen to the opening of Richard Strauss' symphonic tone poem *Also Sprach Zarathustra*, Op. 30 (which was used in Kubrick's *2001: A Space Odyssey*). The piece begins with the softest, barely audible drone of the double basses and builds to an all-out, full orchestra fortissimo—led by crashing cymbals, blaring horns, and pounding tympani—in only a minute and a half! The range of different loudness levels is referred to as the **dynamic range**. *Also Sprach Zarathustra* has an extremely wide dynamic range. Comparatively, a song like the White Stripes' "Fell in Love with a Girl" has a narrow dynamic range because it remains at the same loudness level throughout—loud. A conversation that goes from a whisper to screaming has a wide dynamic range, whereas a politician's speech delivered in a monotone has a narrow dynamic range. Wide dynamic ranges can be challenging for both the sound recordist and the equipment (see Chapter 16).

Inverse Square Law

The amplitude of a sound wave diminishes according to the **inverse square law** as it travels through space, which means that the intensity of a given sound decreases by the square of its distance from the sound source. This is the same law that governs the drop-off of light intensity as one moves away from the source of illumination (see page 291), so you can remember it by the same rule of thumb: doubling the distance from the source results in the loudness diminishing four times, and halving the distance from your source will increase the loudness four times. Knowing that sound intensity drops off drastically the farther one moves a microphone away from the audio source is essential in determining microphone placement.

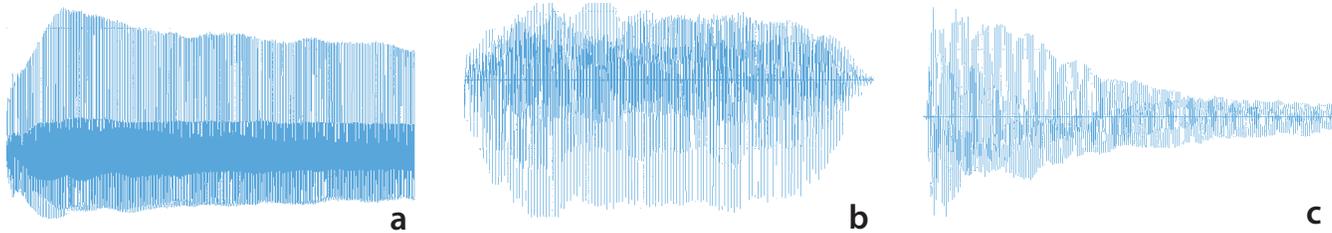


■ **Figure 15-5** Sounds are usually made up of complex combinations of tiny variations called harmonics and overtones that comprise the unique characteristics of a sound's timbre.

Quality (Timbre)

The sound waves shown in **Fig. 15-3** represent pure, electronically generated tones with no character or aberrations. When we encounter the waves of sounds from the real world, the curve does not look quite so uniform, with a smooth curve and perfectly symmetrical peaks and dips. Most naturally occurring sound waves include characteristic irregularities in the overall shape and are also accompanied by a series of other waves of lower amplitude and various frequencies, all of which reflect the particular quality of that sound.

The central and dominant shape of the wave is called the **fundamental tone**, but every fundamental tone also resonates with a series of imperfections and coinciding waves that represent **overtones** and **harmonics** (**Figure 15-5**). These elements constitute



■ **Figure 15-6** Timbre is a feature of a sound's unique character. Here are the waveforms for three different instruments producing the exact same note (middle C): a piano (a), a violin (b), and a human voice (c).

timbre, which is the unique tonal composition and characteristics of that sound (i.e., richness, harshness, resonance). Timbre allows us to easily distinguish different instruments playing the very same note. For example, middle C on a piano sounds quite different from the same note played on a trumpet, or on a guitar, or when sung by a human voice (**Figure 15-6**).

Velocity

Sound is a wave that travels through space, so it has both directionality and speed. The **speed of sound** is 1,086 feet per second. This is very slow compared to the speed of light (which is 983,571,056 feet per second). This is why, when you're watching the fireworks display on the Fourth of July, you see the big flash of light first and hear the boom of the explosion seconds later (**Figure 15-7**).

■ PRODUCTION SOUND

There are several names for it—**production sound**, **field recording**, **field mixing**, and **audio gathering**—but the name of the game is all the same; record the best quality sound possible. Great quality field recordings allow for maximum creative manipulation in post-production. In some ways it's easier to get away with less-than-perfect images in a film than less-than-perfect sound. Badly recorded audio immediately marks your film as that of an amateur. If you're a stop or two underexposed, well, the audience can at least still see what's going on; but if your recording is too low, they can't hear what people are saying and all meaning is lost. A poor original sound recording can be the utter bane of an entire film. It's often impossible to add what is missing or take away what shouldn't be there, and those times when audio *can* be "corrected in post," it's always difficult and often expensive to do. So the primary responsibility of the sound team during the production phase is to get as clean and strong a sound recording as possible. Getting great production sound means understanding sound, knowing your equipment, and practicing good recording technique.

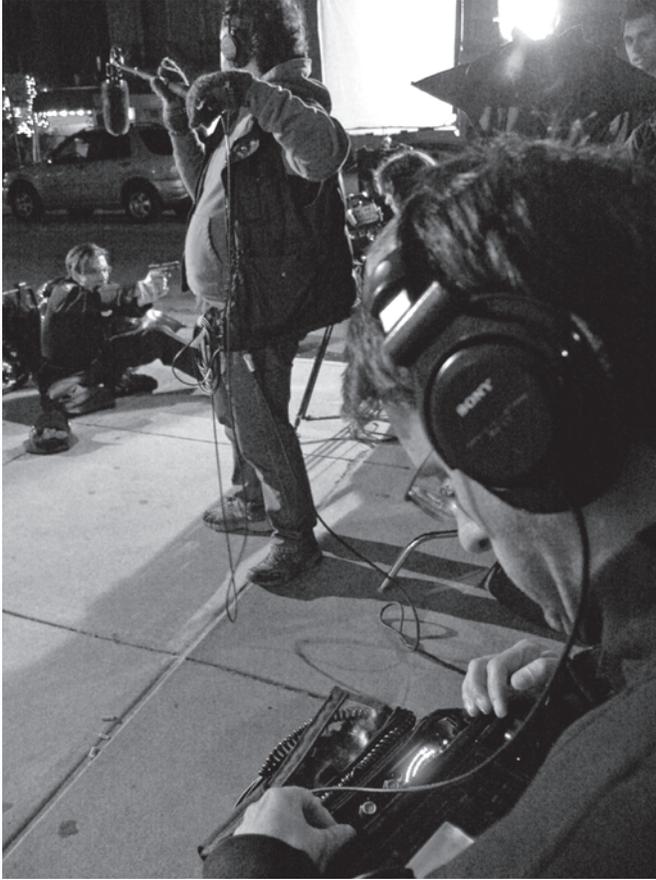
Location Audio: Sync Sound, Wild Sound, and Ambient Sound

Location sound is any sound that is recorded in the same environment as the images. Location sound breaks down into roughly three broad categories: **synchronous sound (sync sound)**, **wild sound** (also called **nonsync sound**), and the important sub-category of wild sounds called **ambient sound** (also called **atmospheric sound**).

Sync sound is recorded simultaneously with taking the image, so sound and picture correspond to each other with frame accuracy and are said to be "**in sync**" with one another (**Figure 15-8**). This



■ **Figure 15-7** In real life, fireworks are usually out of sync with the sound of their blasts, because light travels at a much faster speed than sound. Most films, however, sync them in postproduction, as in Lee's *Brokeback Mountain* (2005).



■ **Figure 15-8** The sound crew, usually made up of a sound mixer (*foreground*) and a boom op (*standing*), is in charge of recording sync sound during the shooting of a film.

could be a character's dialogue, a car zooming past, or the sound of a door closing—anything in which the sound emanating from the scene is recorded in sync with the picture.

In digital film production there are two options for recording sync sound: **single-system** sound recording (both audio and video are recorded on the same card by the camera) and **double-system** sound recording (video is captured by the camera and audio is recorded on a separate digital audio recorder). I will discuss the difference between these sync sound recording approaches in more detail starting on page 369.

Wild sound is audio that is recorded on location, but not simultaneously with the picture, and so has no corresponding picture. Wild sound functions as a sound design element that either doesn't require synchronization or that can be manually synced to an image later in the editing phase. Two common types of wild sound recorded in the field are **location sound effects** (also called **spot sound effects**) and **ambient sound** (includes **background sound** and **room tone**).

From time to time we might be prohibited from getting a specific sound because of limited microphone placement options while we are shooting a scene (often due to the size of the framing). In these cases a sound recordist will often re-record specific sounds from the scene as **wild sound effects** (without the camera rolling) to get a better quality representation that can be

inserted in postproduction as a special effect. For example, in one of my early films I had a very wide shot of a man getting into his car and trying to start it up. The engine doesn't turn over, so he gets out and walks. The framing of this shot was too wide to position a mic close enough, so after I took the shot, the sound team came in and re-recorded the car engine sound and the car door opening and slamming shut with the mic much closer. These two wild sound tracks were cleaner and more robust than what was recorded when the mic was outside my wide framing, and I used these instead of the sync audio during the edit.

Ambient sound refers to the entire group of sounds and tonal qualities of a given recording environment. When we talk about ambient sound we're primarily talking about **background noise** (also called **atmospheric sounds**) which are all of the sounds that occur naturally in any specific recording location. If we are shooting a scene near a playground, for example, the sound of children playing is part of the environment and therefore is expected to be in the scene. However, we certainly don't want background noises to overwhelm the critical audio that we are trying to pick up (i.e., the dialogue), so we might want to minimize the sound of children playing while we record our sync sound dialogue as cleanly as possible (through microphone choice and placement) and then record some high-quality **wild ambient sound** of children playing after the camera stops rolling. This way we can place the wild ambient sound under the clean conversation later and adjust the levels to achieve exactly the volume balance we want.

If we are recording in an interior space, the ambient sounds might be much more subtle, but they are still there. There is always ambient sound in any recording situation; it could be the low hum of a heating system or the sound of a highway far in the distance. Also, there is usually some degree of noise associated with the equipment and film team on the set—even though it is ideally very faint. Some sound recordists will use the term

ambience for both exterior and interior atmospheric sounds, however, you will also hear people use the terms **backgrounds** for exterior ambience and **room tone** for the sound of an interior setting where dialogue occurs.

In either case, it is standard procedure to record a one-minute stretch of ambient sound for every different location at the conclusion of the shoot. This may seem like a small detail, but that one minute of ambient sound is critical in postproduction for regulating background sounds, smoothing out edits in dialogue sequences, making Automatic Dialogue Replacement (ADR) passages match synch field dialogue, creating scene transitions, and so on (see *Ambient Sound and Audio Continuity* in Chapter 16).

Location Acoustics

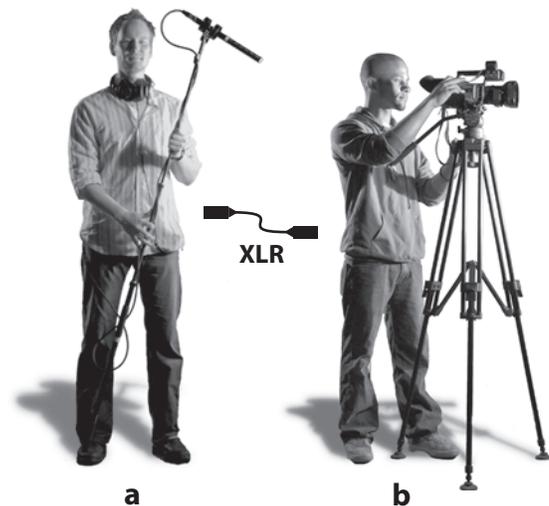
Other important factors to consider when recording audio in the field are the acoustic properties of the location. **Room acoustics** (also called **presence**) are the general aural qualities of a given space and they are part of the characteristics of a space's ambience. For example, the acoustics of a small carpeted room filled with old stuffed furniture is quite different from the acoustics of a bathroom with nothing but tiled floors and walls. In the case of the bathroom, any source of audio that is surrounded by hard surfaces will reflect the sound. Sound bouncing off surfaces is called **reverberation (reverb)**. In this situation a microphone will pick up the audio from the source (**direct sound**) and also pick up the audio reverberating off the walls and floor. The result is a boomy or echoey sound as the signal duplicates itself over and over again. A recording space like this is called acoustically **live**. On the other end of the spectrum, carpets, curtains, and furniture in a room are poor reflective surfaces and serve to absorb sounds after they leave the source. This allows only the direct sound source to be recorded. This is known as an acoustically **dead** recording space.

The other factor that affects acoustics is room size. A small tiled bathroom is a very reflective space, but the reverberation intervals will be shorter than in a gothic cathedral, where the sound travels a greater distance to a reflective surface and back to the microphone, increasing the lag time between the recording of the direct sound and its reflection. The audible difference in the acoustic quality between these two live spaces is the difference in **reverb delay**.

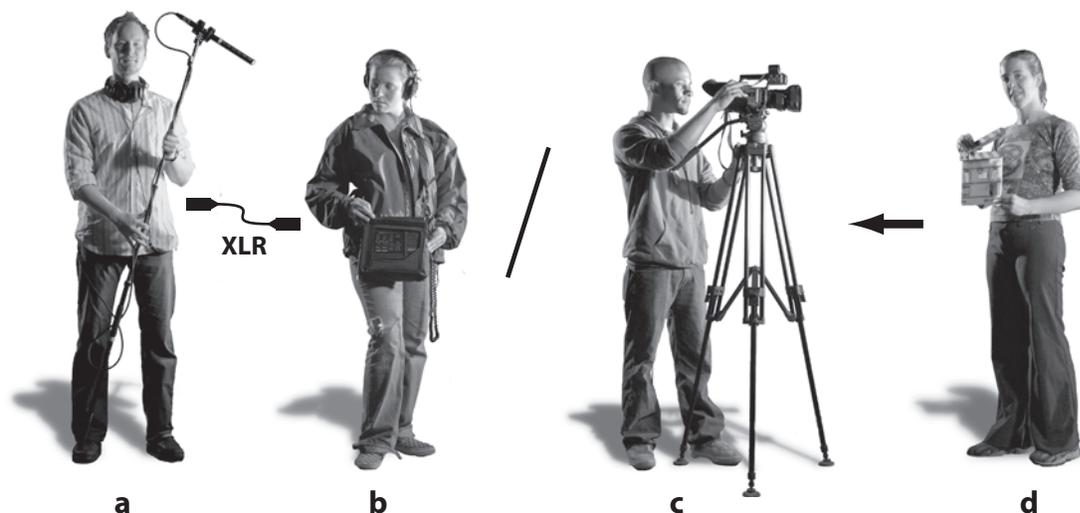
Very live acoustic spaces are often difficult to work with. Always remember, too much reverberation can create muddy audio and reverb echo is impossible to remove in postproduction. We will discuss specific techniques for recording ambient sound and taming acoustically live recording locations later in the next chapter.

DOUBLE-SYSTEM AND SINGLE-SYSTEM RECORDING

Double-system and **single-system** sound simply refers to the number of devices used to record your image and sound during a shoot. **Single-system** sound recording means that both audio and video are gathered at the same time, with the same apparatus (i.e., the camera), and are recorded *in sync* on the same storage media (e.g., memory card) (Figure 15-9). **Double-system** sound recording (a.k.a. **dual-system**) means that digital video is being captured and recorded by the camera, but audio is recorded using a separate digital audio recorder (and separate storage media) (Figure 15-10). In this case, the sound files and video files must be brought together in postproduction and “synched” with one another before editing (see page 475). While double-system sound does add extra equipment and additional procedures for synching, there



■ **Figure 15-9** Single-system sound uses the video camera (b) to record both picture and sound on the same record media. The addition of a dedicated sound person using a boom (a) can provide greater flexibility (see also Fig. 15-23).



■ **Figure 15-10** Double-system sound uses two devices: the camera to record the image (c), and a sound recorder to record the audio signal (b) coming from the boom op and his microphone (a). Because these two devices work independently, a slate (d) must be used to provide an audio/visual point of reference to sync picture with sound in post.

are many advantages to going double-system, and for narrative projects it's particularly recommended and extremely common.

Why Double-System for Narrative Projects?

There are two good reasons filmmakers choose to shoot double-system on a digital production. The first is audio quality. The audio components built into most digital camcorders or DSLRs are not of the same quality as those found on a dedicated, professional digital recorder. While some digital cameras have fine audio specifications, many deliver sub-standard audio quality (i.e., 32kHz, 12-bit audio only) and the cheap circuitry and poor pre-amps can introduce unwanted noise into the signal. Especially dreadful are the unshielded 1/8 inch mini plug audio inputs that are found on most DSLR cameras. The second reason is just as important: flexibility and control. Recording your audio on the camera means that you are compelled to monitor the input levels on the camera itself. Camera operators do not want to (nor should you want them to) be responsible for monitoring audio levels. The trouble is that camera folks don't want sound people hanging around the camera either. For narrative production, it's just a pain for the audio equipment to be on the camera and the sound team to be hovering around checking levels while the D.P. is trying to line up shots. It's true that adding a portable field mixer in the audio chain between the mic and the camera can ameliorate this awkward situation, but there are still limitations to recording single-system on a camcorder or DSLR, so wherever possible a narrative filmmaker should opt for double-system sound (see *Sound Recording Direct to Camera* and "Portable Field Mixers", starting on page 377).



■ **Figure 15-11** Double-system sound always requires a way to sync the picture and sound in postproduction, with the use of a slate being by far the most common method. Still from Scorsese's *The Last Temptation of Christ* (1988).

The Slate in Double-System Recording

As I mentioned earlier, double-system sound always requires the additional step of syncing audio to the picture in postproduction. This is where the slate comes in (**Figure 15-11**). The **slate** (also called **sticks**) is used for two reasons: one is to place a positive visual identification at the head of every take (including, scene, shot, take, and sound number) and the other is to create a one-frame, easily identifiable reference "moment" with which to line up the picture and sound later in postproduction. That moment is the sharp closing of the slate sticks, which is recorded by the camera and the audio record deck at the beginning of every take. Later, when syncing up the image with the sound, it is easy to find the exact visual frame in which the slate sticks make contact. Next, you find the "clap" of the two sticks meeting on the



■ **Figure 15-12** A properly shot and recorded slate is the perfect audiovisual point of reference in postproduction. The frame where the slate is clapped is marked in the video file (a), and then the sound file is positioned so that the sound of the slate clapping (b) is aligned with the marker. Video and audio are now in sync.

audio track, which can be heard and *seen* using the waveform function on your editing software. This spike in the waveform where the sticks “clap” is called the **attack transient**. Then you simply line up the clap picture with the “clap” audio and everything after that point, for that take, should be in sync (**Figure 15-12**). (See page 475 for the procedure.)

Another method for syncing double-system audio involves using a **timecode slate**. If your audio recording device generates timecode (like the Zoom F8 or Sound Devices 702T), then you can use a timecode (TC) slate, which receives the same timecode numbers (via wireless or cable link) that are being laid down on the sound track (**Figure 15-13**). When the clapper sticks snap together during slating, the timecode number freezes at that moment and then returns to 00:00:00:00. With a timecode slate, syncing is done by reading the last timecode number off the slate picture and then simply typing in the same timecode number to locate the exact sync point on the sound track. We will discuss syncing footage in more detail later in the postproduction chapter.

■ DIGITAL SOUND RECORDING

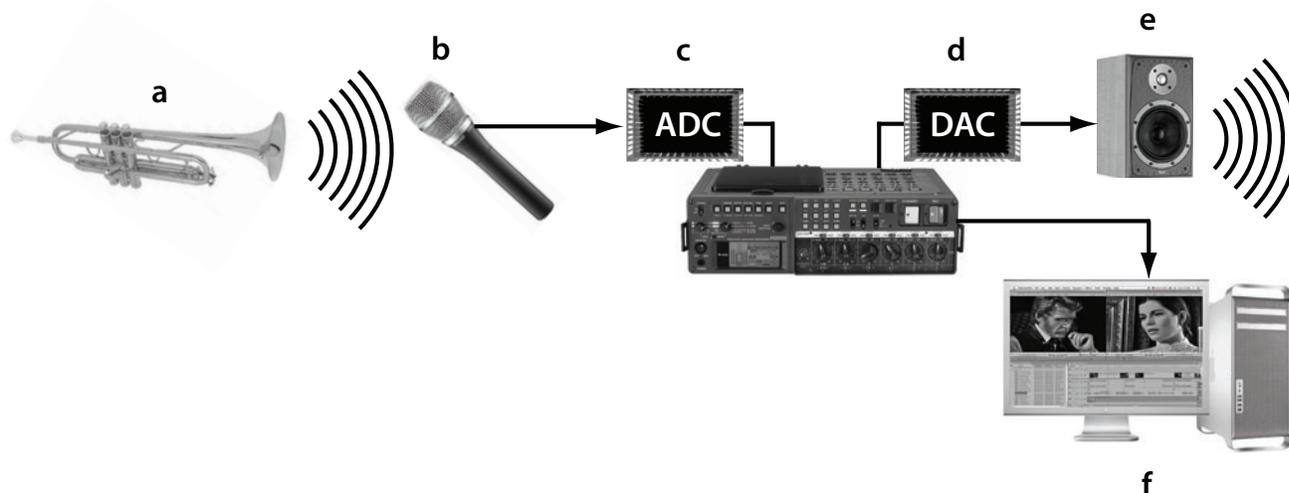
The Basic Signal Path

Let’s look at the basic signal path of a digital recording situation to see how sound starts out as an acoustic source, which is transformed into an electronic signal, then is turned into data, only to be transformed back into acoustic sound again in the end (**Figure 15-14**):

1. Sound recording begins with the **source** of sound, which emits acoustic energy (sound waves).
2. These sound waves enter the microphone, where a diaphragm, magnets, and coil (see page 379) convert the acoustic energy into fluctuations of electrical voltage that are analogous to the



■ **Figure 15-13** A timecode slate makes synchronizing even easier, because it displays the same timecode being recorded with the audio.



■ **Figure 15-14** An acoustic signal (a) is translated into an electrical charge by a microphone (b) and is then converted into digital information via an analog-to-digital converter (c). These data are stored on memory cards or hard drive and later downloaded into a computer for syncing and editing (f). A digital-to-analog converter (d) reverses the process when we play the recorded sound (e).

original sound waves. This fluctuating voltage created by a microphone is called a **microphone** (or **mic**) **signal**, which is sent to the digital audio recorder (or camera's audio input) via a microphone cable.

3. The relatively low-voltage mic signal first passes through a **preamp**, where the signal is boosted, and then goes to an **analog-to-digital converter (ADC)**, which samples the analog audio information and translates it into binary code (a series of 1s and 0s). The sequencing of binary data ultimately represents the aural characteristics of the source sound. The digital information is stored on some form of recording media; this could be a hard drive or memory card depending on the recorder you use.
4. When playing the audio back, the data are sent to a **digital-to-analog converter (DAC)**, which changes them back into electronic energy and outputs a **line signal**, which is the audio signal between audio components. *Be careful not to mix up line and mic. signals—a mic. signal is a low level signal that comes from a microphone that requires boosting with a preamp, while a line signal is essentially the much stronger signal after it has been boosted so that it can flow between audio components.*
5. The audio line signal can then travel to speakers or headphones, where magnets, sound coils, and cones convert the electronic energy back into acoustic sound waves that travel through the air and are received by our ears.
6. The audio data can also be transferred to the editorial hard drives and back-up drives by inserting the memory card into a computer's card reader, or transferring directly via USB or Thunderbolt connection.

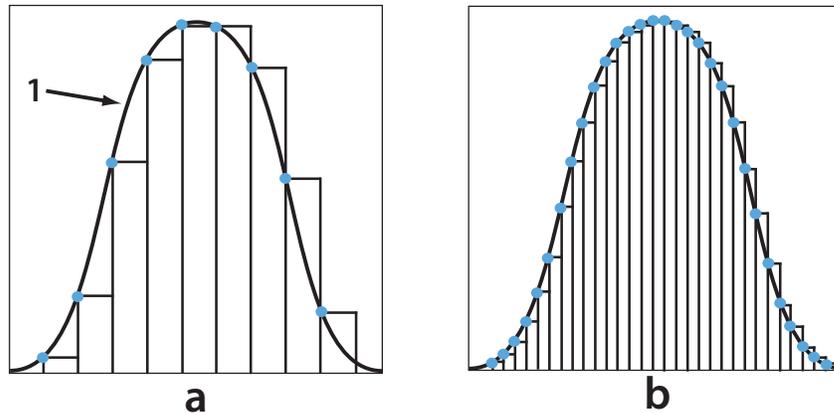
Digital Audio: Quality Matters

The number one factor in determining the quality of any digital recording has nothing to do with the cost of your equipment, quantizing, sample bit rates, or signal-to-noise ratios—any professional sound mixer will tell you that microphone choice, mic placement, and recording technique can make lower-end recording gear sound great, or a state-of-the-art recording system sound terrible. We will discuss recording and microphone technique in depth in the next chapter.

The other, more objective parameters that determine recording quality are found primarily in the analog-to-digital conversion process, especially as it relates to how thoroughly and accurately the analog information is measured before it is assigned its representative data.

Sampling, Bit Depth, and File Formats

Similar to digital video, **audio sample rates** determine how many times a sound (the sine wave of that sound) is measured per second. One **sample** is a single measurement



■ **Figure 15-15** The process of converting analog sound (1) to a digital format involves sampling the signal at regular intervals. The lower the sampling rate (a), the less accurate the digital version will be; a higher sampling rate (b) creates a more faithful reproduction of the original sound.

of amplitude, sort of like a snapshot of a piece of that sound, and primarily determines the frequency response of the recording. The more samples, the higher the sample rate, and therefore the more accurate the reproduction will be because more frequencies will be measured (**Figure 15-15**). Higher sample rates produce better quality sound, but they also take up more storage space on your storage media. The most common sample rate for recording professional quality audio in the field is 48kHz (that is, 48,000 sample measurements per second). As a point of comparison, the standard sample rate for audio CDs is 44.1kHz (you'll find this sample rate on a few recorders and camcorders). Any sample rates lower than 48kHz (like the once common 32kHz) is considered sub-standard. Some high-end audio recorders will offer the option to record with sample rates as high as 96kHz and even 192kHz (!), but most sound mixers agree that this is quality overkill for field recording. In general, it's best to stick with the standard recording sample rate of 48kHz.

The second, and perhaps more easily perceptible, measure of audio quality is bit depth. **Bit depth** (also called **word length**) is a measure of the accuracy and detail of each audio sample, determined by the number of binary digits (bits) assigned to each sample. The greater the bit depth, the better your audio quality will be because the sine wave, in all of its complexity, is more accurately defined. Imagine having a ruler that is divided into $\frac{1}{4}$ -inch units. If any measurement falls between the $\frac{1}{4}$ -inch marks, it will be rounded up or down. This ruler doesn't give you particularly accurate measurements. Now imagine a ruler that is divided into $\frac{1}{48}$ th-inch units and another that is divided into $\frac{1}{96}$ th-inch units. These rulers will measure far more accurately because measurements that fall between markings will be rounded only slightly. Bit depth works the same way, with a sound being measured, more or less accurately, through the number of sampling "levels." A 4-bit sample will measure 16 levels, an 8-bit sample will measure 256 levels, and a 16-bit sample will measure 65,536 levels. With each bit you add, you double the number of values defining that sound, so with 24-bit audio, there are 16,777,216 levels! With greater depth a more accurate picture of the original sine wave will be rendered and consequently the larger your audio files will be (requiring more storage space). The process of rounding up or down areas of the sine wave that are not measured is called **quantizing**. With more bits, you reduce the quantizing error of the recording. In the field you will often encounter 12-bit audio (sub-standard), 16-bit audio (very good quality, the standard bit depth for CDs and standard definition DV), 20-bit audio (great quality, standard on HD video camcorders), and 24-bit audio (superior quality on professional sound recorders). It's always recommended that you use the best bit depth you have available.

The mechanism described here, for digitally converting an analog signal by taking a sequence of discrete individual samplings and then storing that data in a sequential binary format, is called **LPCM audio (linear pulse code modulation)**. LPCM audio is an

uncompressed encoding method, and it is by far the most pervasive digital recording process for professional audio field recorders and HD camcorders. The most popular audio file formats for audio field recording **.WAV** (PC standard format) and **AIFF** (Mac standard format) use LPCM encoding. Both formats work fine in nearly any editing system, but the one you use will depend on your technical workflow and what you need in postproduction. More important is to remain consistent for all your field audio recording. For film audio it's *never* recommended to record to any compressed file format, like MP3.

■ SETTINGS FOR DIGITAL AUDIO FIELD RECORDING

To summarize the information in this section, here are the standard settings for high-quality digital audio field recording:

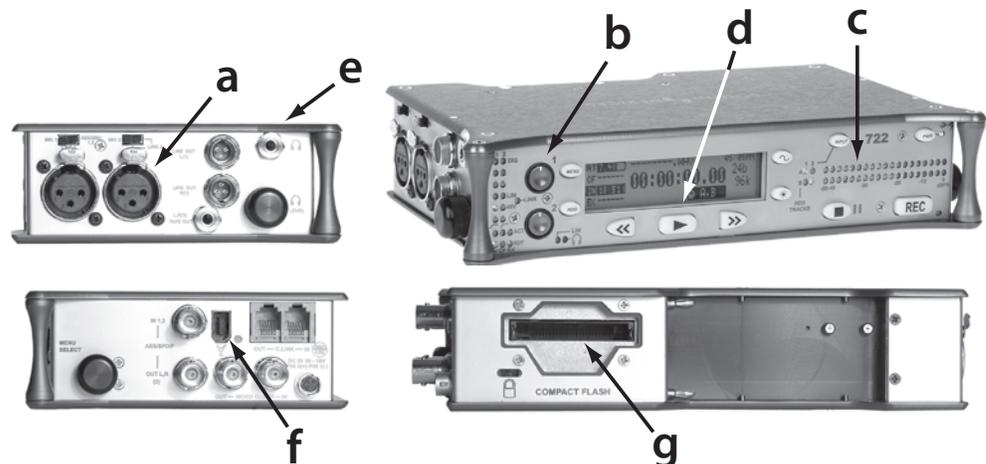
Sample rate: 48kHz	Bit depth setting: 24-bit	Audio file formats: .WAV or AIFF
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It is certainly not a catastrophe if your equipment limits you to 44.1kHz sampling rate or 20- or even 16-bit depths; you can still record acceptable audio with the proper miking techniques. However, going below these specs (i.e., 32kHz, or 12-bit depth) is not recommended and you should look for better recording equipment before you go on your shoot.

■ PRODUCTION SOUND TOOLS

The Digital Sound Recorder

All portable digital sound recorders used for film production record LPCM audio and are essentially the same in their basic features and operation (Figure 15-16). These features include microphone inputs, record level controls and meters, recording controls, and audio outputs. However, the difference between digital recorders centers on how the audio data are stored. We will look at that feature later in this chapter.



■ **Figure 15-16** All professional sound recorders have these essential features: mic inputs and preamps (a), record level potentiometers (b), a peak meter (c), controls for record, play, and searching (d), headphone jack (e), audio/data outputs (f), and record media bay (here it's compact flash) (g)

Microphone Inputs and Preamps

True XLR microphone (mic.) inputs are essential for film production. XLR connectors are the professional standard connector for microphones, mic cables, and audio recorders (see page 383). If it's possible, stay away from any recorder with 1/8-inch mini plug inputs, which you often find on consumer audio equipment and DSLR cameras. Portable field recording

decks typically have between two and four separate microphone **inputs**, also called **channels**, and this allows multiple microphone setups. Each channel can be monitored, controlled, recorded, and transferred as a distinct audio track. Decks with more than four inputs are indeed available, but start to become cumbersome for small-scale film production.

Preamps in the recorder boost the mic signal input. However, the quality of your audio not only depends on the sampling rate and bit depth, but on the quality of the components inside the recorder. Cheap preamps can be a major source of unwanted system noise and will “dirty up” your 48kHz, 24-bit audio so much that it sounds terrible. **System noise** is electronic junk that contaminates the audio signal we want to record. The specifications for the system noise of any particular recorder are measured by its **signal-to-noise** (S/N) ratio, which is the ratio between the audio that we want to record (signal) and unwanted interference (noise) that contaminates that signal. Signal-to-noise ratio is measured in decibels, and the higher this ratio is, the “cleaner” your audio signal will be when it’s recorded. For example, an audio deck that has a signal-to-noise ratio of 55dB (55:1) means that 1dB of noise will be detectable when a signal of 55dB is played back after recording. A signal-to-noise ratio of 95dB (95:1), however, means that the playback signal can be as high as 95dB before we detect any noise at all. Professional digital field recording decks should come in at 80dB or higher—which is extremely clean audio. Again, the first indicators of cheap audio circuitry are mini plug audio inputs (**Figure 15-17**).



■ **Figure 15-17** DSLR cameras (pictured) and consumer grade audio equipment commonly use a mini plug for connecting microphones. This connection is flimsy and prone to interference and should be avoided if possible.

Level Control Potentiometers and Meters

Adjusting and monitoring the strength of your audio signal is at the heart of the sound recordist’s craft. The term **levels** refers to the strength of your audio as it enters the recorder and the degree to which we boost or lower that audio with manual **level controls**, sometimes called **gain controls** or **pots** (short for **potentiometers**). This adjustment determines the strength of the audio signal recorded and is called **setting levels**. On professional recorders you will have one level control for every microphone channel, allowing you to adjust the levels of each microphone independently. Setting levels is aided by a **peak reading meter** (**Figure 15-18**). The peak meter is a highly sensitive instrument that has a one-to-one level correspondence with all sounds entering the recorder. In other words, it reacts to and measures every sound. This allows the recordist an accurate indication of absolute peak levels in any recording situation. Each mic input will have its own corresponding peak meter. Meter displays can be quite different from machine to machine, including pivoting needles, colored LED lights, or backlit LCD displays, but they are all calibrated in decibels that run from $-\infty$ dB on the extreme low end, through -40 , -30 , and -20 dB, and so on, to 0dB on the high end. At $-\infty$ dB there is no signal at all and you will record no sound. If your signal strength exceeds 0dB your audio is too strong and



■ **Figure 15-18** Peak meters are essential for monitoring the strength of the signal being recorded. Peak meters can be LED based (left, showing a two-channel meter) and LCD based (right, showing a four-channel meter).

will become distorted. We will discuss recording techniques and using gain controls and meters in detail in Chapter 16.

Controls and Audio Outputs

Play/Record/Stop control buttons obviously control the starting and stopping of audio recording and playback (to check sound quality and details after recording). A **headphone jack** is standard, because fully isolated headphones are essential for monitoring audio during recording. Headphone outputs often have their own volume control. Beware, however, that you do not mistake the headphone volume level for the record volume level. Headphones are used primarily to monitor the content of your audio, *not* the audio levels as they are being recorded—the peak meter is the device by which we determine record levels (see Chapter 16). When I was a student shooting my first sound film, my mixer had the headphone volume turned all the way up, but the record levels, which he never looked at, were way below standard. The result was audio that he could hear okay in the headphones, but that was recorded “in the mud.” In the end I couldn’t fix the audio and I was forced to reshoot those scenes. **Audio data outputs** send the recorded audio out, either to monitors in the field for playback, or to an external hard drive for backup, or to both simultaneously.

Record Media: Memory Cards

Beyond the common features of any digital field production recorder, one difference between field decks is their **recording media format**—meaning how they store the audio data. Most audio field recorders record in the .WAV file format, but how they store those .WAV files differs. Digital recording formats come and go as the technology evolves, but there are a few standard formats that one is likely to come across.



■ **Figure 15-19** With no moving parts and consuming very little power, SD (pictured) and CF memory cards allow for small, yet sturdy digital recorders.

Most digital audio recorders today use **memory cards**, either **SD cards** (including **SDHC** and high capacity **SDXC**) or **compact flash (CF) memory**. This storage media option became so popular because they are lightweight, easily available, and inexpensive. Also, SD and CF card readers interface easily with computers for backup, and later ingesting. Once a memory card has been backed-up, it can be re-formatted and used again, and again, and again. And speaking of backup, some high-end audio recorders allow you to record to two separate SD cards simultaneously, so you get an immediate safety backup without dumping the data to a hard drive. Finally, compared with the tape-based formats of yesteryear, memory cards contain no moving parts, which mean there is less to break down, they are reliable in extreme conditions, and they use very little battery power. Although the storage capacity of memory cards was limited at first, we are seeing exponential leaps in storage space even as the price per gigabyte becomes cheaper. Almost every major sound recording equipment manufacturer has developed portable SD or CF audio recorders (**Figure 15-19**).

Record Media: Hard Drive Recorders

Hard drive recorders write their data directly to an internal hard drive—what could be simpler? Most portable units intended for film production use a 2.5-inch shock-resistant internal hard drive. Depending on the size of the hard drive, these recorders can store many hours of audio without changing media. Hard drive recorders also interface with computer editing software seamlessly and have a reputation for being quite robust; temperature, humidity, and motion have little effect on the functions and recording. The convenience and robustness of hard drive recorders come at a price, however, as they are among the most expensive machines available. Ultra-high-end, professional hard drive recorders (like the Nagra VI, Sound Devices 744T, or the Aaton Cantar X-2) include simultaneous

recording to memory cards and also include USB connection to a tertiary storage device, like an external hard drive (Figure 15-20). Now *that's* safety!

Sound Recording Direct to Camera

As I mentioned earlier, for narrative filmmaking it's usually a good idea to go with double-system sound recording (see page 370). However, if you have no choice but to shoot single-system sound with your camera recording both sound and picture, you can still get acceptable audio—depending on your camera. Many HD camcorders like the Canon C-300 and Sony PMW-F3 offer very good quality audio sampling specifications (e.g., 48kHz and 16-bit audio) and professional XLR mic. inputs. Also, most HD camcorders with XLR connectors usually offer two microphone inputs with independent **manual level control** capability—meaning you can set the levels for each mic where you want it. But a word of caution, the preset for many cameras is **automatic gain control**, meaning the camera will set your levels for you—this is not good. If you must go single-system sound, it is essential that the camera has a **manual override** function or your audio will sound amateurish despite excellent sampling specs (see page 391 for more detail on this issue). In Chapter 16 we explore in detail the proper method for setting levels manually. In any case, HD camcorders that offer these audio options are definitely capable of recording good quality audio with a single system setup. But audio monitoring convenience is still an issue, so a portable field mixer is definitely recommended (see next section).

Interestingly, many of the ultra-high-end resolution Digital Cinema cameras discourage single-system sound entirely. The Blackmagic Production Camera and Red Scarlet only provide mini plug audio inputs, while other D-Cinema cameras, like the Arri Alexa, will only receive a line level input from the audio mixer/recorder but not a mic. signal. Clearly, D-Cinema camera manufacturers assume that anyone seeking ultra-high-quality (e.g., 2K, 4K, RAW) footage will likely be shooting double-system sound rather than relying on a camera to record audio.

DSLR cameras are especially problematic when it comes to recording audio. Very often the sampling quality is below that of HD camcorders and being essentially photo cameras, their audio circuitry is suspect, not to mention that they usually only provide one mini plug audio input. It's not impossible to do single-system sound with a DSLR, but it's really not the preferred way to go if you want professional results. BUT, if you absolutely have to, then you'll need an adaptor to convert your XLR mic. connector to the mini plug. Also, as with all single-system setups, a field mixer is especially useful given the very awkward, menu-based audio level controls on most DSLRs (see next section).

So, why are the mini plug audio inputs (a.k.a. 3.5mm or 1/8 inch) found on many low-end camcorders and DSLRs problematic? These connectors are fragile, prone to poor contact, and are very easy to accidentally pull out during a take. Also, mini plugs are unshielded and unbalanced and no professional level field recording microphone uses a mini plug. To work around this problem, many people use an **XLR-to-mini adaptor** (called a **pigtail**) so that they can use professional external microphones. This, of course, is better than nothing, but the problem with this solution is that it converts your lovely balanced, shielded audio into an unbalanced signal, vulnerable to interference and noise. A number of years ago I was shooting a short film with an HD camera and using a professional microphone connected to the camera with an XLR-to-mini adaptor. After a few takes into our shooting, the sound recordist noticed that we were picking up a Top-40 radio station. When we



■ **Figure 15-20** Some high-end digital sound recorders like the Nagra VI (*top*) and the Aaton Cantar-X2 (*bottom*) store data directly to an internal hard disk as well as memory cards for safety backup.



■ **Figure 15-21** Although it is possible to get an XLR-to-mini cable (*left*) to use professional microphones with 1/8th-inch mic inputs, a mountable adaptor like the Beachtek (*right*) provides a sturdier solution.

played back the tape we could hear it. It was very faint, but sure enough, there was Britney Spears leaking onto my audio track!

A better solution than pigtails is to use a camera-mountable adaptor with preamps and XLR connections (**Figure 15-21**). Available for camcorders and DSLR cameras, these adaptors allow you to use XLR cables, and some even provide a shielded mini cable to the camera—two big advantages. However, where you find mini plugs you may also find cheap preamps and audio circuitry adding system noise to your signal, so don't expect miracles.

Portable Field Mixers

Portable field mixers (also **microphone mixers**) are small audio consoles that allow for independent level control of multiple microphone inputs (usually four to six) which then output this audio as either a microphone or line signal to your camera if you are shooting single-system sound (**Figure 15-22**). Located in the signal chain between the microphones and the camcorder audio input, sound recordists find portable mixers an indispensable tool because camcorder and DSLR level controls are always right on the camera body itself and it can be very awkward to have the sound recordist hovering around the camera setting levels (not to mention the possibility of shaking the camera if an adjustment needs to be made during a take). Using a field mixer enables the sound recordist to precisely monitor and control levels (and use multiple microphones) at a distance. The output of a field mixer can connect with the camera via a standard XLR cable or via a wireless connection for true independence of movement (**Figure 15-23**). Field mixers are also small enough to be worn in a carrying case over the shoulder, especially convenient if there is only one sound person who is also holding the boom.

As we will see in Chapter 16, field mixers are also handy and very common when shooting double-system sound because of their capacity for simple monitoring of multiple microphone inputs and outputs.



■ **Figure 15-22** Field mixers allow precise control over the recording levels of several inputs. Pictured are two popular three-channel mixers, the Sound Devices 302 (*left*) and the Shure FP33 (*right*).

MICROPHONES

Simply put, a **microphone** (**mike** or **mic** for short) is a device that converts acoustic energy (sound waves) into electrical energy (electrical signal). All microphones are constructed with a diaphragm, a thin membrane that is extremely sensitive to the acoustic vibrations of air particles. The vibrations of the **diaphragm**, which correspond to the sound waves buffeting it, are translated into fluctuating voltage. We say that this voltage fluctuation is analogous to the movement of the acoustic energy, in other words, microphones generate an analog signal.

There are three basic ways that we identify microphones: One is by the method they employ to make this conversion from acoustic energy to an electronic signal; the second is by their frequency response, meaning their sensitivity to the sound spectrum; and the third is by their directionality, meaning the area and range of their pick-up sensitivity. Let's look at each one of these microphone characteristics.

Dynamic, Condenser, and Electret Condenser

A common type of microphone for film and video field production is the **dynamic microphone**, which generates a signal through electromagnetic principles. This microphone is sometimes called a **moving coil microphone**, after the element that converts the acoustic energy into an electrical signal. Basically, a dynamic microphone element consists of a highly acoustically sensitive diaphragm to which a wire coil, with a permanent magnetic charge, is attached. This coil is called the **voice coil** and is suspended around a permanently fixed magnet. As the diaphragm responds to a particular sound source, the coil moves up and down with the vibrations of the diaphragm. The movement of the magnetized coil through the electromagnetic current of the permanent magnet produces an electrical output that is analogous to the original acoustic vibrations (**Figure 15-24 left**).

Dynamic microphones are renowned for their rugged construction, which makes this kind of microphone a favorite on location shooting. They are also less expensive than other types of microphones. Naturally, many of the technical factors, such as sensitivity and frequency range, depend on the manufacturer of the mic, but as a general rule dynamic mics are fairly sensitive and also have a fairly good frequency response. In close mic situations they are more than adequate, which is why news reporters who report from the field usually use these mics. When greater sensitivity and frequency response are necessary, then we usually turn to the condenser microphone.

Condenser and **electret condenser** microphones work on a similar principle; however, instead of using an electromagnetic current (like the dynamic mic), condenser and electret condenser mics work on voltage fluctuations within an electric **capacitor** (another name for condenser). The capacitor is made of two round plates oriented parallel to each other, with a very narrow space between them called the **dielectric**. One plate is the microphone's diaphragm, a movable acoustically sensitive membrane; the other is a fixed plate called the **back plate**. Both of these plates are charged with polarized voltage. When sound waves buffet the diaphragm, the voltage relationship between these plates changes correspondingly, which results in the audio signal. The output signal of

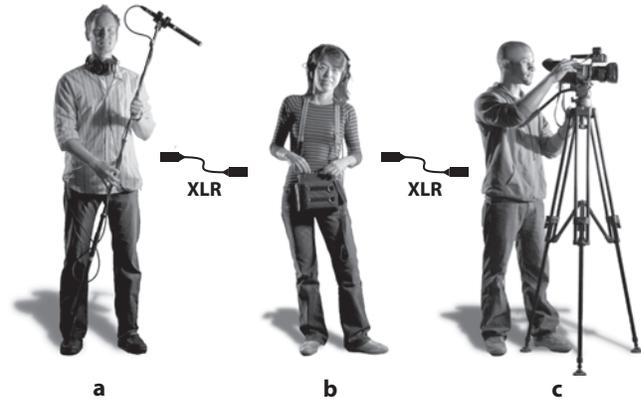


Figure 15-23 A typical single-system sound configuration. Boom operator (a), sound recordist adjusting levels with field mixer (b), and audio recorded on camcorder (c).

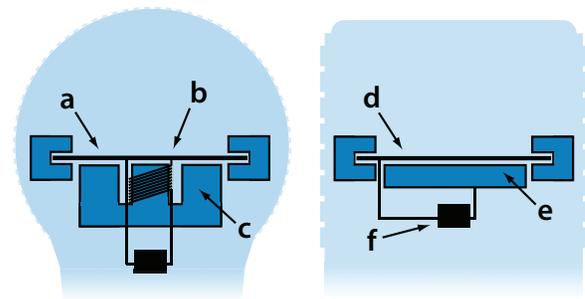


Figure 15-24 A moving coil microphone (*left*) works by converting the movement of a diaphragm (a) into an electrical charge when the coil (b) attached to it moves up and down while suspended around magnets (c). A condenser microphone (*right*) uses a positively charged diaphragm (d) and the negatively charged back plate (e) to form a capacitor; the movement between these two electrically charged plates creates voltage fluctuations that are sent to a preamp (f).



Figure 15-25 Condenser microphones, like the Sennheiser shotgun pictured, need a battery to provide the power necessary to charge the capacitor.

this capacitor is very low, so condenser microphones have a **preamplifier** built into the microphone (**Figure 15-24 right**).

In order for the capacitor to work, both plates require some source of power to provide the necessary polarizing voltage; the preamp also requires some power. Condenser mics can be powered through the use of **phantom power**, which is power provided by the record deck or a mixer, delivered to the microphone via one of the three XLR cable prongs, or through the use of a **battery power source**, which is usually located in an intermediary capsule connected to the microphone (**Figure 15-25**).

The **electret condenser** microphone works on exactly the same capacitor principle as does the condenser microphone, but one of the two plates in an electret condenser is manufactured with a permanent charge, so there is no external power source necessary. The preamp, however, still requires power, but much less than is required by a standard condenser. This is usually accomplished by a small battery located in the microphone itself (sometimes AA, or the smaller N battery, or the even smaller LR44 1.5 volt). The low power requirements allow for a more compact design, which is always welcome in field production. Condenser microphones are generally more sensitive than dynamic mics, both in terms of pickup distance and frequency response. They are especially good with high-frequency audio. However, they cost more than dynamic mics and are considerably more fragile.

Microphone Frequency Response

Frequency response refers to the sensitivity of a given microphone to frequencies in the sound spectrum. This measurement is represented on a frequency response graph (**Figure 15-26**). The x-axis on this graph measures the microphone’s response in dB, and the y-axis measures the frequency. A perfect microphone would have an equal response throughout all frequencies of the sound spectrum. If we were to plot this perfect response on a graph, the line would appear perfectly flat. This would be the theoretical, perfect **flat response**. Flat response in the real microphone world means that, given a large frequency range, a microphone can respond fairly equally throughout. For most microphones, when the extremes of their capabilities are reached, the response dips. All professional microphones come with a spec sheet that will indicate the instrument’s frequency range.

Some microphones come with a **low-end roll-off** switch so that one can choose to make the microphone less sensitive to low frequencies, which are often caused by wind or machine noise in the field. A roll-off switch usually has two symbols. It is generally agreed that it’s always best, if given a choice, to leave the microphone on flat response, gather as much of the frequency range as possible, and then tweak your audio in postproduction, where graphic equalizers can be much more precise in removing unwanted frequencies (**Figure 15-27**).

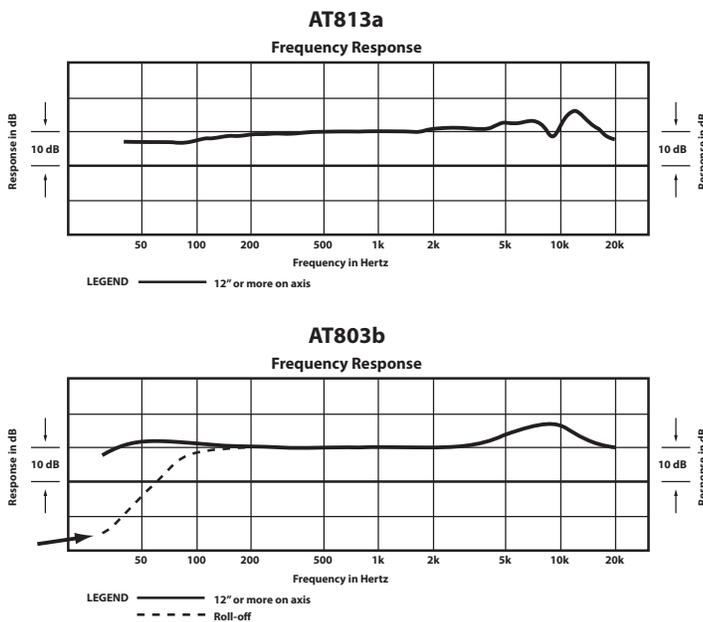


Figure 15-26 A frequency response graph plots how sensitive (measured in dB, on the x-axis) a microphone is to a range of frequencies (measured in Hz on the y-axis). Note that the AT803b, an omnidirectional lavalier condenser microphone, has a “roll-off” option that affects its sensitivity to low frequencies (*arrow*).

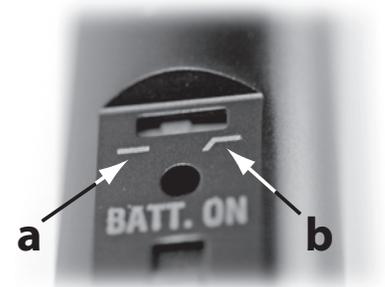
Microphone Directionality

In addition to the method of generating the electronic signal (dynamic versus condenser), we also identify mics by their **directionality** (also called **pickup pattern**), which distinguishes the area and range within which the microphone will respond optimally. This is a critical factor in choosing the right microphone for any given recording situation, as different microphones are constructed to have specialized directionality characteristics. In simple terms, directionality is

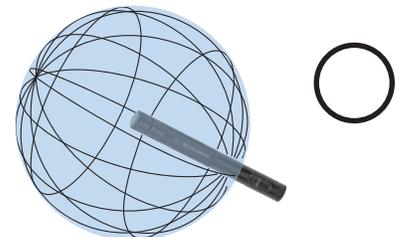
sometimes described by a microphone's basic **angle of acceptance**, which is the area from which a microphone will gather sound. Mics are often broadly categorized as **nondirectional** (wide angle of acceptance), **directional** (limited to a medium angle of acceptance), and **ultradirectional** (very narrow angle of acceptance). However, the **polarity pattern**, represented in **polarity graphs**, is a more accurate three-dimensional conceptualization of a microphone's pickup pattern.

Omnidirectional

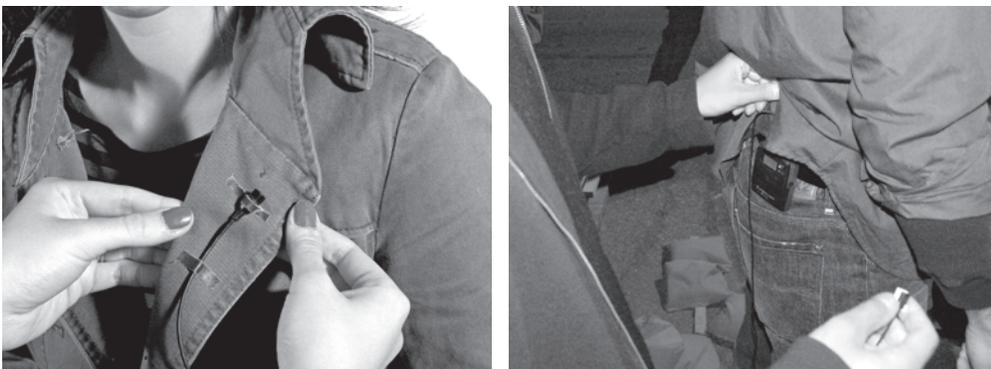
An omnidirectional microphone (Figure 15-28) picks up audio from all directions equally (called a broad or wide pickup pattern). This microphone is a good choice for recording general ambient sounds (like crowd noises) or for miking a scene where sound emanates from a number of different directions or for groups of people (e.g., four friends gathered around a table for dinner). This is also a good choice for interviews in which you want both the interviewer and the interviewee to be mic'd and recorded equally. A **lavaliere** microphone (**lav** for short) usually has an omnidirectional pattern but also has a highly specialized function. Lavalieres are tiny, clip-on mics that can be attached to a lapel or tie or easily hidden under a collar, and they are used for close miking talent (Figure 15-29). However, as tiny omnidirectional mics, they are handy for hiding in the middle of a scene, say behind a candle during a dinner table sequence. One must be aware, though, that these mics are intended to be placed near the chest of a speaker, where a great deal of bass is generated, so many lavs employ some degree of low-frequency roll-off (see Fig. 15-26). Using them as an omnidirectional mic in a crowd situation can result in somewhat thin sound.



■ **Figure 15-27** Some microphones have a “low-end roll-off” setting (b) that makes them less sensitive to low frequencies, usually caused by wind or machine noise. The flat response setting (a) is preferable for most situations.



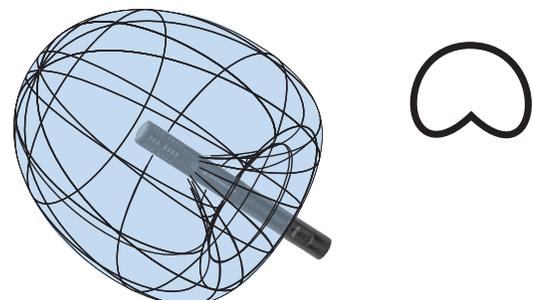
■ **Figure 15-28** The pickup pattern of an omnidirectional microphone allows it to capture sound equally from all directions.



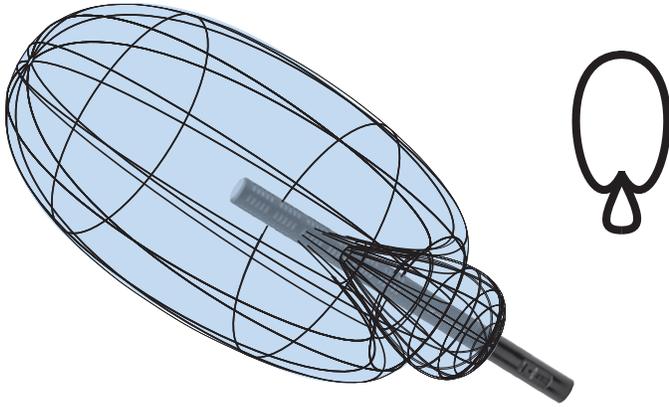
■ **Figure 15-29** Lavalier microphones must be carefully hidden on talent (left) and are perfect for situations where a boom microphone cannot be used or when close miking is needed. If the lavalier is wireless, the transmitter (right) must be concealed as well.

Cardioids

The pickup pattern of a **cardioid** microphone (Figure 15-30) is just as its name suggests (cardioid/cardiac): heart shaped. The pickup pattern is somewhat directional, so the mic can be aimed specifically at the source of the audio, which minimizes extraneous noise yet still provides a natural ambient feel. Its sensitivity is primarily in front, with some sensitivity to the sides, but the mic picks up very little from behind, which is usually where the equipment and crew are. This is a very common microphone used in film production because it offers both control and extremely high quality. When miking a single person speaking, this is a superb choice; however, this mic needs to be placed quite close to the source of sound to deliver a strong audio signal without too much extraneous ambient noise. For a person speaking in a normal tone of voice, optimal



■ **Figure 15-30** A cardioid microphone has a pickup pattern that favors sound coming from the front and sides, but not from behind.



■ **Figure 15-31** Hypercardioid microphones have a narrow range of acceptance that greatly favors sound coming directly from the front, allowing them to be positioned somewhat further from the sound source.

placement is around 1–2 feet. What this means is that if your frame is wider than a close-up you may need a different microphone.

Directional Mics: Supercardioids and Shotguns

The next category of mics, **directional mics**, actually covers a wide range of microphones that share the same basic principle—their pickup patterns are more frontal directional than a cardioid, meaning that they respond principally to sounds directly in front of the mic while rejecting ambient sounds from the side (**Figure 15-31**). This is accomplished by using a tube (long capsule) with slots cut into the sides that reject off-axis sounds. The specification that differentiates these mics is their *degree* of directionality and ability to reject sounds that are

“off-axis.” As a general rule, the longer the microphone barrel the more directional it is. These microphones can be anywhere from 7 inches in length to 20 inches!

Supercardioid (a.k.a. **hypercardioid**, **short shotgun**) has a slightly elongated heart shaped pattern compared with the cardioid because it is more directional in its ability to reject sounds from the sides. This is easily the most common microphone used in film production. The sound quality is very high, yet their increased directionality allows it to be positioned a bit farther away (around 3–4 feet) from the subject making it more versatile for a variety of camera framings.

Shotgun (a.k.a. **line mic**) has the longest barrel tubes and an even narrower range of acceptance. This allows them to be positioned at an even greater distance (4–7 feet) to get an acceptable signal without excessive ambient noise. These mics are especially useful for very wide framings; however, one needs to be a bit careful. Shotguns work great outdoors, but they are tricky to use in interior spaces. Not only will they pick up the sound directly from the source, but also they will easily pick up the reflections of that sound, resulting in a boomy quality to the audio. And, even in exterior spaces, one must be careful about sounds reflecting off surfaces within the mic’s direct pickup pattern. For example, I had a student shoot a couple seated at a small table in a garden restaurant with a concrete wall directly behind them and a small fountain in the garden (off screen). It was a wide two shot, so the student sound recordist pointed a shotgun microphone *between* the couple hoping to pick up both their dialogue. But the extreme directionality of the mic actually rejected their dialogue (off-axis) and picked up and exaggerated the sound of the fountain that was reflecting off the wall behind them.

Microphone Distance Factor

So, why must a cardioid be placed within 3 feet of a subject while a shotgun can be up to 7 feet away? It’s important to know that the reason we are able to mic a subject from further away has to do with the microphone’s directionality and its ability to reject background noise, and not because of any increase in mic “sensitivity.” This phenomenon is called the **distance factor** and yes, there is a mathematical formula for figuring out the distance factor of various mics. But the essential principle is this: the more directional a mic is, the more it favors the direct sound source and rejects ambient noise from the sides; therefore, we are able to raise our record levels on the sound recorder and thereby position the microphone further away relative to where we would position an omnidirectional or cardioid mic for acceptable sound.



To hear interactive recorded samples of these microphone types so that you can compare their unique pickup qualities, go to Interactive Figures 15-28 through 15-31 (interior and exterior) on the *Voice & Vision* companion website.



■ **Figure 15-32** The standard professional audio cable is the XLR, a tough and inexpensive solution for sending balanced, distortion-free audio between microphones, mixers, and recorders.

The XLR Connector

Most professional-quality microphones send a mic signal that is a **balanced output** utilizing the standard **XLR** professional microphone connector (**Figure 15-32**). A balanced output means that the signal is running in opposite directions along two wires within the microphone cable. This effectively cancels out any noise. XLRs are also **shielded cables**, meaning that they incorporate a wire mesh shield that covers the two hot wires and is connected to ground. This shield greatly protects the signal from interference caused by AC or fluorescent hum and intrusive radio frequencies. This is precisely the shortcoming of the 1/8 inch mini microphone inputs on some camcorders and DSLRs. In general, mini plugs are neither balanced nor shielded. The other advantage to the XLR connectors and cables is that the actual connectors are rugged and the male end of the connector fits with the female end through a tongue-and-groove fit and a spring lock, providing for a strong and stable connection that cannot be inadvertently pulled loose. This is especially useful when linking a number of cables together to lengthen the reach of the microphone. One final advantage is that some condenser mics do not contain an internal battery and need **phantom power** which is DC power provided by the record deck or a field mixer. For those mics, phantom power is delivered to the microphone via the prongs of an XLR cable.

Wireless and On-Board Microphones

Wireless Microphones

Wireless microphones (also called **radio mics**) consist of a small pocket-size transmitter to which a microphone (very often a lavalier) is attached, which transmits the electrical audio signal via VHF high-band or FM frequencies to a receiver; the receiver itself is connected to the input of the record deck. Using wireless lavaliers allows close miking while maintaining the talent's freedom of movement, because they carry both the concealed microphone and the transmitter on their person (**Figure 15-33** and **Fig. 15-29**). In addition to wireless lavaliers, there are many radio mic systems on the market that allow you to adapt virtually any professional microphone into a wireless mic with a plug-on transmitter, which means that even the boom operator need not be tethered to the sound recorder by an XLR cable. In both cases, wireless mics allow a sound mixer to get great audio no matter how wide the framing! If there is a downside to wireless microphones, it is that they are vulnerable to interference, especially the farther the transmitter is from the receiver. Some systems use a "diversity" system that is constantly searching for the clearest transmission channel. Nonetheless, you should always have XLR cables handy.



■ **Figure 15-33** This Lectrosonics L Series digital wireless microphone system includes a transmitter (*left*), a receiver (*right*) and a M152 lavalier mic (*top*).

A filmmaker friend of mine, Didier Rouget, shot his short film *Urban/Suburban* (2006) in the Sahara Desert. He conceived of wide landscape shots following two yuppies who, even though they are hopelessly lost in the desert, cannot stop talking about real estate investments. Clearly, wireless lavalier mics were the best choice, so this is what the sound recordist brought to the desert location. As the crew was setting up for a champion shot that included the actors in the foreground with a dazzling setting sun behind them, they discovered that they could not find a clean VHF channel to transmit the audio. Even though they were in a remote corner of the Sahara Desert, they discovered that this area was North Africa's Grand Central Station for innumerable radio signals, and using their wireless system was impossible. As Didier himself wrote to me, "We actually postponed the shoot until we finally found other wireless mics with different VHF channels that work in this area. But I never found time enough to take this shot with the sun. Eventually, I was able to take only one shot, under a very cloudy sky. We all called this shot 'the damned shot.'" In the end, only Didier and his crew know that

they missed a perfect shot, because the film works beautifully nonetheless, but what's most important is how Didier concluded his letter to me: "It would have been better to shoot the first day as scheduled without sound, and postsynchronize it. Once more, I learned a lot with this experience." Indeed, in film we learn every time we're on a set, as much from hardships as from successes (**Figure 15-34**).



■ **Figure 15-34** "Waiting on sound!" Rouget's film, set in the Sahara, sits and waits until a wireless microphone problem is corrected. Production still from *Urban/Suburban* (2006).



■ **Figure 15-35** Camera-mounted microphones are commonly found on even the cheapest video cameras, but the inability to control their position in relation to talent makes them of limited use for narrative filmmaking purposes.

On-Board Microphones

Another microphone that should be mentioned is the **on-board microphone** (or **camera mic**) found on many camcorders (and some DSLRs). These are factory-provided microphones that are fixed to a mount above the lens. Professional cameras and DSLRs allow you to mount your own microphone. Generally these microphones are for news gathering or down-and-dirty documentary shooting where the camera operator is alone. The controllability of on-board mics is far too limited for most narrative filmmaking needs (**Figure 15-35**). The pickup patterns of these microphones vary from camera to camera. Lower-end camcorders often use an omnidirectional microphone, and broadcast cameras use the more directional supercardioids. Some on-board mics are switchable from omnidirectional to directional. Obviously, the more directional the on-board microphone is, the more the audio pickup is restricted to the direction the camera is facing. Conversely, omnidirectional

camera microphones often pick up noises from the camera operator and from the camera mechanisms like the servo zoom. In any case, the on-board microphone's positioning is obviously restricted by the camera angle and camera-to-subject distance. For this reason, in narrative film production, these microphones are never used to record the production field audio. However, many filmmakers leave these mics open (on auto level) to record reference audio. **Reference audio** is low-quality sync audio that you can use to roughly edit scenes together in the field (before you've managed to sync your high-quality double-system field recordings to picture). It can also prove helpful if you are experiencing any "sync issues" with your double-system field recordings.

What's Really Important

A sound person's essential gear package always includes a wide variety of microphones for flexibility in the field. This usually includes omni, cardioid, and supercardioid mics (sometimes in the form of modular condenser systems offering a single power supply unit with interchangeable heads, each with different pickup pattern). A sound person will also have enough lavalier mics (and wireless microphone systems) to wire all characters in a scene if necessary (Figure 15-36). Here is the sound recordist's basic gear package:

- Essential microphones
- Boom pole w/ shock mount
- Isolation headphones
- Sound blankets
- Sound recorder
- Windscreens
- Memory cards
- Memory cards
- Field mixer
- Multiple XLR cables
- Extra batteries (many)
- Misc. tape, logs, etc.



■ **Figure 15-36** A sound recordist's basic microphone arsenal covers all bases: sturdy dynamic cardioid microphone and modular condenser systems offering three interchangeable heads: omni, cardioid, and supercardioid (a); lavalier mics (b); and a wireless microphone system (c).

Beyond the actual gear, however, the most effective factor in getting good sound isn't related to the money spent on equipment; rather it is your knowledge of sound. A good sound person must have a thorough understanding of the nature of sound and of sound recording technique; they must have the ability to listen to the entire aural environment, understand microphone placement, and be able to troubleshoot problems quickly. In the next chapter, we will explore the techniques used by sound recordists for capturing the best possible audio.



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Location Sound Techniques

■ THE SOUND TEAM

The basic production sound team on a small-scale film project usually consists of two people, the **sound mixer** (a.k.a. the **sound recordist**) and the **boom operator**. Occasionally, on shoots with very simple location audio requirements, you'll see one person performing both roles, but when gathering sync sound, like dialogue, is part of the production, two people are highly recommended. On bigger shoots with complex sync audio needs, there is a third person called the **cable wrangler**, who sets up equipment, holds a second boom when necessary, and wrangles the cable when the boom operator follows a moving shot. The sound personnel are a tight team, and they should be chosen with the same diligence as choosing the D.P., A.C., and gaffer. The sound mixer is the head of the sound department and is responsible for getting the best quality audio onto the recording format. This not only means setting the record levels on the sound recorder but also includes understanding the acoustics and ambient qualities of a given location, listening for unwanted noise intrusions on the set, and choosing the most appropriate microphones for the situation. The sound mixer works very closely with the boom operator in strategizing optimal microphone placement. The boom operator is responsible for placing the microphone where it needs to be, whether that means holding it aloft over a scene, hiding it under an actor's collar, planting it somewhere on the set, or any combination of these. The boom operator must know the pickup patterns and capabilities of a variety of microphones and how they function in different acoustic environments (Figure 16-1).

As I have mentioned before, getting good location sound is as important to a film as getting great images, but all too often novices think about audio only at the last minute and choose the sound team either from people on the set who don't look busy or from people with utterly no experience but who are "willing to do anything" to be on a film set. But getting good quality audio in the field can make the difference between a smooth post-production process and a nasty, expensive one. To ensure the success of your shoot and your editing, it is important to choose a competent and knowledgeable sound crew who will dedicate themselves exclusively to the task of getting great sound.

Good recording technique and postproduction mixing are more important now than ever before. The digital revolution has made great quality sound recording and reproduction technology within everyone's reach—even to the point where many homes are equipped with super-high-fidelity surround sound home movie systems. So filmmakers no longer can expect that their final products will be heard through a built-in, 3-inch, mono speaker on the family TV set. Nor can low-budget filmmakers expect to show their work only as a 16mm film print with its accompanying poor-quality optical track. These days you really need great sound, because in almost every screening venue, it shows! Three factors play a major role in getting the best audio in the field: recording technique, microphone technique, and simply using your ears.



■ **Figure 16-1** The sound crew for Chu's *The Treasure Hunter* (2009): sound mixer (*right*), boom op (*center*), and cable wrangler (*left*). The importance of getting the best possible sound quality rests on their shoulders, even in hostile environments, like the windswept sands of Inner Mongolia.

While taking a break from writing this book, I was strolling through Washington Square Park in New York City and found myself watching a group of students from a nearby university shooting a sync sound film exercise. They, of course, had no idea I was a film professor taking notes for a textbook. The director very seriously selected his shot and blocked the actors' movements through the scene, all the while communicating brilliantly with the cinematographer. Off to the side, lying on the ground unattended, was the sound recording gear. After the actors and camera operator rehearsed the scene two or three times, the director turned to the others in his small production group and asked, "Who's gonna hold the boom this time?" The group shuffled their feet and cast glances at one another, but no one volunteered. "C'mon, we need someone on the boom," pleaded the director.

Finally, another actor, who was not in this particular shot, stepped forward and said "Alright, I'll do it." He grabbed the boom, planted its base in his stomach, near his belly button, and dangled the mic in the general vicinity of the camera. The director ran around to the sound recorder, slipped on the headphones and called, "Roll camera!" He then rolled sound and yelled "Action!" As the take played out, he closely watched the movements of the actors, never once looking at the sound levels. "Cut!" he yelled. And then, tossing the headphones aside, said, "That *looked* great! Next shot." He probably had a take that did look good, but he also had one that would undoubtedly give him massive audio headaches in postproduction. And me? I got a nice cautionary tale for my book.

■ SOUND PREPRODUCTION

Successful sound recording begins in preproduction. At this stage directors, art directors, and D.P.s tend to overlook sound issues, so if a film relies heavily on location sync sound recording, here are three tips for ensuring that you get the audio you want:

1. The sound mixer should go on location tech surveys to thoroughly scout the environment ahead of time. On the tech survey the sound mixer should check room acoustics and ambience and should look for any "noisemakers" at the location, like refrigerators, fans, fluorescent lights, and radiators. Then the sound mixer should check the larger environment surrounding the specific location for noisemakers such as nearby highways, playgrounds, airports, and construction sites. This can take some time as a location can sound great for a few minutes, but if you remain long enough you may discover that there is a bus stop right outside the front window where a noisy bus passes by every 12 minutes. If you're shooting in someone's apartment, it's perfectly reasonable to ask them how noisy the neighbors are and how loud they play their music or TV.
2. The director (or A.D.) should communicate with the sound team. Give the sound mixer some sense for what the visual strategy of the film will be. Long static shots with carefully composed lighting will require one sort of miking strategy, while handheld shooting on a set which is lit for 360° movement will need something totally different. Go over the script, scene by scene, and work out what the possible audio challenges might be. All of this helps the sound team anticipate what audio equipment they'll need on the set. In general, this sort of communication fosters a sense of collaboration and quite simply helps them do their job better—which in turn makes the quality of your audio better.
3. The sound team should communicate, before getting on the set, with whoever will be editing and creating the sound design for the film to ensure that they are on the same page as far as technical specs, record media, and delivery details are concerned. Different edit systems, editors, and sound designers prefer their sound elements in various formats or recorded at specific settings. It's best to know what editorial requires before the shooting starts.

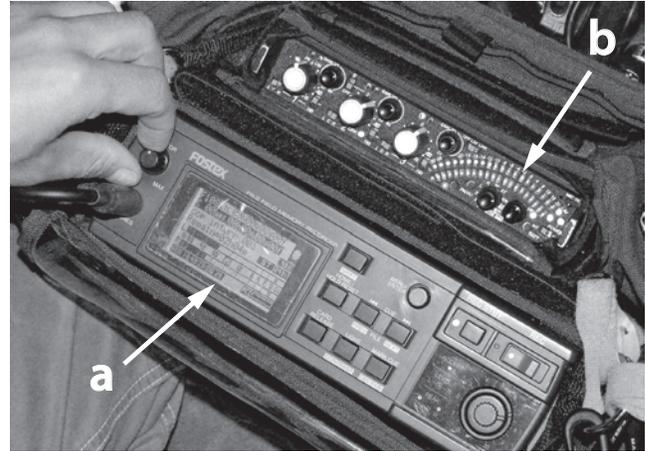
■ RECORDING TECHNIQUE

The **sound mixer's** job is to get the best possible recording of all field production audio, including dialogue, wild sound effects, wild dialogue, and location ambient sound. This means several things: cleanly picking up and isolating the sounds you want from the

unwanted background noise, recording a strong signal, and ensuring the greatest frequency range. It also means being fast, reliable, and consistent; fitting yourself around the lighting, camera, and art department setups; and constantly and creatively adjusting to shifting audio conditions. Solving audio issues on the set is a constant challenge, and it takes resourcefulness, ingenuity, and knowledge. Good sound recordists are not easy to come by, but, by the same token, good sound people are in high demand and work—a lot.

Setting Levels

The term **levels** refers to the **loudness** of a signal as it enters the audio recorder, which in turn determines the strength of the recorded audio signal. As mentioned earlier, all professional recorders offer manual level controls, allowing the sound recordist to control the strength of the signal; this is called **setting levels**. Getting strong audio levels depends on a combination of microphone placement and manual audio level adjustment. The craft of the sound mixer centers on the ability to find proper levels, which generally means setting the loudest possible record level without overmodulating. This provides for the best sound signal for playback and postproduction. For the sound mixer, the most important tools for monitoring and setting audio levels on a digital recorder or DV camcorder are the **peak meter** (found primarily on sound recorders) and the **VU meter** (found primarily on field mixers) (Figure 16-2).

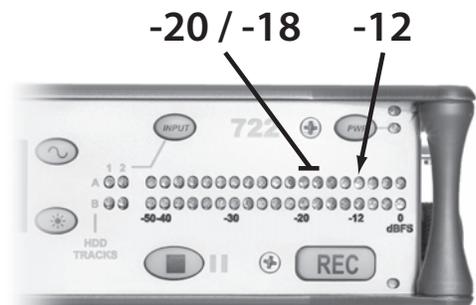


■ **Figure 16-2** A typical sound mixer's equipment chain can include a sound recorder (with a peak meter) (a) and a mic mixer (with a VU meter) (b).

Setting Levels on a Peak Meter

Peak meters are found on professional digital audio recorders and HD camcorders and measure the strength of the incoming signal directly. Peak meters are calibrated in decibels, from -50dB on the low side to 0dB on the high side. If your audio level exceeds the maximum, 0dB , your audio will become **overmodulated** or **overloaded**, which means the signal is too strong to be sampled accurately and the result is distorted sound. Sudden and loud transient sounds, like a car door slamming shut, which **spike** above 0dB are especially a problem, because even these brief noises can cause crackling on the sound track. You cannot fix overmodulated sound in postproduction. On the other hand, if we record a level that is too low, then we will be required to turn up the volume in postproduction to transfer or even hear this weak signal. By turning up the volume of the recorded signal, we also turn up the volume of the unwanted audio noise and the result is greater background and system noise. Recording too low is called recording “**in the mud**,” the mud being system noise. Be careful, however; recording too low is different than recording soft sounds, which sometimes, appropriately, barely register on the peak meter.

To make sure you obtain a good, strong signal, but protect yourself from overmodulation, you should set your levels so that the *loudest audio* in the scene peaks around -12dB on the peak meter. For example, if you have a scene in which a man is arguing with a store clerk and his last line “... and I’m never coming back to this dump!” is the loudest the actor projects in the scene, then, during rehearsals, you will set your levels so this line of dialogue registers around -12dB on the peak meter. The rest of the actor’s dialogue will register lower on the meter, as it should. The range between -12dB and 0dB is called **headroom** and it gives us a buffer for any unforeseen and sudden audio spikes—like the man slamming the door on his way out. The record level for *normal dialogue* should generally fall between -20dB and -18dB (Figure 16-3).



■ **Figure 16-3** Normal dialogue should be recorded around -20 to -18dB on the peak meter. Loud sounds should peak at -12dB or else they risk overmodulating.

When we initially set levels for dialogue (usually during on-set rehearsals) this “normal” dialogue level is only our first reference. It is the job of the sound mixer and boom operator to find acceptable mic placement and levels as quickly as possible and then make adjustments to improve the audio with each rehearsal and with each take. This initial **sound check** is usually done with the actors as the crew makes final adjustments to the lights and camera. You should try to find a moment with the actors, before the director runs through the take, to have them speak into the microphone. Sometimes they’ll run through a few lines, or you can ask them a question that they need to answer at length. Remember, this is only a starting point. Actors often speak louder or softer than their normal speaking voice once the camera rolls and they’re performing. The first run-through or first take will usually help you to tweak your levels (and microphone placement) to get a better signal on subsequent takes.

When setting record levels, it is best to avoid extremes on the level control knobs. We never want to have our gain control set all the way to its loudest point or too close to its lowest setting. These extremes usually mean there is either something wrong with your microphone placement or you have some technical problem along the signal path. Not all sounds need to be recorded between -20dB and -10dB , especially when recording soft sounds. Very low sounds, like papers rustling as someone studies in the library, are fine to record at a low level like -40dB or -30dB . Trying to get this soft sound to peak at -20dB will force you to turn the levels up to their maximum, which will increase the extraneous room noise (ambient sound) to an unnaturally high level. This will also exaggerate unwanted system noise. If a fairly strong source, say a person speaking, is registering very low on the meter, then it’s preferable to move the microphone in closer instead of boosting the recording levels all the way. And vice versa, if a very loud, consistent noise, like an unmuffled motorcycle engine, is spiking the levels, it’s advisable to move the microphone away rather than turning the record levels nearly all the way down. In short, through careful microphone placement (of course, respecting the pickup range of the mic), you should keep your pots within the middle three-fourths of its range.

As I mentioned in the previous chapter, the difference between the loudest and softest sounds in any single recording situation is called the **dynamic range**, and setting levels for a sound situation with a wide dynamic range is a mixer’s greatest challenge. It’s a temptation to raise and lower the recording levels during recording as the sounds increase and decrease; this practice is called **riding levels** (or **riding gain**). But riding levels is not recommended because it causes unnatural fluctuations in the background noise. It can also be a problem with sudden loud or soft passages that were not anticipated and therefore spike above 0dB or fall into the mud. The main problem with riding levels is simply that a range of loud and soft sounds is perfectly natural in any given situation and if you constantly raise and lower the input volume so that every sound records at the same level, the effect is terribly unnatural. Occasionally riding levels may be necessary, especially in uncontrolled situations. But for most controlled environments, we anticipate (or rehearse through) the loudest possible sound for a given situation, set that level at -12dB , and then leave the sound levels alone.

Setting Levels on a VU Meter

If you use a field mixer for setting levels you will likely have a **VU meter** (short for **volume unit meter**) for reference. As I mentioned in the previous chapter, peak meters respond to all sounds directly entering the recorder. The VU meter, on the other hand, indicates an average sound level. It is, therefore, not highly sensitive to short, sharp, percussive sounds (transient sounds). For example, a slamming door in the middle of a moderately quiet scene will cause the needle to jump a bit, but not to the true decibel level of that slam, because the noise is too brief for the needle to respond directly. In addition, although the VU level range is calibrated in decibels, it has a different scale and runs from -20 on the low end to $+3$ on the high end, with 0dB as the audio peak level. The point on the scale from 0dB to $+3$ is highlighted by a thicker, red bar on a needle scale or red lights on an LED scale (**Figure 16-4**).

As a general rule, the *loudest sounds* in a given recording situation should peak at 0dB. Occasionally, the reading can peak into the red zone but should not spend too much time there, and in no situation should the VU meter needle “pin” against the +3 side of the scale. A +3 on the VU scale means overmodulation and distorted sound. *Normally spoken dialogue* is usually set to average around -3dB so that any sudden, loudly expressive moments might peak between -1dB and 0dB . Very low sounds, like our previous paper rustling in the library, can be set to register around -10dB .

Reference Tone and Calibration

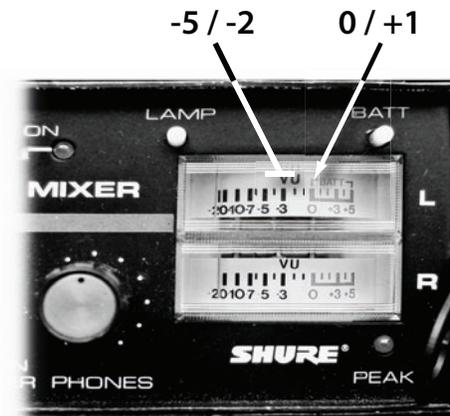
Reference tone (also called **lineup tone**) is a 1kHz pure tone that is used as a reference signal for calibrating a chain of audio devices in the field. For example, let’s say we are plugging our microphone into a field mixer (with VU meters) that we will use to set levels during the shoot. The mic signal then goes from the mixer into either the digital audio recorder or to a HD camcorder (both with peak meters) where it is recorded (see **Figs 15-24** and **16-2**). This is a very common audio chain, but how do we know where to set our gain control on the digital audio recorder (or camcorder) so that we get the same audio levels we are setting on the mixer? All field mixers have a way to generate the 1kHz reference tone, which allows us to calibrate the recorder levels so that it will record exactly the audio signal levels the mixer is sending. The 1kHz tone registers exactly as 0dB on all VU meters; the equivalent level on digital peak meters (according to NTSC) is -20dB .¹ So when you send the reference tone from the field mixer to the recorder, simply set your peak levels to -20dB and then forget them; the digital audio recorder (or camcorder) input level is now calibrated to record the same audio levels you are setting on your mixer (**Figure 16-5**). After calibration, all level adjustments need only be made on the mixer, which simplifies things a lot.

One final note about reference tone: It is standard practice to record 30 seconds of reference tone as the first file on your record media (SD card, compact flash, or hard drive) so that audio transfers and level reference in postproduction can also be calibrated with the original audio recording. This is called **headtone** and it assures the postproduction folks that what they are hearing is exactly what was recorded!

Manual versus Automatic Functions

Level Control Manual versus Automatic

Most camcorders and DSLRs have a setting for **automatic level control**, sometimes called **auto gain**. Auto gain gives away the control for setting audio levels to the recorder, which assumes that there is a single proper level for all sounds, in other words it doesn’t just allow soft noises to be soft and loud noises to be loud, it tries to bring every sound to a middle volume, so it is constantly responding to peaks and pauses in audio, adjusting levels up when there is quiet and down when a loud noise occurs—like a robot relentlessly riding the gain. Because of these constant adjustments, the background sounds, too, rise and fall very noticeably. Another problem is that auto gain is



■ **Figure 16-4** The scale of a VU meter is different from that of a peak meter. The loudest signal should peak between 0dB and +1dB, with normal dialogue registering between -5dB and -2dB .



■ **Figure 16-5** A 1kHz reference tone is used to calibrate the output of the mic mixer with the input of the recorder (or camcorder). The mixer’s VU meter reads the reference tone at 0dB (*left*), whereas the recorder’s peak meter should be set to register the tone at -20dB (*right*).

¹ Many professional sound mixers I’ve spoken with believe that the -20dB reference standard is slightly too low and prefer to set their camcorder or digital recorder peak meter at -18dB against the reference tone.



■ **Figure 16-6** The auto gain control found on many video cameras should be turned off to have precise manual control over the audio recording levels.

easily fooled by sudden, sharp sounds (called **transient sounds**) or drastic dips in volume. If we are shooting a scene where two people at a dining room table are talking in a normal tone of voice and suddenly a fork is dropped against a plate, the auto gain will compensate for this sudden, sharp noise by immediately, and drastically lowering the levels. If a character then speaks directly after this, that initial dialogue will be recorded way too low until the gain readjusts itself back to the dialogue level—which always takes some time. Conversely, if two people are speaking in expressive tone of voice and suddenly stop talking, the auto gain will respond to this quiet moment by adjusting the volume up, resulting in a conspicuous boost in room noise. Just as with auto focus and auto exposure, you should turn off this blunt tool and set your levels manually. If your camera has the option for **manual override**, use it. If your camera *doesn't* have a manual override option and field audio is important for

the project, think double-system! A sound recordist is always better off maintaining full control of the audio signal being recorded (**Figure 16-6**).

Limiters and Frequency Filters

Other automatic audio controls that you will encounter on record decks and field mixers (and cameras) are limiters and frequency filters. **Limiters** are volume controls that only come into effect when an audio signal reaches overload; at this point the limiter suppresses the loudness by **clipping** off the sounds before they can peak. The danger with employing a limiter is that it can be difficult for an operator to tell if the levels are properly set, as volume extremes never peak. In controlled audio situations, it's best not to use the limiter at all, though limiters can be useful when a single person is both booming and setting levels and you anticipate some erratic loud noises in the scene. In these cases, set the levels for the most common audio first, then employ the limiter.

Frequency filters automatically remove unwanted portions of the frequency range (a feature often built into microphones). The most common filters are designed to cut off low frequencies and are variously called **bass filter**, **bass roll-off**, **low-pass filter**, or **low-frequency attenuation**. Bass roll-off is common because we often encounter wind noise (wind hitting the microphone diaphragm) and low machinery hum (like rumbling HVAC systems) in the field. For example, perhaps we are filming in a factory where there is a constant, low-frequency machinery hum that is making the dialogue between two actors difficult to record. A low-frequency filter will automatically suppress frequencies, say, below 50Hz (the specific frequencies rolled off are variable depending on the system). In general, it is not a good idea to use any sort of frequency filters in the field. The equalizing capabilities in postproduction are far more sophisticated and precise than those on field recording equipment and should be used instead. The sound recordist should gather the widest possible frequency range and then be more selective (and creative) about equalizing frequencies out of the audio later in the sound mixing stage.

Headphone Monitoring

In the field, sound monitoring is always done through headphones during actual sound recording. Headphones with isolation pads are essential so that the sound people (both mixer and boom op) can be certain that what they are hearing is only the audio being picked up by the microphone. It is important to remember that we use the meters when setting and monitoring audio levels and *not* judge levels by what we hear through the headphones. Most professional audio recorders and camcorders offer a separate headphone level adjustment, so it is quite possible to have the headphone level set so high that audio sounds fine to your ear but is being recorded at an unacceptably low level. First set your audio to the proper levels with your meters, and then set the headphone to a comfortable volume. You shouldn't need to change the headphone volume again (**Figure 16-7**).

You should also always monitor the audio output at the last device in the audio chain (i.e., the device that is recording the audio) so that you can be sure no interference, noise, or connection issues are introduced anywhere along the audio flow (e.g., between mixer and recorder). For double-system sound, that means your headphones should be monitoring the digital audio recorder and for single-system sound you should be monitoring the output of the camera (not the mixer). Here again, single-system poses some awkwardness because plugging headphones directly into the camera can get in the way of camera operations. In this case it's recommended to get a long **breakaway cable** so that the same cable that sends audio to the camera for recording also sends line level audio back via a headphone return for monitoring.

Headphones are used to monitor the types of sounds being recorded and to listen for sound problems (loose connections, signal interference, unwanted background noise, etc.). Headphones are also used to evaluate other aural qualities of the recording situation, like the acoustics of the location. Once the gain levels are set using the meters, the sound mixer and the boom operator (who should be wearing headphones as well) can also monitor the accuracy of the microphone placement, being sure to keep it on-axis and the subject-to-mic distance consistent (discussed later).

Just as a cinematographer is trained to see every light source and visual detail in the scene, a sound mixer is trained to hear every sound on the location that might wind up on the recording. However, humans have developed highly selective hearing. It is easy for us to ignore or “filter out” inessential sounds and aurally prioritize only the sounds we need to hear in a particular situation. It's easy to go through an entire day and never really “hear” the air conditioning droning in the background, or the buzz of crickets out your window, or the hum of the cooling fan in your computer. Background noises just like these can be anything from distracting to disastrous on an audio recording, so a sound mixer needs to develop an “objective ear” and must communicate to the director when unwanted sounds are infiltrating the scene, especially when they are intermittent sounds, like a plane flying overhead, or a radio coming through the wall from next door, or the refrigerator in the kitchen kicking on. Chances are, no one else on the set has heard any of these noises.



■ **Figure 16-7** Large headphones that completely cover the ears should be used to monitor audio, because they block out unwanted noise.

in practice

Good sound mixers hear everything. Not only are their ears attuned to the ambient noise, acoustic qualities, and problematic transient sounds of a given location, but they remain aware of aural opportunities as well, including wild sounds that might be useful later in postproduction. This is creative listening! On a recent film of mine, we had to postpone an exterior scene because a flock of crows flew in and squawked obnoxiously over the performer's dialogue. So I decided to break for an early lunch, and later, when the crows had flown off to bother some other neighborhood, we continued the scene in peace. I discovered later that while we were at lunch, Michael (my sound mixer) had remained behind and

recorded a few minutes of crows squawking. “Just in case you need it later,” he said to me, adding that “it sounded really cool.” My short film *FearFall* is about Ray, a middle-class man from the suburbs who descends into paranoia over his new next-door neighbors, whom he never sees. Sure enough, Michael was absolutely right. That little piece of wild sound, recorded impromptu, was pure gold in postproduction. I inserted those squawking, nagging crows as ambient sound in certain scenes later in the film, as Ray's paranoia gets the better of him. Those birds, which seemed to me a nuisance at the time, provided me with the perfect sound to subtly suggest Ray's growing anxiety and fearful state of mind.

■ MICROPHONE TECHNIQUE

Selecting the Right Microphone

In the previous chapter we discussed the various characteristics of microphones including how they convert acoustic sound into an electronic signal, their frequency response, and their pickup patterns (starting on page 397). There is no one single mic that can do it all so the sound team must assess each recording situation to determine the best microphone for the job. The principal factors that are routinely considered are: interior or exterior location, distance from sound source (the size of the camera frame that determines how close a mic can be positioned to the subject), the loudness level of our sound source, and the loudness level of background noise. Here are a few recommendations concerning microphone types and where they are typically used—however, keep in mind that this is just a starting point. Every location has its own unique recording challenges and ultimately you must trust your ears. Try out different microphones and use the one that you believe delivers the best-quality audio. If it sound goods, it is good.

- *Shotgun (Line Mic)*: A good choice for noisy exterior locations where the mic's hyper directionality can help you isolate the subject while rejecting background noises. Also, a good choice for wide shots at exterior locations because the distance factor allows you to position the mic further away (more than 5 feet) than other mics. Because of their tendency to pick up reverberant sounds, and their physical size (very long and cumbersome), shotguns are not generally recommended for interior locations.
- *Super-cardioids (short shotguns)*: Perhaps the most broadly used of all mics. Excellent choice for exterior and interior locations that are not excessively noisy. A good choice for medium-long to close-up shots where the mic can be positioned closer than 5 feet to subject. The improved frequency response and slightly broader pickup pattern creates a more pleasing ambient perspective and presence than the long shotgun mic.
- *Cardioids*: The mic of choice for medium-close-ups to close-ups. Cardioids often have fantastic frequency response and the broader pickup pattern makes for a very natural aural perspective. They can be used indoors or outdoors, however, they are more sensitive to environmental noise than hyper-cardioids and require very close miking which may not work with framings wider than a medium-close-up.
- *Omnidirectional*: A good choice in situations that require picking up sounds from different axes at the same time, for example a group of friends conversing around a dinner table. Their 360-degree pickup pattern means that these mics will also pickup environmental noise from all directions—so these are either used in highly controllable interior settings (like sound stages) or for exterior location recording where picking up ambient sounds is precisely the point, for example a person watching a parade and you want to record all the parade and crowd noises. Omnidirectional mics are sometimes used as a second mic recording ambient sounds to a separate track while a more directional mic records the subject. This way, the ambient sounds can be mixed in with greater level control later in postproduction. *Lavalier* mics are a special category of omnidirectional mic that is planted directly on a subject. I discuss their advantages and drawbacks in detail later in the chapter (see page 397).

Balance, Consistency, and Being On-Axis

A typical field recording situation includes dialogue (involving one, two, or three characters) and background sounds. The keys to getting good audio in the field are **balance** and **consistency**; balance is finding the right relationship between the audio we want (dialogue) and the background sounds, and consistency is maintaining this balance, as well as audio levels, from setup to setup. Recording in the field always means picking up some background sounds, but too much background noise can obscure the audio. Background sound in recording is like salt in cooking: you can always add a little more later, but you cannot take it out if you've put in too much.

Balance is controlled by two important factors: microphone choice (directionality) and distance. The distance between the microphone and the audio source, say an actor speaking

dialogue, is as crucial as proper record levels. Getting the microphone in as close as possible is essential because the stronger the signal from our desired sound source, the lower we can set our record levels and therefore the lower the extraneous noise will be. The farther the microphone is from the source of audio, the more background sounds will infiltrate the recording. This is why we always try to get the microphone as close as possible to our actors. It is also important to understand the pickup pattern of your microphone and to place the projection of the audio source (e.g., the mouth of an actor speaking lines) **on-axis**, which means directly within the microphone's optimal sensitivity range (Figure 16-8). As a rule, the boom op first gets the microphone in its optimal position—as close as possible to the sound source and on-axis. “As close as possible” means checking with the camera operator to determine the edges of the visible frame and hovering as close to that limit as you can. Then the sound mixer can adjust gain levels on the recorder to get a strong signal. Remember, boosting the input gain to compensate for a badly positioned microphone (i.e., too far away and/or off-axis) will yield poor results.



■ **Figure 16-8** Microphones should be positioned “on-axis” according to their specific pickup pattern. Note how the microphone is pointing directly at the actor’s mouth from above and slightly in front.

The microphone of choice most often for recording voices is the cardioid. It usually offers the flattest frequency response and a certain degree of directionality, so we have control over the source/background balance. Some cardioid microphones are manufactured with a **speech bump**, which means the microphone is especially sensitive to frequencies where the average human voice falls (midrange) and is less sensitive to high and low frequencies. If your framing allows you to position your microphone within 4 feet of the talent, then a regular cardioid will do; if the framing of your shot is wider than this, causing you to position a microphone from 4 to 10 feet, then a hypercardioid is a good choice. Beyond 10 feet, you could use a shotgun microphone, but remember that although this is a fine solution for exterior shots, in interior locations a shotgun will sound “boomy.”

Booms and Boom Technique

One indispensable tool for microphone placement, and a common sight on any film production, is the **boom pole** (also called **fishpole boom**), which allows us to position a mic as close as possible to the source but still remain outside the boundaries of the shot (Figure 16-9). A boom pole is a long, lightweight pole that telescopes out to various lengths. At one end is a **shock mount** that holds the microphone in place. Shock mounts come in many different styles but the principle for all is the same. The microphone is suspended securely in place by a series of rubber bands that absorb any vibrations or handling noise from the boom pole (Figure 16-10).

The boom allows the operator to suspend the microphone on-axis precisely over and in front of the speaker, yet just beyond the edge of the frame. Occasionally, it is advantageous to hold a boom below the talent and angle the microphone upward, but this can be tricky, as you may pick up background noises from above, like airplanes flying overhead if you are outdoors or fluorescent lights buzzing if you’re inside.

Using a boom requires careful technique. Below are a few tips:

1. Consistency is essential. A boom operator must maintain both a consistent distance between the speaker and microphone and the proper on-axis mic angle during a take. Pulling the boom away from a speaker, even a few inches, or slightly positioning the microphone off-axis will drastically shift the balance between the audio you want (i.e., dialogue) and the background noise.
2. Booms should be handled gently to reduce vibration on the pole, which can be transmitted up to the microphone. Take off all rings that can tap against the boom pole. Use your body and fingertips to change the angle of the microphone to keep actors on-axis.



■ **Figure 16-9** A boom pole is essential to keep microphones as close to the actors as possible while keeping the mic and boom person off frame. Pictured is Antoin Cox booming.



■ **Figure 16-10** A shock mount keeps the microphone secured and prevents it from picking up vibrations caused by moving the boom pole.

3. Boom operators should monitor the audio with their own headphones to hear exactly what they are picking up.
4. The boom operator must communicate with the camera operator to determine the limits of the frame. During rehearsals and just before each take the boom op tests the framing by slowly lowering the mic into the scene. When the camera operator sees the mic at the edge of the frame, the boom op should back off a few inches to obtain some buffer space.
5. Care must be taken not to cast a boom shadow over the set or on the talent. Usually, the boom operator sets up after everything else is ready to go and fits themselves around the existing camera and lighting situation. If the only possible mic position casts a shadow, then the boom op should discuss options with the D.P. or gaffer for flagging or lighting adjustments.
6. Often boom operators are called upon to follow moving talent. Sometimes this means pivoting the body; other times, as with dolly shots, it may mean walking alongside the talent. Care must be taken to move quietly and maintain consistent subject-to-mic distance and pickup axis. Boom operators should practice these moves, know where they are going, and be especially aware of casting boom shadows when moving through a set (**Figure 16-11**).



■ **Figure 16-11** Talent in motion can be especially difficult to keep “on-axis” while recording sound; rehearsals and knowledge of the script are necessary for good results.

7. A boom operator should be familiar with the script in order to anticipate movements and dialogue levels.
8. Remember, rehearsals are not just for the actors—they are for the crew as well. The sound team should perform their duties on every run-through as if it were a real take and tweak their strategy along the way.
9. Some boom poles are made so that the mic cable runs inside, but in cases where the mic cable swings free, the cable should be wrapped a few times around the pole to avoid having it slapping against the sides and transmitting noise to the mic.
10. In situations that are too tight for a boom pole, it is also possible to mount a microphone on a small handheld device called a **pistol grip** (with a shock mount) (**Figure 16-12**).

Using Lavalier Mics

There are certain situations for which booming is not a viable option. For example, long shots might not allow you to position a mic close enough to get decent audio, or perhaps character movement is so elaborate that a boom operator could not possibly follow the action. In these cases you may consider using a lavalier microphone planted on your talent. Hiding lavalier mics requires a little bit of ingenuity, tact, and gaffer's tape (see **Fig. 15-29**).

Lavalieres are also a good choice when you are working with wide shots or in very noisy environments. The extremely close miking of a lavalier allows the sound mixer to greatly lower the input level, thereby reducing the background noise; additionally, you can position the actor so that their body acts as an absorbing sound buffer and blocks unwanted sounds.



■ **Figure 16-12** Recording sound in close quarters can make handling a boom cumbersome; for these situations, a pistol grip is more convenient.

Although lavalieres can indeed give you great sound, there are a number of other factors to be considered:

1. *Perspective problems.* The close, intimate audio presence of a lavalier can seem odd in long shot situations. The sound is close but the image is distant. Some perspective problems can be fixed in the sound mix if you have access to the proper equipment, so before you use this strategy, know what is available to you in postproduction.
2. *Pickup axis.* Lavs need to be placed carefully with regard to vocal projection and possible direction shifts. For example, let's say we've hidden a lavalier microphone under the left side of a performer's collar, but during the course of the take the performer turns and speaks over the opposite shoulder. The drop-off in the performer's audio level can be extreme (**Figure 16-13**).
3. *Noise.* Hiding a lavalier microphone on the talent can pose an unwanted noise problem, as this type of mic is particularly vulnerable to "rustle" noises from clothes or fabric. Take care to tape down lavalier microphones to clothes or to the body, such that there is no possibility of other fabric rubbing against the mic as the actor performs—for example, at the sternum in the little depression between the pectoral muscles. Every working sound person has a home remedy for rustle-free lavalier mounting. One common method is to wrap a Band-Aid around the body of the lav to keep clothes from direct contact. One guy showed me an elaborate, bent-paperclip cage he made, a sort of teeny-tiny shock mount. It worked well, but unfortunately, I never could duplicate his sculptural creation on my own.
4. *Mobility.* Using a standard lavalier microphone still means that the talent is tethered to a microphone cable that extends from their body (often out of their pant leg) all the way to the recording deck. This can restrict movement. In instances where long shots



■ **Figure 16-13** Because of their tiny size, lavalier microphones can be easily concealed in the actor's clothing (*left*), but special care must be taken to stay "on-axis" (*center*). A turn of the head can make the signal difficult to record (*right*).

are required and an actor's mobility is essential, a wireless microphone (RF mic) should be used (see page 383).

5. *Feelings.* Hiding a microphone on talent usually means working under a person's clothing, so you need to be tactful when approaching actors to wire them. Less experienced actors will tell you, "Give me the mic and I'll put it on myself." But this isn't a great idea for obvious reasons. It's best to wire your performers in a discreet place (don't, for example, ask them to take their shirt off in the middle of a busy set). Also, let them know why all this is necessary; if you tell them that you're trying to record their lovely voice and their brilliant lines as cleanly as possible, then they're more likely to allow you to gaffer tape a microphone to their bra or to run an XLR cable down their pants. Also, if you need to plant a mic on a minor, always make sure their legal guardian is present.

Miking and Perspective

Obviously, the closer we can put the microphone to the speaker, the stronger our signal will be. But when we record for film we also need to consider the **perspective** of a person's voice and how the audio recording will relate to our expectations, given the frame size and the proximity of the camera to the subject. It will feel odd to have an extreme close-up on your characters and to hear their dialogue as if it's coming from a great distance, and vice versa. Fortunately, in narrative production much of this problem is more-or-less solved on its own, because even though we try to get the microphone in as tight as possible, the dimensions of the visual frame determine how close we can actually go before the mic shows up in the frame. A tight close-up allows us to place a microphone close to the subject, which will give us a better frequency response, warmer, more intimate sound, and less ambient noise intrusion. A wide shot will require us to keep the microphone a distance away, and this change in sound perspective is usually appropriate for the camera-to-subject proximity.



■ **Figure 16-14** In this scene from Lund's *Snapshot* (2006), the framing made it necessary to use multiple mics. A boom mic slightly off frame left was used for Nathan (David Andrews, *foreground*), while Marcello (Henry Darrow, *background*) was miked with a wireless lavalier.



■ **Figure 16-15** In this scene from Altman's *Nashville* (1975), six-way overlapping dialogue is recorded live thanks to the use of wireless lavalier mics placed on all of the talent.

Using Multiple Microphones

Occasionally you may have a situation in which one microphone simply doesn't cover all the bases. This is especially the case with shots that involve a dialogue between two people who are far apart, or with long shots that involve substantial character movement. The former situation often requires a combination of booming and planting microphones on the set where characters will stand to deliver lines, whereas the latter case can simply mean hiding wireless lavalieres on your talent (**Figures 16-14** and **16-15**). Each location and each miking situation is unique and poses a variety of challenges. To a large extent, that's the fun of this job! As a sound mixer and boom operator you need to understand the capabilities and limitations of your equipment and be resourceful and creative in devising strategies to obtain the best possible audio under any circumstances.

Ambient Sound and Audio Continuity

Concerning ambient sounds, we also need to consider **audio continuity**. Continuity is usually discussed in visual terms, like making sure the actors are wearing the same clothes from shot to shot, or holding their glass with the same hand, and so on, but continuity is essential for audio also, and continuity problems usually come from radical shifts in ambience from shot to shot. This is obviously true if there is some sort of intermittent intrusive noise recorded in, say, a reverse

shot which wasn't there when recording the master shot—like a lawnmower or airplane. However, there are more subtle shifts in ambience that the sound team should be aware of. For example, in a simple dialogue scene we would never mic character A with a lavaliere for their close-up reverse shots and then mic character B with a hypercardioid for their close-up reverse shots. We would obviously get a drastic shift in presence and background noises.

Sometimes, however, this sort of ambient shift is unavoidable given changes in camera framing (and therefore mic position). For example, it's not uncommon to use a hypercardioid with a wide master shot and then switch to a regular cardioid for close-ups. Ambient shift can also occur if we use the same microphone but change the distance from sound source to microphone from shot to shot; because the recordist is required to change levels in this situation, we'll get a shift in ambient sound and therefore a discrepancy in audio continuity. If the background noises shift from shot to shot, it creates a tough situation for an editor who is trying to invisibly cut two shots together to create the illusion of continuous time and space. *For this reason we always record one minute of ambient sound* (sometimes called **room tone** for interiors) at each and every location. After the director calls the last "Cut," before anyone starts striking the set, the mixer needs to ask everyone to be quiet for one minute of ambience recording. The mic is then opened at the normal, speech level and the boom operator announces the sound take by stating (1) the production title, (2) the location, (3) the date, and (4) "one minute ambience" (or "room tone"). Then everyone stands stock still while they record one minute of general ambient sound. After one minute, the mixer calls "End ambience," and stops the recording. Now the set can be struck. It is important to do this while the crew and equipment are still on the set. Remember, they, too, were part of the ambient atmosphere during each take (the bodies absorb echoes, etc.). You must also do this even *before* turning off any lights, because movie lights make little pinging noises as the metal cools.

This is a practice that people usually have very little patience for on a hectic film set, but it pays off big dividends in the editing room, because the editor can use this baseline ambience as a separate track to smoothly suture together shots with differing ambience (see Chapter 23).

Miscellaneous Recording Challenges

When directors scout a location, they are usually evaluating the visual qualities of the set, rather than its aural qualities. Frequently a sound team will find itself on a set that looks terrific to the camera, but that has serious problems for sound recording. **Reverberant spaces** are one such problem. Earlier in the book we spoke about "live" recording spaces with hard surfaces that bounce sound back and forth, creating sound reverberations (page 369). Too much reverberation can create indistinct audio with shrill highs and boomy low frequencies. **Sound blankets** (usually just regular moving blankets) are used when reverberation threatens to compromise sound quality. By hanging blankets just off screen and laying them on tiled floors, you in effect absorb the sound before it can be reflected. The more blankets, the more sound is absorbed (**Figure 16-16**).



■ **Figure 16-16** Sound blankets off screen absorb sound before it bounces off hard surfaces. The blankets used for this medium close-up in a stairwell will not be visible (*top*). Sound recordist Daniel Brooks' alternative to sound blankets is a sound panel made of lightweight studio foam baffle (*bottom*).



■ **Figure 16-17** Windscreens cut wind noise when shooting outdoors. There are models available for most mics, even for lavs. Here a Rycote Softie is used on a super-cardioid mic.

Another common sound challenge—this one for exterior location recording—is **wind noise**. Microphones are particularly vulnerable to wind noise because the wind acts like sound waves and buffets the highly sensitive microphone diaphragm. High winds can sound like a freight train, but soft winds, too, can contaminate sound by generating a low-frequency rumble. To this end, many microphones are manufactured with built-in **windscreens** that are foam wind buffers surrounding the head of the microphone. Windscreens dampen the effects of the wind on the diaphragm without altering the incoming sound waves. Built-in windscreens, however, are rarely enough protection from even the slightest breeze. Thankfully, there are many windscreens on the market that fit the head of almost any microphone—even for lavalieres—and you should always bring one to your exterior locations (**Figure 16-17**). In fact, most sound teams would never shoot outside without a windscreen on the mic.

■ THE SOUND TEAM'S PROCESS AT A GLANCE

Load in and Audio Gear Prep

Establish Your Sound Gear Station

This is done after the sound team has a good idea where lights will be. The record station is usually tucked away where they will not get in the way of the camera, lighting, and art department activity. Sound carts on wheels are helpful for moving your station from shot to shot.

Prep the Sound Package: Checklist

1. Ensure that all the sound gear is complete and that every part of it functions properly including: audio recorder, field mixer, microphones, wireless systems, cables, headphones, and so on.
2. Batteries should be fully charged before arriving on the set, and you should have plenty of extra batteries for those that are not rechargeable. Also establish an on-set battery charging station.
3. Enter your audio recorder settings:

■ Sample	■ Bit depth:	■ File format:
rate: 48kHz	24-bit	.WAV or AIFF
4. Calibrate audio recorder and mixer (or mixer-camera) to reference tone (page 391).
5. Insert your record media (sound roll). Record verbal slate and 30 sec. reference tone (page 406) at the head of every new sound roll.

6. Check the audio chain (mic → XLR → field mixer → recorder) to ensure that there are no loose connections or interference.
7. Double check backup protocol with data wrangler (page 415).
Fill out sound log info (box on page 407).

Recording a Take

Double Check all Settings, Switches, and Power Level

As digital audio recorders get smaller and smaller, so too do their buttons, knobs, and switches. It's very easy to accidentally bump a knob or switch out of whack. So before each shot, take a moment to check buttons, switches, and settings. Also, be sure to regularly check your battery levels. These verifications should be the first step in your standard operating procedure for each take.

Headphones on Sound Recordist and Boom Op (if possible)

As you prepare for recording a take, headphones should be on and until the end of the take you should be actively listening for background noise and audio chain problems. It's not always possible to get headphones on the boom op, but if you can, then do it.

Boom Op Gets Into Place

Working around the lighting setup, the boom op finds the best location to mic the scene without casting shadows on the set or the talent. For scenes where

talent is miked with lavalieres, the boom op will have wired the talent during wardrobe.

Set Record Levels

Once the boom op has the mic positioned on-axis, you can ask the talent to run a few lines (or say a few words) at normal scene volume. This allows the boom op to find the optimum range and angle for the mic, and for the sound recordist to set audio levels using the meters—all the while listening for background noise as well. When things are set, the sound team is ready for the take.

Start Audio Recording When A.D. Calls “Sound”

During the slating procedures, the sound recordist’s cue is “roll audio.” It’s important that you confirm that you’re *actually rolling* by checking the Record/Pause indicator light. It’s quite easy on digital recorders to *think* that you’re rolling when you’re actually still on pause.

After Pre-roll Call “Sound Rolling!”

Make sure that every take has five seconds of pre-roll before you call “sound rolling.” During that five seconds you should be checking the Record/Pause indicator light to confirm that you’re *actually rolling*.

During the Take: Monitor Levels, Background Noise, Gear Issues

While a take unfolds, the sound recordist should be actively listening to the entire aural landscape being recorded and noting changes in performance sound levels, intrusions of background noise, mic axis consistency, and any audio chain issues that might emerge (like loose cable connections or radio

interference). Every take should be tweaked for improvement. If it’s serious, then this might be a reason for another take after the issue is corrected.

At Director’s “Cut” Switch Off the Recorder and Fill in Sound Log Immediately

After the take, immediately fill out the sound report and start preparations for the next take. If you believe that there was a sound problem on a take, then communicate this to the director.

Record Room Tone after Last Shot at Every Location

Recording one minute of room tone for every location is critical for sound editing, so don’t let the crew’s grumbling dissuade you from getting a full one minute—and remember to record room tone *before* anything changes on the set (including leaving movie lights on).

Give Sound Cards to the Data Wrangler

Sound cards must be backed up at the end of each day and organized with the camera files on one edit drive (and one or two safety backup drives). Once the memory card has been double backed up you can reformat the card for re-use. Some sound recordists also make their own hard drive backups of everything (just in case the data wrangler isn’t on the ball). You should also take a moment to reconcile your sound report with the files on the backup drives.

Strike Your Gear

The entire sound team strikes the sound gear methodically and carefully and puts batteries on a charger, ready to use on the next shooting day.



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On-Set Procedures

There are many ways to shoot a narrative film. The complexity of the project, the size of the crew, the nature of the location, and the style of the director all have an impact on what actually occurs on the film set. Director Kelly Reichardt shot her third feature film, *Old Joy* (2006), with a crew of six, a principal cast of two, predominantly exterior locations and available light, and with everyone bunking together on location for the duration of the shoot (see pages 20–21). Filmmaker Alexander Engel’s award-winning short, *This is It* (2013), was shot in three 12-hour days, mostly in one interior location (with a few exterior shots) and a crew of nine; and Didier Rouget shot his second short film, *Vive le 14 Juillet* (1995), in one day, on the streets of Paris, with three crewmembers, two actors, no lights, and no sound (see these two short films on the *Voice & Vision* companion website). The shooting processes for these small-scale productions are bound to be different than those for your standard industry blockbuster film, with crewmembers numbering into the dozens and a veritable convoy of equipment trucks and trailers. There are many books on the market that explain in complex detail all of the tasks and procedures on a standard commercial feature film, but be careful: a production must adjust its personnel size and on-set procedures to the scale of the project, especially on short films, in order to keep the creative process from being weighed down by excessively elaborate logistics. On the other hand, you must make sure that you have adequate personnel, time, and equipment to pull off the movie you have in mind. This chapter looks at the basic on-set process for an average short narrative film with sync sound. While certain tasks and procedures can be scaled to fit larger or smaller projects and crews, there’s nothing in the following discussion that you can cut entirely.

■ WALKING ONTO THE SET

So you’ve thoroughly completed your preproduction. You’ve talked to everyone, rehearsed and discussed the script with the cast, and figured out the aesthetic and technical approach to each scene with the crew. Everything and everyone necessary to accomplish the day’s shooting is here, the location is secured, and you are armed with your marked shooting script, overheads, and shot list. Now what? Now you get down to the work of building your film one setup at a time, take after take, with the knowledge that being well prepared allows you to respond creatively to what is happening on the set. When you walk onto a film set for the first time, whether you’re a director, D.P., actor, art director, sound mixer, or grip, you will feel something remarkable—the energy of a group of people who have come together to make a movie. You will also, probably for the first time, be in the actual shooting space and watching those actors in their costumes moving in that location.

As you collaborate with the cast and crew, new ideas will start to emerge. If you know clearly the shots you need to make the film, then you are freer to improvise, cut, alter, or adjust, to accommodate new ideas or unexpected obstacles. Use the chemistry of all of those



■ **Figure 17-1** On the set. The creative intensity and collaboration that are generated by a focused and involved cast and crew are among the great experiences of the filmmaking process.

creative people gathered in one place and the inevitable surprises that occur on the set to improve the project at every turn. So get down to work, but remember that production is rarely just the mechanical realization of the film that had been developed in preproduction; rather, it is another creative stage in the evolution of your idea (Figure 17-1).

■ WHO DOES WHAT, WHEN

Whatever the scale of your production, the basic stages for a shooting day are the same:

1. Art department arrives at the location to dress the set (also called prepping the set).
2. Camera, lighting, and sound teams arrive, offload equipment to the staging area, and prep their gear.
3. Director and on-camera talent run a tech rehearsal of the first camera setup in the actual space.
4. Set up camera, lights, and sound based on that rehearsal while talent get into wardrobe.
5. Run the scene a few more times, tweaking lights, camera, sound, and performance.
6. When all cast and crew feel ready, take the shot!
7. Repeat these six steps until your film is done.

After a while, this routine becomes completely automatic for everyone on the project and, at last, you're making a movie. But let's look a little closer at each step for an average short film project using lights and sound, and fill in some essential details.

Dressing the Set

The first team to arrive on a set, in addition to the director and producing staff, is the art department. The art department **preps the location, dresses the set**, and prepares wardrobe and props in advance of the rest of the crew. Often, the art department will be prepping the next day's location while everyone else is shooting the current day's scenes. On small films, however, it's not always possible to have access to a location a day ahead of time, nor is it necessary if the set needs are minimal, which is often the case for exterior shoots, for example (Figure 17-2).



■ **Figure 17-2** Before lights, camera, or sound, the art department arrives and preps the set. Here fake snow drifts of cotton are laid along the sidewalks of New York City for a winter scene being shot in August.

Loading In

When the rest of the crew arrives on the set, they begin the process of **loading in**, which simply means getting all of the necessary equipment onto the location. A very simple shoot might only involve enough equipment to fit in the trunk of one car, while larger projects, especially those with extensive lighting needs, might require trucks full of gear. No matter how much equipment you're using, it is critical that you establish a designated area, near the actual set, where all of it will be held. This is called the **staging area** (Figure 17-3). When you need something, you'll know where to find it; when you're done using something, you'll know where to return it. Orderliness is essential! When equipment gets lost, nine out of ten times it's because there is no established staging area and equipment gets sprayed all over the location in the course of a shooting day. In this scenario, almost without exception, something gets lost. It may be something small, like a zoom handle or a filter, but it could be something expensive or essential, like a battery cable, a microphone, or a roll of exposed film from the day's shoot!

Prepping the Gear and Rough Setup

After load in, each department preps the gear that will be used that day.

Camera department assures the proper functioning of the camera and enters the appropriate camera settings, selects and cleans

lenses and filters, checks memory cards, calibrates the external monitor, preps the camera support, starts the day's new slate and camera log, and coordinates procedures with the data wrangler (see “Basic Camera Prep Checklist” box on page 221).

Lighting and grip check proper functioning and safety of the lighting instruments they expect to use, locate and test the electrical supply on the set, and organize all grip supplies (gels, C-stands, sandbags, flags, and so forth) so that everything is easily to hand when needed.

Sound department find a convenient spot for the sound recording station, enter audio record settings, prep all mics with fresh batteries, test all cables and connections, check memory cards, enter in the day's new sound log information (see “The Sound Team's Process” box at the end of Chapter 16).

With all the equipment now loaded in and prepped, the question everyone is asking is: How and where do we set up? Each department should have their own copies of the marked shooting script, overheads, and shot lists, so they should already have an idea of the basic setups. This allows them to position the camera more-or-less where it should be for the first setup and rough in the most basic lighting units.

Tech Rehearsal

At some point during or after the rough setup, the director and actors will stage a **tech rehearsal** in the dressed set (Figure 17-4).

This is a basic run-through of the scene to be shot, including dialogue and blocking, so that the crew get a more accurate sense for where the camera and lights should be positioned, what additional lights and lighting control is needed, and how the scene must be miked. The tech rehearsal is also the director's first time running the scene in the actual location and viewing the framings from the camera. Changes to the visual conception of the scene at this point are common. Slight (or major) adjustments to the framing, merging shots, and rethinking the blocking of the actors are all part of the tech rehearsal. Also, during the tech rehearsal the camera crew might lay **focus marks** on the floor. These are small pieces of tape that follow the path of a character's movement in the space. They are measured to the camera so that focus can be accurately pulled as the character hits their marks, meaning as they move from mark to mark during the scene (see page 243). Once the scene has been staged, the departments get to work.

Setup

After the tech rehearsal the actors leave the set to get into **costume and makeup** and, if there is time and it is necessary, the director will run lines or quick rehearsals with them off the set. This is an important time between an actor and director. The director's task at this point is to get the actors **into character**, meaning get them into the emotional and psychological space necessary to pull off the scene, and to remind the actors of the performance decisions that were made during preproduction rehearsals and read-throughs (see the section “The Director and Actors on the Set”).



■ **Figure 17-3** Designating a staging area is necessary to keep tabs on where everything is and where everything should be once shooting is finished.



■ **Figure 17-4** A tech rehearsal, where actors do a basic run-through of a scene, is essential to establish the lighting, blocking, and camera and sound placement.

Meanwhile, following the D.P.'s instructions, the lighting crew completes their setup by rigging, focusing, gelling, and controlling all light sources. At the same time, the D.P. and A.C. take countless light meter readings to make sure that lighting, exposures, and focus (and depth of field) are in line with the visual strategy established in preproduction. If there is movement in the scene, the camera department will rough-in marks for pulling focus. The D.P. may ask an actor to stand here or there, or walk through their blocking again so that lights, camera, and focus can be more accurately established. If an actor is not available (e.g., they're rehearsing or getting into wardrobe), then a **stand-in** is used (Figure 17-5). Ideally a stand-in and the actor have approximately the same height and coloring, and on major film productions there are specific people who are hired as stand-ins for particular stars. But on small shoots a stand-in can be any available crewmember. During the lighting setup the art department is also on set, laying out the various props for the scene and available to adjust set pieces or furniture in order to create a better composition or accommodate lighting issues.

While all of this is happening, the sound department strategizes how to mic the scene given the environment, the blocking, and the framing (Figure 17-6). Should the recordist decide to boom the scene, they will wait until the lighting crew has finished their work before establishing the final spot for the boom operator, in order to fit themselves around the lights so boom shadows do not fall onto the set. If lavalier microphones are used, then the recordist must find the talent and wire them for sound. This should be done while they get into costume and not while the director is working with them. Once sound is all wired up, the sound crew will test their recording gear (again) to be certain they are getting a clean audio signal. In a single-system sound situation that means making sure the audio chain (mic → field mixer → camera) is calibrated to the 1kHz reference tone and transmitting clean audio (see page 391). The same goes for double-system sound (mic → field mixer → recorder), except that the sound recordist will additionally record a **verbal slate** at the head of the record media that includes (1) the name of the project and director, (2) the roll (card) number, (3) the date, (4) the recording sample rate/bit depth, and, if your recorder has a tone generator, (5) the headtone level (i.e., -18dB digital). Then the recordist will record 30 seconds of reference tone, which is used to calibrate the postproduction sound transfers. After this, the sound team is ready.

From time to time the director will check on the progress of the lighting, camera placement, and look of the set. Sometimes the director will look at the set itself and other times assess the look that is emerging on an HD monitor with a feed from the camera. On larger shoots an A.D. will serve as the director's proxy and oversee the setup, communicating anything urgent between director and crew. This leaves the director free to work with the actors.



■ **Figure 17-5** Using stand-ins instead of actors to focus lighting units can save time during production, especially when actors are in rehearsal or makeup.



■ **Figure 17-6** While the lighting crew sets up, the sound department devises a recording strategy and tests equipment.

Final Run-Throughs

When all of the technical setup has been completed and everyone is ready to go—camera in place, lighting set up, sound in position—the director will call for a **run-through** (also called **dress rehearsal**). During the run-through, everyone proceeds as if you're actually filming, without actually rolling camera or sound. This allows everyone to make final adjustments: actors modify movements and performance; the camera operator refines focus, camera moves, and composition; the lighting team tweaks the lights to get them just right; the art department addresses whatever set piece, prop, costume, hair or makeup issue needs addressing; and the sound team establishes boom position and final record levels. And all of this activity is happening under the watchful eye and instructions of the director, whose job it is to make sure that everyone's creative and technical energies are working toward a single, unified cinematic goal (**Figure 17-7**).



■ **Figure 17-7** Run-throughs are essential to getting your actual takes just right, especially on tricky shots like this moving escalator setup from Mercado's film *Yield* (2006)

Sometimes a crew will go through several run-throughs before everyone feels they're ready to roll; however, you need to be careful. You can tweak, adjust, fix, and rehearse endlessly. If too much time is being wasted splitting hairs or fixing things that no one would ever notice, the producer, A.D., or P.M. must step in and push things along by reminding everyone how little time there is and how many setups they must accomplish before the day is over, and that they generally need to "move it." This efficiency nudge hopefully prompts the director to say, "Okay everyone, let's try a take."

in practice

■ THE SLATE AND PRODUCTION LOGS

The **slate**, the **camera report**, and the **sound log** are all used to keep a running record of every **camera take**. They are also critical to organizing, coordinating, and syncing footage in postproduction. In the heat and pressure of production, it's easy for novice filmmakers to be spotty with the logs, but they learn quickly how much time that wastes in postproduction. Take your time and fill out your logs and mark your slate accurately—every single take!

The slate and production logs contain two levels of information: general production information and shot identification information.

First Level: General Information

The general information usually does not change over the course of a shoot (except for the shooting date):

- Title of the project
- Shooting date
- Name of the director
- Names of the D.P. and A.C. (or sound mixer and boom op. on sound logs)

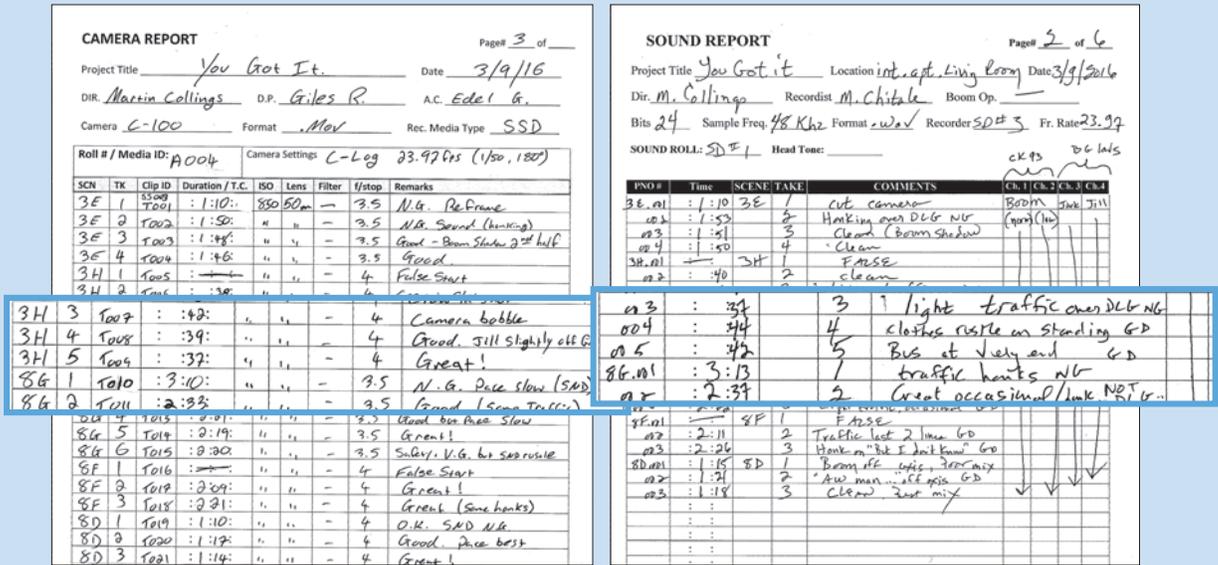
- Format and camera settings specs (or audio file specs on sound logs).

Second Level: Shot Identification

The second level of information starts by identifying the specific memory card you're recording to. Then you list which specific scene and shot angle is being recorded and how many times it has been attempted (takes). These ID tags change with each and every take on both logs and the slate simultaneously (**Figures 17-8** and **17-9**).



■ **Figure 17-8** Roll, scene, and take numbers. The information on a slate is vital for postproduction, so care should be taken to keep the slate updated, accurate, and readable.



■ **Figure 17-9** The information on the camera report (left) and sound logs (right) should remain perfectly coordinated with the slate throughout the shoot. Spot checks are recommended. Blank camera reports and sound logs are available on the *Voice & Vision* companion website.

- **Roll number (or media ID):** The roll number refers to the camera memory card (SDXC, P2, SxS, SSD, etc.) or media drive. When you fill up a memory card and replace it with the next, you change the roll number on the slate and logs. Memory card roll numbers run sequentially, the first being roll #001, then roll #002, roll #003, and so on.
- **Scene/shot number:** The scene and shot you are currently shooting (e.g., scene 3H) is taken from the shot list (which itself corresponds to the marked shooting script, see Chapter 5). The scene/shot number changes to the next on the shot list after the director believes that a good take, often called a **keeper take**, has been recorded and you can move on.
- **Take number:** This is the number of times you've attempted a scene/shot. This number changes each time you make another attempt at the same shot (e.g., 3H-take 1, 3H-take 2, 3H-take 3, etc.), until you achieve a keeper take.
- **Clip ID:** Each camera take is given a specific metadata clip ID by the camera (and sound recorder), so the easiest way to log picture and sound footage is to enter the assigned clip ID for each take. In some cases your camera (or sound recorder) will allow you to enter in your own metadata clip ID, in this case, simply enter in the shot numbers that correspond to the slate.
- **Duration/Timecode (logs only):** It also helps to enter the duration of the shot. Shot timings help you keep track of how much storage space you've used and how much is left on the card. If you're using timecode, it automatically gives you an accurate time count of each individual take because the *start* number of one take is also the *end* number of the previous take. For example, a shot that starts on TC 02:26:51 and ends on TC 02:27:37 (the start TC of the next take) is 46 seconds long.

Slates and logs are used to label every single take, whether you're shooting digitally or on celluloid film*. On small-scale films, like student shorts, the A.C. generally keeps the camera reports and updates the slate, while the sound mixer keeps the sound logs. But if the A.C. is busy with other tasks, like pulling focus or elaborate dolly moves, the A.D. can also load the slate. In either case, establish a routine and stick to it. It's also important to compare logs from time to time; it is essential for a smooth and efficient postproduction process that the production logs and the slate are kept in perfect coordination. Finally, it's a good idea to cross check the logs with the data wrangler's footage backups at the end of the day (see page 415).

* For slating and logging protocols specific to celluloid workflows, go to the tab "Working with Celluloid Film" on the *Voice & Vision* companion website.

SHOOTING A TAKE

This is the moment of truth. All of the preproduction preparation, all of the setup and rehearsals, boil down to what happens while sound and camera are rolling. A **camera take** is defined as the moment the camera is turned on at the beginning of a shot to the moment it is turned off after the director has called “Cut!” A take begins with the director or A.D. asking for “quiet on the set” and for everyone to get into their positions. Actors, camera crew, and sound crew all position themselves where they need to be. Then the A.C. (or whoever was assigned to load the slate) steps into the scene holding the updated slate (clapper arm already opened) for the camera to see.

After everyone is in position and it’s quiet on the set, the A.D. (or the director on small shoots) then calls the shot. **Calling the shot** is a standardized routine for every sync sound take on a double-system film production. The order and commands are designed to make syncing dailies in postproduction routine. Here’s how the A.D. (or director) calls a shot:

1. A.D. (or director): “Is anyone not ready?” If no one says anything, then . . .
2. A.D. (or director): “Roll sound.”
3. SOUND REC.: Starts recorder and after a five-second preroll calls out, “Speed.”
4. A.D. (or director): “Roll camera.”
5. CAMERA OP.: Starts camera and calls, “Rolling.”
6. A.C. (or other slate person): When the slate person hears “Rolling,” they call out the scene and take numbers, “3H, take 4,” snaps the slate sticks closed. It’s very common to use a phonetic alphabet when identifying a shot (like “18 Bravo take 3,” or “10 Papa, take 5” or in this case, “3 Hotel take 4”). After the sticks snap closed, the A.C. moves quickly out of the scene and settles down quietly!
7. DIRECTOR (after a pause): “Action!”
8. The take plays out and the director will wait a beat after the scene has ended before calling out . . .
9. DIRECTOR: “Cut!” No one can call cut except the director and no one stops their jobs until the director calls “cut.” There may be a great reaction or visual tableau at the end of a scene that the director wants to linger on, and if the camera operator simply turns off the camera because they thought the scene was over, they’ve lost a great moment. Also, a director should not call “cut” exactly at the end of the shot; it’s wise to wait a beat or two to give yourself *handles* for editing. However, the director can certainly call “cut” before the scene is done if something egregious has occurred, like a piece of the set falling over, the actor speaking the wrong lines, or a police car driving past with its siren wailing.
10. When “cut” is called, the take is over and the camera and sound recorder are turned off.
11. Immediately after a take, the camera report and sound logs are updated as the slate is reloaded for the next take (and if you’re shooting with file-based media and you have time, you can enter shot information into the metadata).

Slate Protocol

Slates are very important in film production and postproduction. Editors rely on these to identify, sync, and organize clips. Sloppy slating can lead to lost time and confusion later on. Here are a few things to keep in mind:

- Make sure the slate information is always updated. I’ve seen students go through entire, multi-day shoots and never change the roll number or the date even once.
- The camera operator must be able to read the slate (and see the clap) in the viewfinder. A slate that is half-way out of the frame, out of focus, or too dark to read is useless. In dark situations shine a flashlight on the slate or use an electronic slate (**Figure 17-10**). If the D.P. tells you that the slate clap wasn’t visible, call out “second sticks” and try it again.



■ **Figure 17-10** The slate must always be in the frame, in focus, and readable. Here the A.C. uses a flashlight in a dark location to ensure that the slate is visible.

- In tight close-up situations, where the slate is near the face of the talent, don't *slam* the sticks. It can be distracting to the actor. Call out "soft sticks" to alert the editor that the sound will be soft and close the sticks more gently.
- For shots that are done without recoding sync sound at all, called shooting **MOS**, hold the slate to the camera for a few seconds with your hand between the sticks. This alerts the editor that there is no sync sound. It is very common to have a mix of sync takes and MOS takes in a single shooting day.
- For super tight close-ups where you cannot fit a regular slate, use a mini-slate (**Figure 17-11**). Everything gets a slate ID!
- Tail slates. Sometimes you need to get a shot off right away, or you'll lose a special moment (like a boat cruising unexpectedly in the background or a perfect wind blowing through the trees). In these cases we use a tail slate to mark the take. A **tail slate** means that the verbal marker and slate clap are done at the end of the shot, but before the camera is turned off. To avoid confusion with the next shot, tail slates are held upside down and called out as "tail marker" by the A.C.
- If you are shooting single-system sound, all takes are still slated but the commands for the sound recorder are obviously omitted and there is no need to clap the slate because there is no postproduction syncing to be done. With single-system, slating is purely for visual reference, so the slate (with the proper scene information) is simply held in front of the camera with sticks closed for a few seconds after "roll camera."

Evaluating the Take

Technical: Performance and Continuity

After the take, the director first checks with camera and sound for confirmation. If there was a technical problem, it must be communicated to the director at this point so that he or she can determine if a **retake** is needed:

- **Camera.** If the camera lost focus, or bobbled in the middle of the shot, or if a pan didn't follow the actor or got a light stand in the frame, then a retake might be necessary.
- **Sound.** If the microphone drifted off-axis too much, or the actors delivered their lines so loudly that the levels clipped, or if the mic picked up extraneous noise (like a lawnmower starting up next door), or any other problem like this, you'll probably require another take.
- **Performance or new ideas.** The director also evaluates the performances. Did the actor drop some lines? Was the performance not as good as it could be? Were the actions awkward or incorrect? Maybe everything was fine, but the director got some new ideas while watching the scene unfold. All of these things could also lead to a retake.
- **Backgrounds and periphery.** Besides the main subject and action, is everything in the frame as you want? If something distracting is going on in the background, or a piece of equipment shows in the corner, a retake might be necessary.



■ **Figure 17-11** Mini slates are handy for very tight close-ups. Everything should be slated.

- **Continuity.** Continuity issues also must be considered. Did the actor have a cigarette in the long shot but not in this close-up take? Was the actor wearing a coat in the long shot but is now wearing only a shirt for the close-up? Is there a problem with matching screen direction or performance intensity from shot to shot? These issues also can require a retake. On projects that require a lot of continuity shooting, it is a good idea to have a dedicated **script supervisor**, who makes notes on continuity details in every shot and marks off shots that have been completed (see "The Script Supervisor's Report" page 413).

If the director decides that another take is needed, then the problem with that take is noted in the camera and sound logs "comments" area and, after making the necessary corrections (technical or performance),

the whole process is repeated for “take 2.” Keep in mind that the “comments” notes are important because not all “bad takes” are a complete loss. Sometimes a technical or performance problem isn’t a problem throughout the take, and there are some good moments that can be used in the editing. These should be noted as well (Figure 17-12).

If the director is happy with the take, then it is marked as a “keeper” in the logs and everyone moves on to the next scene/shot on the shot list. After all of the shots from a particular camera setup are completed, the camera and lighting move to the next angle and setup begins again.¹ This system is repeated, take after take, setup after setup, scene after scene, day after day, until you’ve got your movie “in the can.”

Other Retake Factors

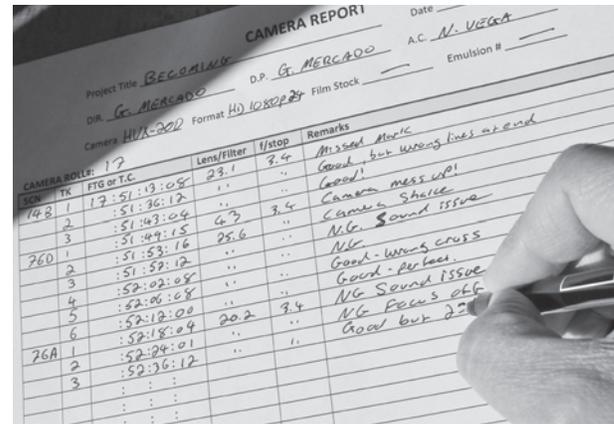
There will be times when everything on a take went relatively well, but the actor or D.P. feel that they could have done better or want to try something new, or feel that with one more take they can really do something extraordinary. In these cases they should ask the director for another take. If you can afford the time and the footage, it’s a good idea to listen to these requests.

Sometimes, when cast and crew nail the scene on the very first take, a bizarre superstition takes hold of everyone and they think, “It can’t have been *that* easy.” Or “What if something happens to that take? It’s the only one we’ve got.” In these cases, the director may call for another take, “just for safety’s sake.” This is called a **safety take**. The funny thing is, there is often some problem with the safety take (technical or performance) and then people will inevitably want to do retakes of the safety take, and so on. Still, safety takes are a good idea, if only to give you some options in the editing room.

There will also surely be times when you are running out of time or film or both and simply not getting the entire shot you’re after in a single take. This situation calls for the director to be crafty. Perhaps you have everything you need, but it is distributed in good moments among several “imperfect” takes. Maybe all you need to do is shoot a cutaway, or a simple reaction shot of someone else, which will then allow you to piece together the best parts of various takes seamlessly. It’s important that a director keep in mind during the shooting process the flexibility that editing affords.

Checking Video

If you are undecided about the quality of a take, you can always cue the memory card, and watch the shot in playback (Figure 17-13). But a few words of caution. Evaluating shots by replaying takes can be helpful, but it can also be extremely time consuming if you are compelled to check each and every potential keeper take, and replaying shots can also drive you a little crazy in the quest for absolute perfection. You may find yourself doing retakes for things that no one would ever notice but that you see, on your third close screening, as a flaw, like a smidge of light spill



■ **Figure 17-12** A camera report contains comments and technical information about every shot taken.



■ **Figure 17-13** Checking clips on the set can help you correct errors and make improvements for subsequent takes, but unnecessary reviewing can slow you down. Pictured director (and star) Don Cheadle checking video with script supervisor Belle Francisco on the set of *Miles Ahead* (2015).

¹ WAIT! Before you move on, the sound recordist must record one minute of room tone—then you can break down the setup.

in the corner of the frame, or a hair out of place, or a perceived hesitation in a movement and so on. Some people derisively call the playback monitor the “video village” because of all the personnel who gather around it to watch takes, and discuss them as a committee, which can waste valuable production time. Directors who get into the habit of re-watching everything they’ve shot on the set can expect, and should schedule, a longer shooting period.

■ TAKES, RETAKES, AND MISTAKES

1. The camera and sound crew must be alert, aware, and honest about evaluating the technical qualities of a take. Everyone makes mistakes; this is what retakes are for. One time, while my class and I were shooting a brief scene on 16mm for an in-class production exercise, we shot a take of two guys playing “rock-paper-scissors” as if their lives depended on winning. The close-up shot involved a slow pan from one player’s face, to their hands, then to the other player’s face. The actors really nailed the performance and after calling “cut,” I turned to the camera operator and asked, “Was that good for camera?” The response was a less than confident “Uh, yeah, s’pose so.” “Was it good, or not?” I pressed. “Yeah, yeah, it was good.” When we got the rushes back from the lab two days later, we all saw that the pan wasn’t great; it mostly missed the hands playing the game and the end of the move didn’t really find its final composition on the second player’s face, landing instead somewhere around his shoulder. The student knew the pan wasn’t good, but he didn’t want to admit to his teacher that he messed up the shot so he was less than honest with his evaluation. Unfortunately, and predictably, the photographic evidence was right there and undeniable. Obviously, it’s so much better to simply say, “the pan was off” and do another take, than to discover in post-production that there’s only one poor take to edit with. If I had been shooting digital, I could have checked it in the field myself, but shooting on 16mm film (without video assist), the crew needs to be especially exacting and forthcoming.
2. In one of my own films, I had a scene in which a business executive delivers distressing news about imminent layoffs to his management team. The problem was, I couldn’t get the executive to deliver his speech in one clean take. Not only did he flub his lines,

but the multiple takes were making him feel increasingly on the spot, and we discovered that when he got nervous, he’d start stuttering. After about five takes I became concerned about the amount of film I was burning on this relatively small moment. Because I planned to intercut the executive’s speech with the reactions of one particular worried manager, I came up with a workaround. I figured I had the first three sentences of the speech covered in one of the five takes. Then I imagined exactly where I could cut into the scene and we simply had him deliver two other, tiny chunks of the speech (no more than two sentences each) for the camera. After these two short shots, which he achieved in one take each, I sat with him on location and recorded the entire speech as a sound take only. This way, he could read the speech, sitting down, without the lights and camera on him. He was terrific, and I had both my images for intercutting and the rest of the speech to insert as audio under the anxious face of the manager.

3. A colleague of mine recounted a time when, on her film set, she had an actress who was great during run-throughs but who got “big” when the camera was actually recording. “It was totally unconscious, but she couldn’t help it. She would turn up the intensity a few notches whenever she knew we were doing a real take.” In addition, retakes only made her performance even bigger. So the director told camera and sound that they’d secretly record during the run-though and then they’d also take some scenes after the run-through, so that the actress wouldn’t catch on. Since they were shooting on HD video, they put a little strip of black tape over the red light, which indicates when the camera is rolling. The plan worked and the actress’ performance in the film (all from “run-throughs”) was convincing, “but we had no slates for her good takes otherwise; if we had slated, she’d know we were rolling.”

■ ADDITIONAL SHOOTING PROCEDURES

Time Management

It has been said many times that a film set is “organized chaos.” You have a group of talented craftspeople, each responsible for a specific area and all working within a highly fragmented process. Usually this work is done under very tight deadlines and very limited resources. Time is one of our most valuable assets on a film set and it cannot be wasted. While it is the A.D.’s (and P.M.’s) job to make sure that everything moves along swiftly and efficiently, there are some common time sucks that everyone should be aware of. All of these issues are discussed in detail throughout the book, but here is just a brief reminder of actions and behavior to avoid in order to remain on schedule:

Not starting on time	Endless tech. tweaking	Being disorganized or sloppy
Poor preparation	Lack of communication	Elastic meal times
Too many setups	Unnecessary takes	Horsing around
Needlessly complex setups	Endless reviewing of takes	Social networking on set

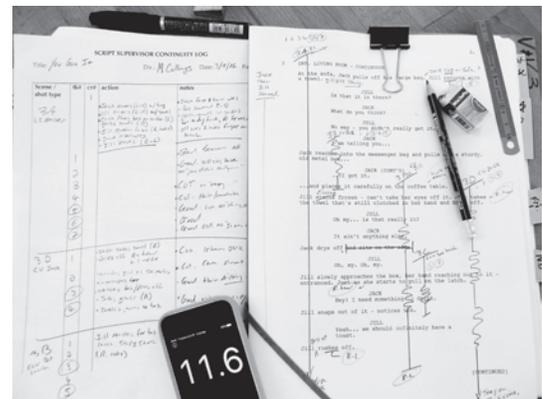
The Script Supervisor’s Report

The **script supervisor** position is critically important on complex, continuity style shoots (see page 162). During each and every take the script supervisor keeps copious notes: how many takes for each shot, the timing of each take, what went wrong, what might be useable, and so on. The script supervisor also keeps track of continuity issues (sets, props, wardrobe, movements, line of action, sightlines, and so on). Ultimately, it’s the script supervisor’s job to assure that the footage gathered each day will cut together in postproduction. For this reason, the script supervisor works very closely with the director, and other principle crew, to evaluate what has been covered, how it was covered, and how it might cut together in the edit (**Figure 17-14**). They will also spot check the camera and sound logs, and slates, to ensure that everything is corresponding.

The script supervisor starts the production day with clean script pages and after each keeper take, they draw a line right through the action and dialogue that a particular shot covered. This is the script supervisor’s **lined script**, it looks somewhat like the marked shooting script created in preproduction (see **Fig. 5-1**). In fact, one could say that the script supervisor is re-making the shooting script, but with one *big* difference: *the script supervisor’s lined scrip reflects the actual shots taken* rather than the shots as they were anticipated in preproduction. Most of the time you will be duplicating the coverage you planned during preproduction, but during actual production it’s common for coverage to be changed in some scenes; perhaps some camera angles were added or omitted or merged. Maybe the director decided that the master shot was all that was necessary and that close-ups were not needed. Or maybe the director realized on the set that adding a new close-up angle would be a powerful shot to cut to. Or perhaps rather than three static shots to cover a conversation, the director decided to go handheld and shoot the scene in a long, roving one take. All of these types of decisions are reflected in the lined script, making this an important record of the director’s ideas during production and the actual footage taken.



■ **Figure 17-14** The script supervisor confers regularly with the director, the D.P., and the sound recordist about continuity (and logging) issues. Pictured is script supervisor Ashley Gibson.

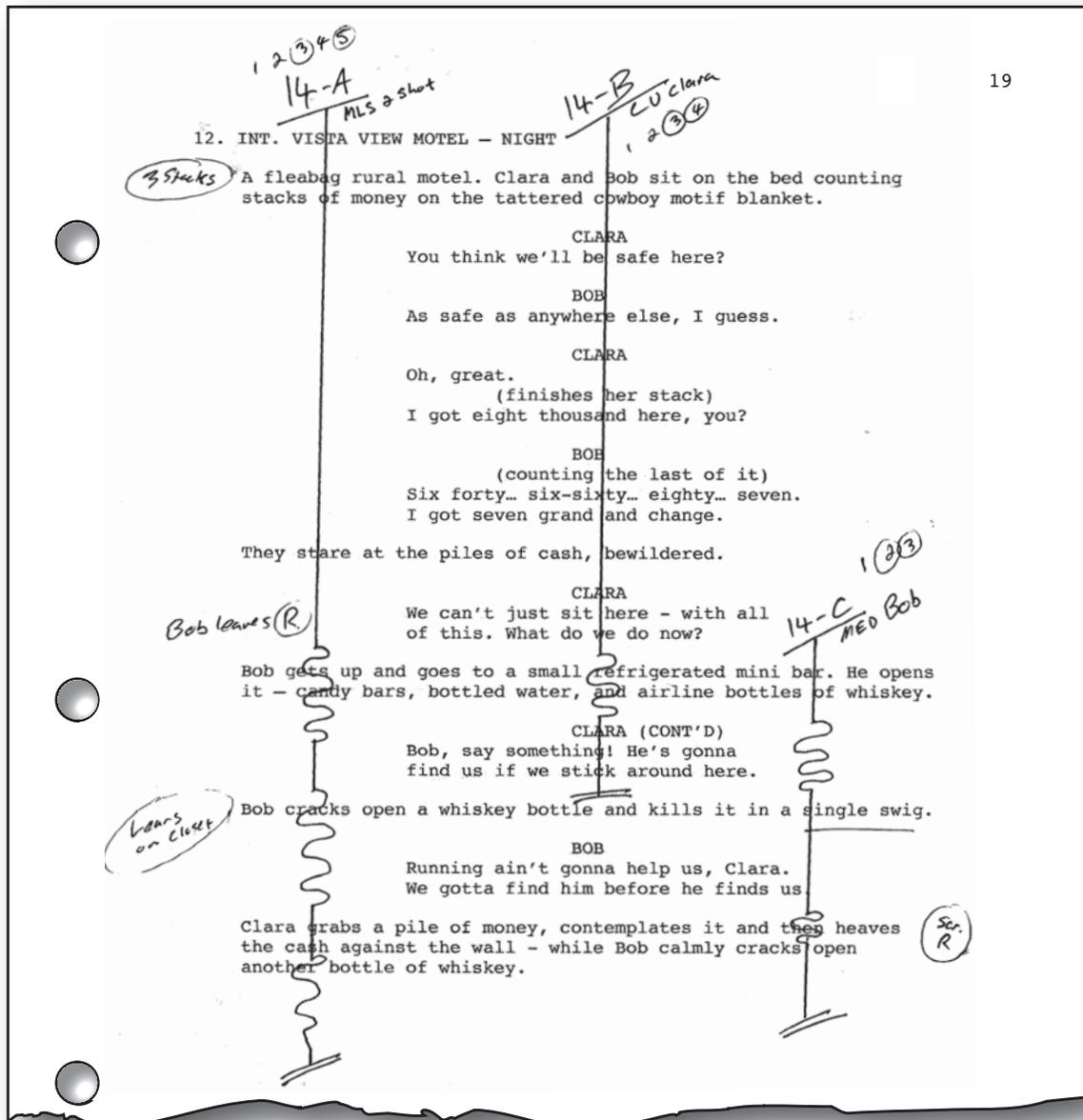


■ **Figure 17-15** The continuity log (*left*) and the lined script (*right*) are regularly updated during the shoot to reflect what shots have already been taken, the action and continuity details in each shot, and all changes to the shooting script that were made by the director on the set.

Along with the lined script, the script supervisor keeps continuity notes on a **continuity log** that looks much like a camera log, but contains notes about continuity concerns, like screen direction, eye-line matching, prop handling, and so forth (Figure 17-15). The script supervisor's lined script and continuity notes along with the camera and sound reports all comprise the **continuity report** that goes to the editorial staff and are essential to an organized editing process.

The lined script also allows everyone to see at a glance if every moment in the film has in fact been covered. For this, the script supervisor lines off the content of each shot with two different lines. A *straight line* indicates that the action was visible on camera and therefore covered, a *squiggly line* means that while that section was part of the shot, it was not actually seen by the camera (like the dialogue of a character who is off screen).

Take a look at (Figure 17-16). It shows the lined script markings for a two-person conversation covered in a simple shot/reverse shot style: a MLS master shot showing both Bob



■ Figure 17-16 One page of a script supervisor's lined script.

and Clara at the bed (14-A), a CU shot of Clara at the bed (14-B), and a MS shot of Bob at the mini-bar (14-C). The length of the line tells you where each shot begins and ends. Notice that the master shot (14-A master) is a straight line right through—because the camera sees both people involved in the scene—until Bob leaves the frame; then his lines and actions are no longer covered and these get a squiggly line. Shot 14-B (CU Clara) covers Clara from beginning to end (straight line) but Bob's not covered (squiggly line). And shot 14-C (MS Bob) covers Bob's actions and lines away from the bed, but Clara is not shown (thus the squiggly line). Notice that all of Clara's lines have been covered twice from two different angles (14-A and 14-B), providing some editing options. Using this method, as you work through each scene, shot by shot, it's easy to see what has been covered and what hasn't because any part of the lined script that *has not* been drawn through with a straight line still needs to be shot.

Also notice that small continuity details, like screen direction when Bob leaves the frame and when the money is thrown, were noted in the margins. Also, the script supervisor has noted the number of takes next to each shot and circled the good takes.

On complex films, even short ones, the role of the script supervisor is indispensable. On very simple films with small crews, the A.D. or the editor can create the lined script while *everyone* on set keeps an eye out for continuity issues.

■ DATA MANAGEMENT

The need for an organized system of data management and backup (video and audio files) is critical on today's sets. It's very easy to shoot willy-nilly, spraying footage across various memory cards, and forget exactly what you have and where it is. Footage gets easily lost this way. I've also known students who have, in the heat of production, grabbed a memory card, believing that it was unused, and reformatted it, only to discover that the card contained the previous day's footage. Ouch! So before you leave any location, or before you break down a setup, the memory cards or drives (audio and video) go to the **data wrangler** (a.k.a. **data loader**) who dumps the memory card contents onto hard drives for backup and spot checks the files for corruption (playing back the keeper takes). Only *then* is it safe to strike the set and move on. This procedure assures that if there is some sort of technical problem with an important take, you are still setup to reshoot. This procedure also ensures that, if the memory card gets lost or damaged, there are backups of everything shot up to that point. What follows are the correct and safe procedures for data wrangling.²

File-Based Media Management on the Set

It's critical for any film of any size to manage, in the field, the accumulated media files (video and audio) in a systematic, organized, and safe way.

The two reasons we should copy and backup files in the field are function and safety. Video memory cards (SDXC, P2, SxS, etc.) or media drives fill up—and quickly. In some cases, a production has multiple cards at their disposal, and in other cases, there are only a few cards available that must be re-used a number of times during a project. In either case, there are usually not unlimited cards or drives so at some point, cards are copied, backed up, reformatted, and re-used (obviously there should always be at least two cards on set so that while one is being backed up you can continue shooting with the other). As far as safety goes, the longer you wait to backup a card or drive that is filled with valuable footage, the greater the chance that it could be damaged, corrupted, or lost. So for safety's sake you should copy, backup, and double backup your data regularly and systematically (yes, a 3x backup). Keep in mind that the portable hard drive on which you dump your

²The data management tasks on projects that require the expertise of a Digital Imaging Technician (DIT) are more complex and are discussed in Chapter 7.

video and audio files will be the drive that goes into postproduction, which is why you *must* have a second drive for backup—or even a third drive for a backup of the backup. No joke.

There are several schools of thought about *when* to back up footage and check files for corruption. You can gather all video and audio cards/drives and copy them at the end of each shooting day, or safer, you can copy your footage along the way as each card fills. Whatever you choose, the most important thing is to *devise an organized, methodical, predictable workflow*, one which the entire camera department understands and follows, and stick with it for the duration of the project. In fact, it's very common for the data wrangler to distribute a memo to the camera department outlining the data management protocol, including a card or drive labeling system, so that everyone is on the same page.

The Data Wrangler's Kit

Transferring footage on the set requires that you have a dedicated data management station (Figure 17-17) that includes: (1) a laptop computer, (2) at least two robust portable hard drives: one edit drive and one backup (or better *three* drives for double backup), (3) a multi-card reader that accommodates the media used for video and audio recording (e.g., SDXC, CF, P2, SxS etc.), (4) a battery backup system in case of power failure (professional data wranglers will always have this), and (5) white and red paper tape and sharpies for labeling.

The Data Backup Process³

Again, it's important that the data wrangler establish a systematic process, communicate this with the camera department, and then stick to it for the duration of the shoot. Straying from established procedure can result in footage getting lost or cards being re-formatted before being copied.

1. *Label it "Full"*: When a memory card or camera drive reaches capacity it goes to the data wrangler who immediately marks it with a strip of red tape. Red tape, as everyone on the set should know, means: HANDS OFF! This is record media that has NOT been backed up.
2. *The Data Dump*: The data wrangler then dumps the data onto the portable hard drives placing the contents of the card into organized folders (see "Data Organization" later). There is *no reason* for the data wrangler to change anything in these files or the metadata.

Simply copy them. While you can get away with two drives (one edit drive and one backup) standard procedure is to use three drives: one edit drive and two backups for safety. Drives can get lost, damaged, or corrupted, and given the relatively low cost of high capacity portable hard drives, it's worth the nominal expense to truly protect your precious footage.

3. *File Verification*: The copied files then get checked against the original card or drive using a **checksum verification utility**. Checksum utilities do not compare drives byte for byte (which would take too long), but compares file identification markers across the drives to make sure that all files are accounted for. If you do not have a checksum utility, the data wrangler can compare the data size of each card folder with the folders on the drives (e.g., 127.35 GB)—if they match perfectly then it's a good bet that everything was copied.



■ **Figure 17-17** A typical data management/footage backup station with a card reader, two backup hard drives, a portable computer, and tape for labels.

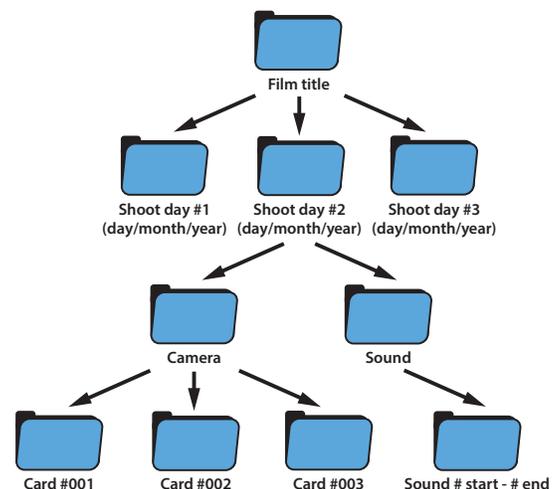
³ Much of the information in this section comes from two sources: Consultation with D.P. and A.C. Ben Silberfarb; and the video "Media Management 101" by Evan Luzi which can be found on his website www.theblackandblue.com.

4. *Corruption Spot Check:* Next, the data wrangler spot checks the files for corruption and glitches. Usually, this means scrubbing through the first file and a couple of takes in the middle and watching each keeper take in its entirety.
5. *Reformatting Media:* When the data wrangler is convinced that all files have been successfully copied to an edit drive *and* one (or two) backup drives, and that all files are in good shape, they can then remove the red tape and replace it with white tape labeled clearly “OK for Reformat.” The data wrangler then hands this card or drive back to the A.C. to be re-used. In the high tension atmosphere of a film set, it’s simply not safe to have un-labeled memory cards or drives floating around because A.C.s can easily forget verbal instructions to re-format or not re-format specific cards. *So, put a label on it!*

Data Organization

The keys to organizing data across the backup drives are simplicity and consistency. The simpler your organization is, the easier it will be for the editor to understand where everything is. Backup folder structure should reflect the same basic information used on the camera and script supervisor logs (**Figure 17-18**):

- *Folder level #1: The project folder.* Labeled with the film’s title.
- *Folder level #2: Shooting day.* All logs kept on the set are organized by shooting day and so should your backup file structure.
- *Folder level #3: Camera footage and sound clips.* Inside each shooting day folder are separate folders to hold video footage and sound files.
- *Folder level #4: Card number data folders.* Camera cards are labeled in the logs (and on the slate) in sequence. When camera memory card #001 fills, the next one gets card #002, and then card #003 and so on (also referred to as the “Roll #”). Each card should be copied to its own card # identified folder. Sound cards can be different because sound files are much smaller. It’s not unusual for a sound recordist to have the entire day’s recording on one card. So here the file label for the sound card backup should reflect the day’s sound clip numbers from start to finish (e.g., Snd # 1–Snd # 83) again, reflecting the sound recordist’s logs.



■ **Figure 17-18** The standard folder structure for backing up picture and audio memory cards in the field.

AFTER THE SHOOT

Striking the Set

After the last “cut” has been called and the day’s final keeper take has been logged and backed up, the work is not over. The last task of a film crew’s day is to **strike the set**. Because this happens at the very end of a long day, you can be sure that *everyone* on the set is exhausted and wants to get home—and for this reason *everyone* must contribute to striking the set. It is a serious breach of film production ethics to participate in a shoot, but then skip out when it comes time to strike. No one leaves until everything is packed up and squared away. When crewmembers commit to a film, they must commit to the bitter end, which means that they need to clear their schedules and be there when it’s time to put all the toys away (**Figure 17-19**). Striking the set must be done neatly, carefully, and thoroughly. If you simply toss the equipment aside to get it out of the way, you will only make the load-in and setup for the next day’s shoot all the more difficult and time consuming. Even worse, carelessly striking a set can damage equipment. Each department is responsible for striking its own gear, but everyone pitches in until it’s all packed



■ **Figure 17-19** Everyone helps strike the set. Putting gear away should be done carefully and methodically.



■ **Figure 17-20** A group of filmmakers celebrate the conclusion of an intense but successful production period with a well-earned party.

neatly away and the set is put to rights, meaning it's clean and orderly. If you're striking a set to which you will not return, make sure you return that location to its original condition or better (see page 425).

When the director announces to “strike the set,” all lights are immediately powered down first, but they are one of the last things to get packed away. This allows them to cool before you fit them back into their cases. Also, the data wrangler, sound mixer, and A.C. should take some time to download and organize all of the day's camera and sound rolls and compare logs against the backups

That's a Wrap!

After the last “cut” has been called on the very last day of the shoot and all of the coverage for the movie has been accomplished, the director will gleefully

exclaim, “That's a wrap!” This means that the production phase is officially over. The last set strike is called the **wrap out** and includes returning the last location to its former state, and all equipment to the rental house, school checkout facility, or wherever it came from, and getting the last of the exposed film to the lab. After the last set strike has been completed, there is nothing left for the film crew to do but attend the wrap party.

The Wrap Party!

The **wrap party** is exactly what it sounds like. It's a party thrown soon after the final shooting day that brings together the entire production team, cast, and crew one last time (**Figure 17-20**). But this time it's not to work on the film, it's to have a good time, eat some good food, dance, share stories, and generally get to know each other outside of the intense and harried environment of a film set. The feeling of camaraderie at a wrap party bonds the team as they communalize the production experience that they have all recently been through. It's also a way the producer and director can express their gratitude for the team's efforts and for a job well done. Take note: I don't mention the wrap party to be cute, I mention it because it's an important part of this process. If your experience with the cast and crew was positive, you very well might call on them again in the future. In fact, they may call each other for their own projects in the future. One director friend of mine always hands out cast and crew contact sheets to everyone involved in the film. A good wrap party leaves everyone with a better final experience than a set strike, and it's quite simply an essential part of creating and maintaining your film community. It should also be a line item in your budget!

■ THE DIRECTOR AND ACTORS ON THE SET

[...] 99 percent of my experience has been that actors, if you treat them with respect and ask for their expertise, they will share that expertise with you.

Mike Figgis (From *Digital Filmmaking*, 2007)

A director contributes not by instructing the actor but by inspiring him. A performance is wholly the creation of the actor's imagination, of the control he has over his expressive instrument (voice, body), and even more significantly of his emotions, sensory feelings, intuitions and mental attitudes. [...] In reality you are leading the actor on a very short reign, gently coaxing him into a performance that he must believe is entirely his.

Alexander Mackendrick (From *On Filmmaking*, 2004)

People often ask me what is the secret of directing actors, and they always think I'm being facetious when I answer that all you have to do is hire talented people and let them do their work.

Woody Allen (From *Moviemakers' Master Class*, by L. Tirard, 2002)

In Chapter 7, I discuss the working relationship between directors and actors during pre-production rehearsals and the bond of trust that must be formed. So a productive, collaborative relationship should already be in place when you arrive on the set. However, more should be mentioned about the directing process that occurs on the film set.

In a significant way, an audience can overlook many small problems in a film if the performances are compelling and convincing. By the same token, a film that is technically flawless, or even spectacular, can fall flat if the performances are not persuasive. This is not just an issue on highly dramatic films with complex emotional situations and dialogue. A very simple film, with simple actions, can also be dragged down if the performances go awry. Here is a good example: In an introductory film class, one production group made a very simple silent film about someone doing their laundry. This was, in fact, their first film. The laundromat was beautifully picturesque and the shots were perfectly focused, exposed, and wonderfully composed. The lighting was simple but effective and the scene coverage and editing were sharp. In every way it was a visually successful film, except that the actor, who was not an actor but a friend of the filmmaker, had this slight goofy grin on his face. The grin said, "Hey, I'm on camera!" and it shattered the fictional illusion that the director had so carefully created. The film ended up not being about a guy doing his laundry, but about a guy who was aware of being filmed while trying to perform doing the laundry. It was the director's job to not only organize the sequence of events and compose the shots, but to notice that revealing grin. The director needed to find a way to get the talent to drop it and to do this routine cleaning chore as if he were alone and had done it a hundred times before. Fundamental to the art of film directing is getting performances that are truthful and that emerge from the dramatic moment.

To this end, it's important that a director not allow technical considerations to pull them away from the actors. This is why the producers, the A.D., and/or the P.M. are so important on the set; they transmit the director's wishes to the crew to keep them going, allowing the director to work with the actors right up to the point where the camera rolls. This is also why a reliable and resourceful crew is important; they can take their direction and run with it.

The exact process of working with actors is dependent on many factors, including acting styles, training and experience, directing styles, the tone of the film, the unique circumstances of the production, and the particular actor/director personalities and relationship. This is a topic that is clearly beyond the scope of this book, but I have listed some texts in the Recommended Readings to introduce you to the essential aspects of working with actors in dramatic filmmaking. However, what follows is a basic (if somewhat idealized) description of the way actors and directors work on the set, during the production process.

Tech Rehearsals

Tech rehearsals are not just for the crew; the tech rehearsals allow the actor, without the pressure of a rolling camera, to inhabit and move within the real space of the scene, usually for the first time. This has emotional/performance implications for sure, but it also has practical implications as well. If your scene involves any physical business at all—for example, making a cup of tea—this is where the actor will figure out where the tea spoons are located, how to open the tea bag, how well the kettle pours, in what order to perform the task, and so on. Figuring out these little bits of action at this point will not only improve the authenticity of the performance, but it will save you countless retakes because your talent won't be rummaging cluelessly through drawers looking for a tea spoon in a kitchen that's supposed to be their own.

Setup

One of the most important moments between an actor and director happens while the crew is lighting and setting up the shot. There is usually some significant time for work here, and this is when the director reminds the actor where this particular scene falls in the larger story. Remember, we do not shoot a film in sequential order; rather, scenes are rearranged in the shot list to create the most efficient order from a production perspective. It's not unusual, for example, to shoot the end of a film in the first few days of a shoot. It's not easy for a performer to jump around to the various scenes of what is supposed to be an organically unfolding linear story. This means that on the set the director must serve as the guide for the actors, reminding them, with each camera setup, where they are in the story, what their character has been through up to that point, and where they need to be emotionally in the current moment when the camera rolls. Thoughts and approaches developed during the script readings and preproduction rehearsals should be reviewed and any new ideas discussed. It is one of the principle jobs of the director to help the actors understand the story and their characters, speaking in very specific terms about what you want to do with that story and how you intend to present and inflect the characters, actions, and dialogue in the script. This, of course, is predicated on the fact that you, as the director, know what you're after first, and then find a way to communicate that to the actors so that they can achieve the performance energy, mood, and nuance the movie needs.

Run-throughs

Once everything is set up and the actors are finally in front of the camera, you will do a few run-throughs before you roll camera. With each run-through, first ask the actors how the scene felt to them and what they thought about the way the scene is or isn't working. Use whatever is useful in their comments, and explain why you can't use other aspects of their feedback. Keep all comments and discussion constructive and focused on the story and scene at hand. In other words, simply talk with your collaborator and work it out. The next run-through should be a bit closer and the following one closer still. Just at the point when you think the cast and crew are comfortable, in the zone, and ready to "nail it," that's when the director announces, "Let's try a take."

Takes

It's not uncommon that the actors (and crew) are thrown off a bit on the first take of a new scene (especially early on in the shooting schedule). The added element of being recorded for all posterity can itself impose on a performance. If the take is not what you were after, simply talk with your collaborator again. Start with what was working well in order to zero in on what you think isn't working and why it's not working. Often, it's a simple fix, like more or less physical action, shifting the character's gaze or blocking somewhat, offering a few suggestions for performance adjustments, or simply giving the actors a few more tries to find their focus. Other times it's more complex, like when it becomes clear that the dialogue or scene coverage needs reworking or an actor is emotionally dissipated and simply cannot connect to what you have in mind. In any case, a director needs to be sensitive to all possibilities and do whatever is necessary to get the right performance on film. If that means rewriting a few lines, do it; if it means a few extra takes, do it; if it means letting the actor stir their tea with their left hand instead of their right, do it; if it means taking a few minutes to remind the actor of the scene work you did earlier, do it; if it means finding a new camera angle, do it; if it means clearing the set of unnecessary personnel, do it; if it means rearranging the schedule so that you can take another day to work the scene in rehearsal, do it. Don't go with an unconvincing or inappropriate performance and hope no one will notice. The job of the director is to guide both cast and crew so that their collective creative efforts successfully fulfill a single creative goal, a unified vision of a story told on film. If a director has done the casting right, then the success of the performances depends on the director being able to communicate that vision in specific and workable terms, terms that the actor (trained and nonactor alike) can understand, absorb, and run with. With each take and with each adjustment the director and actors make between takes, you should get closer and closer to a keeper take. Then you move on to the next, and so on.

Flexibility and Opportunities

It's easy for a director to get completely invested in their preplanned vision for the film and insist that everything fit within that plan, and usually this isn't necessarily a bad impulse. But a director should remain open and alert to surprises, inspiration, and unplanned gifts. Not infrequently, in the energy of the full production environment, a performer will find something new, fresh, and special. If you're excessively wedded to an old idea for a scene or character, you might just overlook a performance gem and mistake it for a bad take simply because it isn't what you had in mind.

in practice

The director Kelly Anderson told me this story of using a simple and ingenious device for getting actors in the right emotional space while she was directing *Shift* (1999), her first narrative film. *Shift* tells the story of Melanie, an unhappily married waitress who develops an intimate phone relationship with a telemarketer who, it turns out, is also a prison inmate. The scene Anderson was shooting was a wide two-shot of Melanie and Diane, another waitress, behind the counter of the diner, speculating about what Melanie's telephone/inmate boyfriend might look like, since she's never even seen a photograph. They kid around as they refer to various male customers off screen ("I'll bet he looks like him over there"), some cute and some less than attractive. Because they're looking and pointing to guys off screen, Anderson had her first A.D. stand off camera to give the waitresses a point of focus for sightlines. The tone of the scene was supposed to be lighthearted and full of fun, saucy girl talk about guys. But during the run-throughs,

Anderson says, "It was flat. Flat, dull, staged and not fun." She gave her actors some direction but nothing seemed to infuse the performances with the lively spirit she was after (Figure 17-21). She did a few takes and it didn't improve. Then she remembered that, while the actresses were in makeup prepping for the scene, she overheard them talking about how "hot" the intern production assistant was. On the next take she switched the A.D. for the intern just as the camera rolled, so that the waitresses would be looking at someone they truly had a little crush on. "Immediately the tone switched. When they saw this really cute intern standing there they were both surprised and started to giggle and blush. Now they had something to work with and I got that fun, girlish spontaneity I was looking for" (Figure 17-22).

What made this little directorial ploy possible was that Anderson could spend time with her actors while the crew set up, listening and responding to them even while they were in makeup.



■ **Figure 17-21** One of the primary duties of the director is to help the actors find the right emotional tone for each scene. Here, director Kelly Anderson confers with actors before another take during the shooting of her film *Shift*.



■ **Figure 17-22** Anderson got the performance she was after as Diane (Marla Sucharetza) cannot help but giggle as she talks about guys with Melanie (Alethea Allen).



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Set Etiquette and Production Safety

CHAPTER 18

A film set is an exciting, intense, and often pressure-packed environment filled with energetic people who are focused, driven, and usually working with limited time and resources. In this environment there is often a temptation to cut corners to get the job done. But cutting certain corners often proves to be counterproductive—or worse, downright foolish and dangerous. The following sections cover essential set etiquette and safety issues that should always be observed so that your project is safe, productive, and rewarding (Figure 18-1).

■ SET ETIQUETTE: RESPECT, COURTESY, AND GOOD WORK

Everyone on a film set should be treated with respect. This is not just a top-down issue (e.g., producers respecting the grips) but goes for all crewmembers toward each other. As they say in the business, when you come onto a film set, leave your ego at the door. Respect has three dimensions on a film set: we must respect the project, we must respect the people on the project, and we must respect ourselves by doing good work. This brief code of conduct outlines the standards of behavior on a film set for showing and earning respect as a member of a film production team:

1. *Do your job, whatever that job is, to the best of your ability.* Films are created by a coordinated group of individuals; one person slacking off can throw the whole thing off and places unfair burden on someone else who has their own job to do. Doing your job well also means knowing your job well. If you sign on to be the sound mixer on someone's film, then you had better know how to be an excellent sound mixer. Educate yourself, train, learn what you need to know to be exceptional at your job, whatever that job is. And given the rate of technological change in this field, many crew roles require that crew engage in regular research to remain current with the state of the art. Doing your job well also means staying alert and being ready when you are needed. Sometimes, there are chunks of downtime on a film set, but you must keep your ears and eyes open for anything that needs doing in your department. Lulls in activity are not invitations to go wandering off to get snacks or make personal phone calls. You never know when the set will suddenly come alive, and the last thing you want is for a producer or director to shout, "Anybody know where the hell [so-and-so] is? We need to shoot a take!" If you are a knowledgeable, conscientious, reliable, and effective worker, whether you're a production assistant photocopying screenplay sides or the D.P., people will want to work with you again and again. Every single project you participate in, from your first student film, is part of the reputation you establish for yourself.
2. *Always be on time, which means be early!* The film industry places a very high premium on promptness. Being late shows a phenomenal lack of respect toward the other people who arrive on time ready to work; in other words, when you are late, you waste other people's valuable time. This goes for everyone



■ **Figure 18-1** Film sets involve an intense, focused, and highly coordinated effort by a group of individuals engaging in diverse tasks yet sharing a common goal—to make a great movie. For this “controlled chaos” to work, proper set etiquette must be observed at all times.

on a film during all stages, from directors starting crew meetings on schedule, to the makeup person showing up on set on or before call time. Being late can hold up an entire crew and waste valuable production time. I remember being on a set where the crew waited 25 minutes for the guy who operated the teleprompter. No one else could do it, we couldn't shoot without it, so we all just had to wait. When he arrived he was full of excuses (the weather, the traffic, etc.) and he worked that day—but he never worked for that producer again and was fired by the teleprompt company. If you have a reputation for being late (even on the level of film school), you simply will not work much.

3. *Maintain a positive “can-do” attitude.* Film productions involve lots of problem solving: rigging a light where there is no space, getting just the right camera angle, recording useable audio in hostile environments, and so on. A production thrives with people who love a challenge and are innovative when it comes to solving or working around less than ideal circumstances.
4. *Respect the team structure.* It is often said that a film set is “controlled chaos.” The thing that keeps this process from devolving into “total chaos” is the way crews are organized and tasks are delegated. No matter what the size of the production team—from four students to 34 paid professionals—a film crew is highly organized and specialized. Everyone has a specific job to do and people they report to. You must respect the chain of command, the division of labor, and the areas of the other people on the team. Let's say you're a boom operator and the ideal place to position the microphone catches one of the lights and casts a shadow on the set. It's a serious breach of etiquette to adjust that light yourself. Instead, speak with the gaffer, explain the situation, and between the two of you you'll work it out.
5. *Treat everyone with courtesy.* If you treat people well, they will treat you well. Listen to people. Crew should, of course, listen closely to the department heads, but D.P.s, art directors, directors, and producers should also listen to their crews. Give praise where praise is due and do not take credit if it is not yours to claim. Learn people's names. Don't criticize negatively or humiliate people if mistakes are made. Don't create work or call meetings that are unnecessary. Don't get in the way of the work other people have to do. Crude comments or jokes about race, sex, religion, or specific people on the set are simply not appropriate and inevitably erode trust and good will. Raucous behavior in general can throw everyone's concentration off—stay cool, calm, and focused.

Now, all this does not necessarily mean every film set is a total love-fest. In fact, you will surely find yourself on sets where you don't necessarily like some of the people you're working with. But personal feelings ultimately should not enter into the equation. Everyone has a job to do, and everyone should behave as a professional and do that job regardless of personalities. When you sign onto a film (paid or not), you have a personal obligation to do your job as well as you can and see the project through successfully. Once it's all over, then you can vow never to work with certain people ever again, but for the duration of that film shoot you must do your job.

Food and Breaks

Twelve-hour workdays are not unusual on a film production. When a crew finds its groove and they're knocking down setups and keeper takes with the smooth efficiency of a well-oiled machine, everyone on the set enters an altered state, and time becomes relative. Four hours can pass but will seem like moments. However, the body knows that it's been working hard for hours. To maintain the morale and physical stamina of the crew, well-timed breaks for food are essential. You cannot expect people to work long hours for you if you do not feed them. And a **food break** means all work stops to allow the cast and crew to sit, relax, and eat; it does not mean sandwiches on the run. Giving people meal breaks will only make them a happier, healthier, and more productive crew. You also need to make sure that the food is somewhat interesting. When I was a student I once worked as a grip (for free) on a low-budget, seven-day (12 hours/day) film shoot. To save money, the producer decided to serve the crew pizza twice a day. He also decided not to spring for coffee

in the morning. The thought of seven days of pizza was more than any of us could bear. After four days he had a disgruntled crew who organized a meeting with the producer to demand some variety for our meals. The next day we had sandwiches, but from that point on the crew referred to him as the “pizza producer.” We did our jobs and we did them well, but when it was over we all vowed never to work for him again.

Because film shoots are long and hard, and food is essential, you should take any dietary issues of your crew seriously. A producer or production manager should know before ordering food who is a vegetarian or if people have any food allergies. It’s a big problem if you’ve been shooting for six hours and order pizza only to discover that the sound mixer is allergic to dairy products and therefore cannot eat anything.

Another critical detail is to always have water available throughout the shooting day. Film work is physically strenuous and sets can get hot, so you must have plenty of water on hand to keep your crew hydrated. This is especially critical for exterior locations on hot days. And it only stands to reason that if you want your crew to drink water to stay hydrated, then you’d better make sure that there are bathrooms conveniently available on the set. If you’re at an exterior location, do not imagine that people can just go behind trees or bushes. Also, don’t assume that the local fast-food joint will allow your cast and crew access to its toilets. Part of preproduction is securing (or renting) the necessary facilities.

Courtesy on Public Locations

Beyond courtesy among cast and crew is the issue of the broader public. Many times you will be shooting in public places like parks, sidewalks, beaches, neighborhoods, and coffee shops. These places are not your private film set, so you must treat the public with respect and try not to disrupt their lives too much. In other words, keep as low a profile as possible. This includes not making excessive noise, not parking in such a way that it obstructs other people’s access, being conscientious about litter, and not taking up more space than is necessary. I remember going to a café in my neighborhood where the owner allowed a student film crew to shoot before working hours. But this crew was running late and the café had to open while they continued shooting. Making matters worse, they had totally commandeered the place by strewing pieces of equipment on every table and chair, preventing patrons from sitting down to enjoy a cup of coffee. I took my coffee to go and the owner admitted that he regretted his decision to let them shoot there. The next time a film crew asks, that owner will surely reject the request. Being rude, taking up more space than you need, and bossing the public around so you can get your shot is a sure way to engender hostile feelings for your project and any other film project that tries to work in the same public space. Think of yourself as an ambassador for filmmaking in general—if you leave people with a bad impression, then you’ll spoil it for others.

Respect and Protect the Locations, Props, and Costumes

Making movies often involves renting or borrowing locations that are real-world, functioning spaces, not film sets. The unwritten rule in these cases is that, when the shoot is over, you should leave a location in exactly the same condition you found it, *or better*. It’s important to observe this rule if we are to maintain the good faith of those generous people who open their homes, shops, restaurants, and property to us for the sake of our movies. This requires that you instruct everyone on the team to be careful to protect the location. Additionally, a few extra precautions are standard:

1. Lay clean tarps over carpets before you load in your equipment.
2. Carefully assess the electricity distribution so you don’t overload internal wiring.
3. Designate a single place for the production team to dispose of garbage.
4. Place delicate objects well out of harm’s way, and ask the location owners to secure their valuable items in another place.
5. Be aware of the placement of hot movie lights: they can blister paint and burn drapes. Also, don’t use tape directly on walls as it will peel paint off.
6. Assign someone the job of monitoring the condition of the location. If necessary, this person can suggest that the crew take some time out to clean the space.

7. Take photographs before you move furniture around so that you know exactly where everything belongs when it comes time to return the space back to normal.

From time to time an accident may occur and the location might sustain some damage (e.g., you accidentally gouge the wall while moving a C-stand). Don't try to hide the damage and get away with it; tell the owner of the property and offer to fix it. Also make sure you have some contingency money in the budget to professionally clean or repair the location if necessary.

It's also very common to rent or borrow props and costumes for use in a film. Usually, a prop or costume rental (like an equipment rental) will come with some form of insurance to cover costs of any accidental damage, however there are many times when filmmakers borrow very special items or the personal property of someone because they need a particular prop or costume not easily found at a rental house. For example, I once helped out on a period (early 1900s) production that required a number of period set-pieces and props. I happened to be friends with a woman in the area who owned an antique store and she was extremely generous in loaning precious items for the project that included a very expensive antique bicycle and an exquisite antique clock. In these cases, very special provisions must be made to protect these items, and this is the responsibility of the properties department and wardrobe (or art department on smaller films) but ultimately the director and producer are responsible for damage to precious items. In my case, while I was not officially part of the crew, I still refused to allow anyone on the crew to store or manage these items because I had a solemn obligation to my friend to protect them. So I brought them to the set when they were needed, I watched their placement and use very carefully, and when shooting was over I immediately took them back to their owner.

Unfortunately, there are many cases where filmmakers abuse, and even destroy, props and costumes that were very generously loaned to a project. It may be accidental, but personal items are very often not replaceable. A recent case involved a one of a kind, historic Martin guitar that was destroyed during the shooting of Quentin Tarantino's film *The Hateful Eight* (2015). The scene involved Daisy (Jennifer Jason Leigh) playing the guitar and singing until an enraged John Ruth (Kurt Russell) grabs the guitar out of her hands and smashes it to bits. Sound mixer Mark Ulano described the incident during a film screening panel this way, "The guitar was a loner [sic] from the Martin Guitar Museum and there were six doubles made. The guitar was from the 1870's and was priceless. What was supposed to happen was we were supposed to go up to that point, cut, and trade guitars and smash the double. Well, somehow that didn't get communicated to Kurt, so when you see that happen on the frame, Jennifer's reaction is genuine. [...] Kurt shattered the antique guitar and everyone was pretty freaked out. Tarantino was in a corner of the room with a funny curl on his lips, because he got something out of it with the performance." Ulano then claimed that after learning of the incident the Martin Museum representatives asked, "Do you need another one and can we please have all the pieces to display in our museum?"¹ This incident was recounted in an SSN Insider article as a "particularly amusing story," however, the Martin Guitar Company was not amused. When Dick Boak, a representative and archivist for Martin Guitars, discovered what had actually happened, he said;

We were informed that it was an accident on set. We assumed that a scaffolding or something fell on it. [...] All this about the guitar being smashed being written into the script and that somebody just didn't tell the actor, this is all new information to us. We didn't know anything about the script or Kurt Russell not being told that it was a priceless, irreplaceable artifact from the Martin Museum. [...] We want to make sure that people know that the incident was very distressing to us. [...] I don't think anything can

¹ "SSN Screening Series: The Team Talks About 'The QT Factor', Smashing Guitars and Shooting in Minus 10 Degrees on the Set of Tarantino's 'The Hateful Eight,'" by Diane Panosian, 12/31/15, SSNinsider.com

really remedy this. We've been remunerated for the insurance value, but it's not about the money. It's about the preservation of American musical history and heritage.

(From "Martin Responds to 'Hateful Eight' Destruction of Antique Six String"
by C. McMahon, 2016)

In a Facebook post Boak added, "We certainly didn't ask if they wanted another one. We did ask for the pieces to see if we could salvage anything. We couldn't!"² The bottom line is that such a precious object should *never* have been mishandled, let alone destroyed for the sake of a movie. It's not enough that the properties department know how valuable a special prop is, they must communicate it to the actors handling that prop. The director also should have communicated to the actor where the action was supposed to stop so that the guitar could be swapped out and the replica smashed instead. Clearly, there is culpability to go around and in the end no one protected the precious object that was generously provided and entrusted to them. Such a sad waste.

Respect Your Equipment

Filmmaking is a highly technical art form, and you cannot make a film without equipment. Neglecting, manhandling, or misusing your equipment will undoubtedly hurt you because your gear will either not function properly or cease to function at all. In the case of electrical equipment, misuse can be especially dangerous and even deadly. Respecting equipment includes:

- Educating and training yourself in the proper use of the gear before you get on the set.
- Using a specific production item for its intended use only.
- Not physically modifying or customizing equipment that is not yours.
- Maintaining an orderly set and staging area, and packing equipment away properly.
- Handling all gear with care—this includes protecting equipment from damage, dirt, water, accidents, and general manhandling. Always clean gear when necessary.
- Using common sense at all times (Figure 18-2).

Obviously, when you are renting equipment, you will be charged for damages and your reputation will be scarred. In a school situation, where all students desperately rely on the quick turnaround of common and properly functioning equipment, your manhandling of gear will not only result in a fine or loss of privileges (as in the school where I teach) but it could also jeopardize other students' ability to complete their work, and therefore their film and their grade is put at risk.

■ PRODUCTION SAFETY AND SECURITY

The information in this chapter is designed to alert you to some of the major issues concerning production safety and security and to prompt you to take them very seriously. These guidelines are here to help you avoid risk of death, injury, arrest, equipment loss and damage, lawsuits, project collapse, and a bad reputation. Absolutely nothing else in this book means anything if your project is not a safe one and catastrophe occurs. This discussion, however, is in



■ **Figure 18-2** Careless handling of equipment will result in damage, production delays, and even injury. This guy is doing everything wrong. By carrying too much gear and dragging improperly coiled cables, not to mention the camera slung recklessly over his shoulder, he's tempting a production calamity.

² Dick Boak Facebook post, Feb. 3, 2016.

no way comprehensive, nor can it address the safety concerns of every production and circumstance. For this reason I urge you to do further research into the specific safety contingencies of your particular project and to check with all the applicable labor union, state government, local government, location, and school safety regulations and procedures before you start rolling the camera.

Every semester, I discuss safety practices in my production classes, first in a general lecture and again when I meet with production crews to discuss their specific projects. I'm happy to say that I have a very good record when it comes to my students pulling off their films without incident; nonetheless there are those occasions, as any production teacher can attest, where students insist on doing things that are strongly ill advised. I collect these experiences (and those from other schools and professional film shoots) to share with future classes, hoping that they will learn from the mistakes of others. I recount some of the most boneheaded and unsafe things I've heard of people attempting in the pressure and stress of a film production. I tell the story of the crew who put their camera operator on rollerblades and had him hold onto the rear bumper of a moving car with one hand while shooting with a \$10,000 film camera in the other—it was cool until they drove over a pothole. I recount the story of the students who improvised a climactic scene of a woman burning a photo of her boyfriend, but they did not give the actress a safe place to drop the burning photo when the flame got close to her hand—so she dropped the fireball into a waste paper basket filled with, well, waste paper. I tell them about the team who wanted to shoot in an abandoned public pool so they ignored the “No Trespassing” sign,



■ **Figure 18-3** This is an exuberant idea for an improvised traveling shot in a time when cars were rare and car mounts nonexistent; however, these days you'd get in serious trouble for trying a move like this. This is one of the rare times I'll tell my readers, “Do not do what this master filmmaker is doing!” From Vertov's *Man with a Movie Camera* (1929).

cut through the chain-link fence, and started shooting—they were surprised when the police officers wouldn't accept “But we're only shooting a movie!” as a legitimate excuse. You'll hear more stories later in the chapter. Every time I tell these stories my students rolls their eyes and snicker at the ridiculousness of the actions. The laughter seems to say, “What an idiot. Who would *do* something like that!?” And yet, from time to time one of those snickering students who was shaking their head ends up doing something like that. Thinking that you're immune from doing stupid stuff can quickly evolve into thinking that you can *get away with* doing something stupid. And the minute you think that you can get away with it is when something bad happens, to equipment or people. So the first step to avoid stupid accidents is to acknowledge that we are all capable of poor judgment and therefore must remain vigilant, stay smart, follow rules, heed warnings, and listen to others who have the experience and expertise to tell us how things should be done and when we're being unwise and reckless (**Figure 18-3**).

■ THE THREE COMMANDMENTS OF FILM PRODUCTION SAFETY

1. Every filmmaker has a moral and legal obligation to keep the cast and crew, and the public, safe. Lack of funds is never an excuse for poor safety practices.
2. Safety is everyone's responsibility. You are first responsible for safety in your specific

department, but if you see something dangerous or excessively risky anywhere on the set you *must* mention it. *If you see something, say something.*

3. Learn and follow all safety regulations and guidelines that apply to your specific project (union, government, school, location).

Prepare for Safety

A great deal of the effort and attention for ensuring a safe production process happens in preproduction. Don't think that your project is so small or so blessed by the filmmaking gods that you can get away with avoiding these steps:

1. *Research, study, and follow all safety regulations and guidelines that apply to your specific project.* This may include guidelines from the state or local governments and law enforcement; regulations of the specific location where you are shooting; safety requirements of unions that represent your cast and crew, if any; and the safety guidelines established by your school or department as well as the production parameters expressed by your instructor (in the syllabus or verbally) for the class. I have a colleague who was reviewing a student script and saw that the last scene took place on a building rooftop. He was assured that they had permission to shoot on the roof, that the rooftop had high walls around all edges, and that they would not be shooting near these walls. When he saw the dailies, however, there was a shot of the lead actress sitting on the *other* side of the wall, perched on the edge of the rooftop—very stupid and reckless and in clear violation of the safety regulations of the building and the school. Teachers do not create arbitrary limitations or seek to restrict your creative freedom. We impose limitations because we want you and your team to have a safe and successful production so that you may live to make many more films in the future.
2. *Obtain legal permits where it is necessary and respect the parameters of the permits.* It's important to remember that location permits protect both parties involved. The filmmaker is protected because the location is legally approved and secure, and the person or entity that controls the location is protected because the contract releases them from any liability should someone get hurt during the shoot. Many location permits will lay out specific parameters for the shoot (areas and activities allowed or forbidden, specific hours for shooting, type of equipment allowed, number of crew allowed, and so forth). These parameters are usually included for your safety, and in those cases where normal activity at the location will continue during your shoot, for the safety and respect of the people who work there. For example, if you're shooting during a normal work day a nice café owner *might* let you shoot at one or two tables in the far corner, but they probably won't let you take over half the tables and the area behind the counter where they make coffee. It is absolutely imperative that you abide by the rules of the permit. If you are denied a permit, then you *must* move on and find another location (see pages 139 and 432).
3. Assign a **safety coordinator** as part of the production team. On very small shoots this can be the producer, P.M., or A.D. On larger shoots with many locations and safety challenges, this should be a dedicated crew position who should be involved from the very beginning, during preproduction planning.
4. *Location surveys should include looking for and noting any safety concerns on the set.* It's important to bring along one person (safety coordinator) who is responsible exclusively to note all safety issues. This includes a careful assessment of electricity capabilities (discussed later), structural condition, hazardous materials, potential fire hazards, weather exposure, proximity of high voltage lines and traffic, dangerous natural terrain, neighborhood crime trends, hospital proximity, a secure staging area, and so on. This person should also note all emergency exits, fire extinguishers, and access points.
5. *Hold safety meetings with the department heads and producing team.* These meetings are especially important after a location survey so that each department can anticipate and address its specific safety concerns before the shoot occurs.
6. *Distribute emergency information to everyone on a set.* For every location, everyone on the film team should have the emergency contact information for the police, fire department, and ambulance as well as know where the nearest hospital is. It's a good idea to put this information right on the call sheet, which everyone gets (see **Fig. 5-14**).
7. *Consult (or hire) the appropriate safety specialist* if you plan to do anything with fire, automobiles, stunts, prop weapons, water, etc. (discussed later). They are good at

their jobs and a little money in the budget for this will pay off in a safe, trouble-free, and dramatically convincing production.

8. *Schedule reasonable hours.* Allow enough time for the crew to rest between shooting days, and schedule enough time to allow your crew to do their jobs thoroughly and thoughtfully (see page 128). Don't cram so many setups in each day that everyone is rushing and cutting corners just to stay on schedule. Give people time to do their jobs properly.
9. *Everyone must know how to operate their gear before getting on the set.* This is especially important for large and potentially dangerous items like dollies and generators. Speaking of large and dangerous equipment, *do not* rent or attempt to use equipment for which you are not qualified, and do not attempt to use equipment (or do procedures) that requires a trained and certified technician. And *no*, watching a how-to video on YouTube does *not* constitute training. Specifically, do not try to use large trucks, cranes, generators, or high-wattage lights if you're not trained, qualified, and licensed.

Production Insurance

The boom operator is holding the microphone aloft over the scene, the actor walks two steps farther than in the previous take, so the boom operator steps back but trips over a sandbag, falls, and breaks an arm. It can happen to anyone. When the boom operator gets back from the emergency room, he's got a cast and a hospital bill for \$5,000. If you've arranged for production insurance, you're covered; if not, well then your low-budget movie isn't so low budget anymore. Production insurance is necessary for all film shoots, regardless of the size, scale, and budget. Insurance protects the project from catastrophe should there be any injury to the cast or crew or damage to the equipment. In fact, if you want to use SAG actors, you must show proof of insurance before they can enter into a contract with you. Additionally, many rental houses and locations require proof of insurance (some rental houses will provide insurance on equipment for an extra rental fee). Be aware! Finding and securing insurance does not happen instantly—it takes a long time to find an insurance company, determine what kind of insurance you need, and complete the application process, so give yourself plenty of time to go through the process. If you're a student, your department should have information about where and how to acquire production insurance. If you're an independent filmmaker, then there are several insurance companies catering to low-budget films. The Independent Feature Project (IFP) website is a good place to start your search (www.ifp.org). There are more links to insurance resources in the Web Resources section of the companion website.

Common Sense

By far, the preponderance of accidents that happen on the set occur because people forget to use common sense. I've already mentioned this earlier in the book, but it bears repeating; no one on a film set should do or request anything of anyone that would even remotely jeopardize their safety. Asking a camera operator to climb up onto a steep rooftop to get a panoramic shot constitutes a willful and dangerous lack of common sense, as is jerry-rigging a structurally unsound and untested camera mount to a moving car (or any other support). Both cases constitute **negligence**, which is defined as conduct that falls below the standards of behavior established for the protection of others against unreasonable risk of injury (**Figure 18-4**).



■ **Figure 18-4** Do not attempt under any circumstances. No amount of liability insurance or skating prowess will ever make this kind of thing a good idea.

Here is a true story of a staggering lack of common sense that turned dangerous. A group of students in one of my classes (I'm sorry to say) was making a film outside an all-night bodega. The scene they were

shooting involved a big American car pulling up to the bodega and the lead character strutting out. They thought it would be cool to set the camera up in the parking spot on the street so that when the car came to a halt, the front grill would be framed in a tight wide-angle close-up! Already we can see that common sense was not in play here. A wide-angle CU meant that the car would need to stop about 24 inches in front of the camera. But they, and I mean a crew of five with no objections from anyone, decided to go with it and put the tripod and D.P. off the curb, right where the car would pull in. The driver of the car, another member of the crew, all on his own decided that it would be even cooler to come to a *hard stop*, with the tires skidding a bit and the front grill bouncing in front of the lens. Well, you can guess what happened. The car hit the camera smashing the lens, and breaking the D.P.'s finger. The entire crew was banned from using school equipment after that and, needless to say, the movie never got made. It's a sad story, but hopefully it'll encourage everyone reading this book to weigh creative impulses against potential risks and to use common sense.

In addition to willful negligence, ordinary, unintentional carelessness can also create serious problems. I was recently on a set where, in a rush to get a setup done before losing the daylight, I saw a grip struggling to single-handedly carry a 1-K baby, a light stand, a sandbag, a bounce board, and a tangle of extension cables up a steep flight of stairs. Even though I was on set to take photos for this book (i.e., not my department), I stopped the guy and helped him schlep equipment so he wouldn't break his careless neck. You should also avoid (or ban) all possible set distractions, like pets, visitors, iPods, and the reigning king of all distractions, the smartphone. I once visited a student film set and saw someone trying to set up a big 2-K softlight while talking to a friend on a cell phone squeezed between her ear and shoulder. If you see something, say something, right? I told the student to hang up and pay attention to what she was doing. I was amazed that she didn't seem to think what she was doing was all that risky. On a film set, all cell phones should be *off* during work hours unless making a project-related call.

Personal Responsibility and Comportment

Although this next point should be obvious, which is why it's here under the "common sense" section, it must be stated in no uncertain terms. No drugs or alcohol on a film set. By drugs I am not only talking about illegal substances, but you must also be careful with many prescription medications and over-the-counter drugs that cause drowsiness or fuzzy thinking. Many allergy and flu medications are also very effective sleep aids, so before you get on a set, read about the side effects of any medication you're taking.

Also, it's up to each crew member to dress appropriately for their particular role on the set. This is especially important for crew who work with or around heavy equipment and electrical gear. Leather palmed gloves to protect your hands from scorching hot movie lights are obvious, but it should be equally obvious that high heels or open toed shoes are not appropriate footwear if you're required to move equipment, build sets, or work in the middle of a C-stand jungle. Always wear shoes or boots that protect your feet. You should also wear pants which cover your legs, but *not* baggy jeans that slouch half way down your butt. You surely do not need the added encumbrance of your waistband wrapping around your knees while you're carrying a 2-K Fresnel (Figure 18-5).



Finally, it's important for safety's sake to keep your set neat and orderly with room for movement. Use your staging area, put things away that are not being used. Don't leave gear where people can trip on it and never,

■ **Figure 18-5** Film crews should always show up to a set dressed appropriately for their task. Baggy jeans sagging below the butt, short skirts, high heels, and flip-flops are not only fashion "don'ts" on a film set, they can cause injury.

ever block emergency exits with equipment. And don't think that organization is someone else's job—*your mommy isn't there to clean up after you.*

Locations and Permits

This point was made earlier, but it's so important that it bears repeating. Never shoot in a controlled location without securing the necessary legal permits, and always abide by the activity parameters established in the permit. Rules, regulations, and restrictions are put in place to protect workers, the public, and the facilities. If you are refused a permit, do not attempt to sneak in and shoot anyway. Find another, similar location that will allow you to shoot, or failing that, re-write the scene to accommodate the available locations (see page 139 for more on location permits).

Earlier in this chapter I recounted the story of the students who cut through a chain link fence to shoot in an abandoned pool clearly marked “No Trespassing;” those students got lucky—they were caught by the police. But on February 20th, 2014, the 27-year-old camera assistant Sarah Jones was killed by a train (and other crew members were seriously injured) while shooting for the film *Midnight Rider* on an active train track without securing the legal permission to do so. According to the final report of the National Transportation Safety Board, “The [NTSB] determines that the probable cause of the accident was the film crew's unauthorized entry onto the CSX Transportation right-of-way at the Altamaha River bridge with personnel and equipment, despite CSX Transportation's repeated denial of permission to access the railroad property.”³ While the conduct and culpability of the production staff and the director are still being litigated as I write this book, sentences have been handed down for criminal trespassing and involuntary manslaughter; the director, who pleaded guilty, received jail time; and this highly publicized case shook-up the film industry into seeking industry wide improvements in production safety and production leadership accountability. But beyond the legal dimensions, this tragedy should never have happened; it was entirely avoidable, and the director and producers should have been much more attentive to the safety of their film crew. To have been denied a permit *twice* is something which should never have been disregarded, overlooked, or ignored. Clearly, the permits were denied to them for good reason—if only they had accepted the decision and moved on. Sarah Jones' family has created the website “Safety for Sarah” to help bring attention and pro-active effort to the issue of film production safety. You can go to www.safetyforsarah.com to find out more.

Rest and Health

Filmmaking on any level is strenuous work. Keep yourself healthy and mentally sharp by getting enough sleep and eating well during your production period. Also, allow your crew the same. Without rest, your thinking and coordination will be blunt and you'll lack the energy to deal with the general intensity level of filmmaking—no one is an exception. Also, be sensitive to driving times. If you're shooting 250 miles out and expect to wrap at midnight, arrange for hotel accommodations; do not ask anyone to drive four hours to get home after a 12-hour workday.

Weather

The entire production team must watch the weather and dress appropriately. In cold conditions wear extra clothes, beyond what you would normally wear on a cold day. When you are working in cold weather for hours, the cold eventually seeps in. In extreme cold conditions, an exterior location should always have a sheltered, heated area nearby where cast and crew can warm up. If you're in a remote area, this could be a tent or shed with a portable heating unit.

In extremely hot weather, lots of drinking water is especially crucial and if you're outside, protect your crew from sun exposure. This means providing sunblock and shade in the

³ NTSB Accident Brief Press Release, March 23, 2015, www.nts.gov/investigations/AccidentReports/Reports/RAB1501.pdf

form of tarps and umbrellas (which also protect equipment from direct sun). Finally, don't shoot in hostile weather just to stay on schedule. Ice storms, rainstorms, heavy snow, and gale force winds not only make for a miserable experience and compromised footage, but are simply dangerous. Don't risk injury to personnel and damage to equipment, just reschedule.

Risky Locations

You should know, long before you arrive to shoot, if your location is safe through your location scouting (see Chapter 6). If during the location scouting or tech survey you discover that a location is not structurally secure, that there are hazardous materials on the site (asbestos, flammable or toxic compounds), or that the electrical wiring is not up to code, then simply look for another location. It's also best to avoid dangerous locations like steep cliffs, soft riverbanks, and busy highways. Dangerous neighborhoods or buildings known for high crime or gang activity can put your crew and equipment at risk. If you must shoot in dangerous neighborhoods, contact the local police and find out what provisions are available for security. I tell my classes the true story of a small crew who were making a fiction/documentary hybrid film and wanted to capture some gritty reality so they followed the subject of the film, a true heroin addict, as he went to a dealer to score drugs. The next thing they knew, the crew had guns pointed at them and all of their money and equipment was taken. Did it not occur to them that these are dangerous people? Did they think their status as filmmakers would protect them?

Picture Vehicles and Drones

We use automobiles in films quite a bit, and extreme caution must be exercised around them at all times. Whenever a person drives a vehicle in a distracted state, like while talking on a cell phone, they are prone to accidents; this also includes acting. When performers are acting (i.e., recalling lines, staying in character, finding emotions), they are very aware of being on film and much less attentive to the road.

Car camera mounts must be rigged and tested by people who know what they're doing and should never be driven on public roads without a permit. I often tell a story, which comes from another film school, of the director and camera operator who wanted to get some pickup shots from out of a window of a moving car. While the camera operator hung out the window with the camera (!?), the director drove the car and gave direction. They weren't going fast, but distracted as they were, they crashed the car, damaged the camera, and had to deal with police, school administration, insurance companies, and so on. They were lucky no one was hurt.

For inexperienced filmmakers, car chases, screeching tires, and car stunts of any kind are very bad news and absolutely not recommended. The majority of stunt-related deaths and injuries involve vehicular accidents. Automobile stunts, including driving fast, must always be accomplished by trained "precision drivers" driving carefully prepared picture vehicles, and these professionals are often out of budget reach for students. In addition, there is an enormous amount of coordination, permit work, and insurance coverage involved in car action sequences. Even the "simplest" car stunt is dangerous. The story related earlier about parking the car inches in front of the camera attests to that.

Mounting a camera on drones (a.k.a. UAV or Small UAS) for aerial shots has become increasingly popular (see page 265). While there is no doubt about their value to gather low-cost aerial footage, it must be acknowledged that drones are not toys; they require training to use correctly and safely, and they require permits. Drones are not "easy" to control so your operator must be thoroughly trained and certified. You don't want to crash a drone into an actor's face, nor do you want to crash your equipment into a tree. Clearly, flying drones over crowds of unaware people is a terrible idea given the chance that something could go wrong; a drone and camera falling from several hundred feet can do serious damage. The second note of caution is that there remain many legal issues concerning the use of drones in general. These are, after all, potentially powerful surveillance devices

and can be seen as invasive. The FCC forbids UAVs within a specific radius of airport flight corridors and many government buildings also restrict drone use nearby. If you fly a drone near the homes of unsuspecting people, you can expect them to call the police believing someone is spying on them or casing out their property. So you must do your research—check with the local film office and contact the FCC to learn the restrictions and protocols at your location. Also, many film schools have established policies concerning the use of drones for student film projects—some schools forbid it outright, while others have strict parameters for their use. The bottom line is, make sure you take all necessary precautions and have all necessary permissions before putting anything in the sky with a camera on it.

Weapons and Violence

Never use a real weapon in a movie. No real guns ever and no real knives. You must always use **prop weapons** (a.k.a. simulated weapons). **Prop knives** are blunt and often made of plastic or rubber. **Prop guns** come in three flavors: **rubber guns**, which are made of heavy rubber material; **nonfiring “function” guns**, which are made of metal and have working hammers, slides, triggers, and cartridges but have no chamber and cannot fire anything; and **blank-firing guns**, which make a bang and produce a flash out of the barrel. Blank-firing guns can still injure or kill you when not used properly and they require additional permits and insurance to use on a set. It is best not to use a blank-firing gun at all, and most schools strictly prohibit their use for student films. You must also be careful with nonfiring guns, as they are designed to look authentic and can easily be mistaken for a real gun if taken anywhere off your set.

As was the case for *Kiarra’s Escape*, the student film excerpt that is streaming on the *Voice & Vision* companion website, students wanting to use a nonfiring prop gun are usually required to get permission from the instructor and the program’s production area head or safety supervisor. To get this permission they must: (1) provide extensive detail for the prop’s use (a final draft script), (2) prove that they have the appropriate production insurance, (3) are renting from a reputable theatrical prop house, and (4) have received training in the prop’s use. Additionally, the shooting location itself may require more information, special insurance, police supervision, and so on (**Figure 18-6**).

If you have a prop gun in your film (nonfiring or blank-firing), here are a few essential rules:

1. Review all state and federal laws concerning theatrical weapons use.
2. Always rent from a certified and reputable prop weapons rental house.
3. The people handling the gun (actor and prop master) must be trained in how to use the prop.
4. Treat every gun, even a nonfiring prop, as if it’s a loaded weapon.
5. No one else may touch the prop weapon or blanks.
6. You must have a secure place to store prop guns when not in use.
7. Always notify the local police about your intention to use a prop weapon, whether indoors or outdoors, and arrange for police supervision if required.



■ **Figure 18-6** The nonfiring prop guns used in the film excerpt *Kiarra’s Escape* (on the *Voice & Vision* companion website) required special permission from the school and were handled exclusively by the prop master and actors who were trained in their use. They were also securely locked away when not in use.

This last point is commonly sidestepped by novice filmmakers because they believe it’s a hassle that could potentially derail their production, but it is essential, for the protection of the entire cast and crew, to inform the local police of your intention to use a prop firearm or stage violence in a public space. It does not matter if you are shooting on a sidewalk or an interior scene on private property, passers-by and neighbors can see inside homes, stores, or any other location. If they see someone pointing a gun at someone else, they will call the police. Recently, an independent filmmaker making

a mafia movie on Long Island was shooting a scene of a convenience store robbery. The action included actors holding guns on a store clerk *inside* a rented convenience store. The crew was very small and they were shooting with a small-format camera using mostly available lights, so there were no overt signs that filming was in progress. Someone driving by saw what was happening through the windows and called the police. The next thing they knew, real cops stormed the shop with real guns drawn and disarmed the actor “with force.” Luckily, very luckily, no shots were fired before the police realized that this was a film shoot and the guns were props. The producer and director placed their entire cast and crew, and the police officers, in grave danger by not making a simple phone call to notify the police ahead of time of the project (Figure 18-7). More on prop weapons safety can be found at www.moviegunservices.com/mgs_safety.htm.

It’s important to remember that this concern is not only about guns. You should notify the police of *any* scene of aggression or violence that takes place at an exterior location, even if it does not include weapons. I tell the story of a group of students who ended their film with a scene of a man beating up a former friend who stole everything from him. At the last minute, they decided to change the location from inside an apartment to the courtyard between apartment buildings. Neither actor was trained in fight choreography, so they decided to shoot it in an extreme long shot from the apartment window for believability’s sake. As the scene unfolded in the courtyard, people from the surrounding apartments looked out their window to see what the commotion was all about. They saw two men fighting, cursing, and screaming with each blow—but they did not see a film crew or a camera, as they were shooting from inside a third-floor apartment. Because these were very convincing actors, it did not appear to be kids fooling around. So the police precinct received emergency calls about a terrible assault in progress, and cops surrounded the courtyard.

Fire and Open Flames

Fire is unpredictable and flames of any size can quickly get out of hand, so fire should always be avoided. Many schools and locations absolutely forbid open flames of any sort on film shoots, so make sure you check all regulations that apply to your project. If your film



■ **Figure 18-7** News stories of vehicle accidents, accidental fires, misuse of prop guns, and real arrests on film shoots. This is not the way you want your movie to make it into the news.



■ **Figure 18-8** Even though this romantic scene from Shelton's *Bull Durham* (1988) uses common household candles, the many open flames pose a huge fire risk, which must be taken seriously. For shots like these, a dedicated safety supervisor should oversee the art department setup to ensure that the flames are not near flammable materials and this person must also be on set, with a fire extinguisher, during production.

absolutely must have a fire of any size at all (like a campfire) and you are legally allowed to have one, then you should have a trained, bonded, and insured **pyrotechnics expert** on the set. The same goes for any type of legal fireworks (illegal fireworks are, of course, forbidden).

Even if your film has something as small and ordinary as birthday candles or a match lighting a gas stovetop burner, always designate a person to watch that open flame, and make sure they are armed with a fire extinguisher (**Figure 18-8**). Here is a story I heard from another film school. The scene was a birthday party of an elderly man. The art department thought that 65(!) birthday candles would look better than two candles (a six-shaped candle and a five-shaped candle). Sixty-five small candles add up to a lot of fire! As the students were lighting the candles, they forgot to start with the inside candles and work

their way out—so someone burned their hand, jumped, and knocked the cake over; the lit candles fell on the paper napkins, and a fire quickly started. Luckily, the crew doused it with the punch from the punch bowl, but they narrowly escaped a serious disaster.

Fire is no joke. Always make sure that matches, lighters, or anything else used to ignite a flame are put securely away after the scene and not just left around. Always have a fire extinguisher on the set (either bring your own or, in public buildings, locate the nearest available one) whether you're using open flames or not.

Water

I discuss electricity and water (showers, pools, etc.) later (see page 441), but if you are shooting on a boat or near any large body of water, do not use electricity at all; rather, since you'll be outdoors, use bounce boards. Additionally, life vests and safety lines are mandatory. Don't use "tippy" boats, and don't overload boats. Many scenes that ostensibly take place in open water are actually shot with the crew and equipment on a pier and the talent in the water only a few feet away. No one knows what's off screen, so be creative, cheat the shot, and you won't find yourself tipping over in a rowboat and dumping that \$25,000 RED One camera to the bottom of the lake (**Figure 18-9**).



■ **Figure 18-9** Scenes that take place in open water can often be cheated closer to the shore so that crew and equipment remain on solid ground. In this production still from *De Daltons* (2007), the film crew remains on the pier while shooting a scene in the water. Notice the extra personnel standing by the camera (*right*) and wrangling cables (*left*) to make sure everything and everyone remains dry.

Physical Stunts

Here's a comedy scene: a woman races down a grocery store aisle, turns the corner, and knocks the store manager over with her cart. This can be funny, but it's also a stunt and can cause injury. For very simple stunts like this, you should first cast a performer who is in good physical shape and knows how to fall without breaking bones. Then you must protect the actor with body pads and floor mats off screen. Also, rehearse the stunt until the actor is comfortable with the fall. However, in many cases (e.g., your store manager is played by a frail elderly actor) even a simple fall like this could pose a danger. Some actors will just never fall well or convincingly.

Don't take risks. Most physical stunts require a **professional stunt performer**. If your script calls for someone to, say, crash a bicycle on the sidewalk, slip on some stairs, climb over a chain-link fence, or engage in a fight, you cannot do these things with regular actors. First, you stand a good chance of hurting the talent, no matter how well padded they are, and second, most actors will never give you a convincing fall because they just don't know how. Professional stunt people are worth the extra expense and insurance precisely because they know how to do stunts so that no one gets hurt and yet are dramatically (or comically) convincing (**Figure 18-10**). Veteran stunt performer and stunt coordinator Matt Anderson, whose many credits include feature films and TV, describes his job like this:

If I'm just working as a stunt man, my job is to simply make something look as dangerous as possible, while actually taking as little risk as possible. That's the profession. [...] You don't really want to hire an actor to go down a flight of steps, so you hire a stunt man that can do the job. As a stunt coordinator, it is your job to know the people that can do these things. Usually, they've worked in the business for a longer period of time, they know how to do the stunts and know how everything is set up. But first and foremost as a stunt coordinator, your job is safety. You have to make sure you can make something look spectacular without crashing a lot of people and putting them in the hospital

Matt Anderson (From www.pollystaffle.com)

The two critical aspects here are the emphasis on safety (which should be your emphasis as well) and the ability to make even simple stunts completely convincing. There are many agencies, like Stuntworks.com, where you can consult with stunt coordinators before you undertake any sort of physical stunt and cast stunt performers. When casting for a stunt performer, you'll notice that each person specializes in different things—some are good at falls, and others (usually martial arts trained) are expert at fight choreography—and they will be very specific about their physical type so that you can make a good physical match with your talent in cases where you're looking for a stunt double.

Security

In addition to safety, you must think about the security of people, equipment, and personal belongings when you are shooting, especially on location. Theft of equipment and the personal belongings of cast and crew is a common problem on film sets. A producer must ensure that the staging area for equipment is secure and that the actors have a safe place to store their personal belongings while they are on set and in costume. This is especially challenging when you are shooting in a public exterior location. In some cases you may need to assign a person the job of locking away and watching over people's belongings. Never just leave valuables and equipment in a car. Cars get broken into all the time. I have many stories of lazy students who left equipment in a locked car overnight (rather than unload and lock it away indoors) only to find everything gone the next morning. My colleague told me a story of driving home from a long shoot with her D.P. and stopping to have a bite to eat. They tried to find a bonded (insured) parking lot because they had some equipment in the van, but they couldn't find one so they parked on a fairly busy street. When they returned to the van, all the locks had been popped off and the equipment was gone. In this instance she was lucky on three counts: (1) she had paid extra for theft insurance when she rented the van, (2) the D.P. did what any professional would do—he took



■ **Figure 18-10** A trained stunt performer can make physical stunts look very dramatic while keeping everyone safe. Pictured is stuntman Matt Anderson in Davis' *Forget About It* (2006).

the camera into the restaurant with him (never leave a camera in an unattended vehicle), and (3) the thieves were not interested in all those DigiBeta tapes in the van and left them behind—these contained all the footage they had shot up to that point!

Gear also gets stolen when there are not enough people loading or returning equipment. One person must be assigned the job of watching the vehicle while others take equipment inside. Loss also often happens on messy, disorganized sets. When set strikes are rushed and haphazard, things get left behind. Leaving equipment in a public hallway while the entire crew is in an apartment shooting is asking for it to get stolen. People will steal your equipment, boxes, extension cords, gels, C-stands, tape, purses, computers, whatever, if you give them the opportunity,

Security also means providing a safe place for cast and crew to work and not asking them to go into unsafe territory just getting to or from a location. For example, if people must travel through dangerous areas late at night, provide escorts or shuttle transportation.

in practice

■ ADDITIONAL SAFETY INFORMATION RESOURCES

There is much more to learn about safety and there may be areas of specific concern for your particular project that were not covered. To find more information, the best place to start is with the Contract Services Administration Trust Fund (CSATF). Within the CSATF is an Industry Safety Committee, which is composed of guild, union, and management representatives active in industry safety and health programs. This committee researches and publishes bulletins and guidelines that provide detailed guidance for film and television industry safe practices.

The CSATF publication *General Code of Safe Practice for Film Production* is a basic summary of safety standards and is a *must read* for everyone involved in film production. You can download this document from the *Voice & Vision* companion

website (Chapter 18) or the CSATF website, www.csatf.org/pdf/GenCodeoSafePractices.pdf.

The CSATF *Safety Bulletins* are much more detailed recommendations for safety standards as they pertain to specific issues and circumstances, like the use of prop weapons, stunts, animals, cold weather, etc. You can find the bulletins at www.csatf.org/bulletintro.shtml.

Another highly informative publication is the *Safety Guidelines for the Film and Television Industry in Ontario*, which is published by the Ontario Ministry of Labour. Whether or not you are shooting in Canada, this is a well-researched, cogently organized, and highly informative publication concerning film production safety. You can find a pdf of these guidelines on the *Voice & Vision* companion website or on the Ontario Ministry of Labour website: www.labour.gov.on.ca/english/hs/pubs/filmguide.



■ **Figure 18-11** Electricity can kill you. Care, common sense, and knowledge are required even when using minimal movie lighting.

■ ELECTRICITY AND SAFETY

Film and video production often requires the use of many lights, adding up to thousands of watts of power; using lots of lights means that a filmmaker is harnessing a great deal of electricity. Electricity is dangerous stuff and must be treated properly. A few safety principles and common sense are all it takes to ensure a safe and successful production experience (**Figure 18-11**).

How Much Electricity?

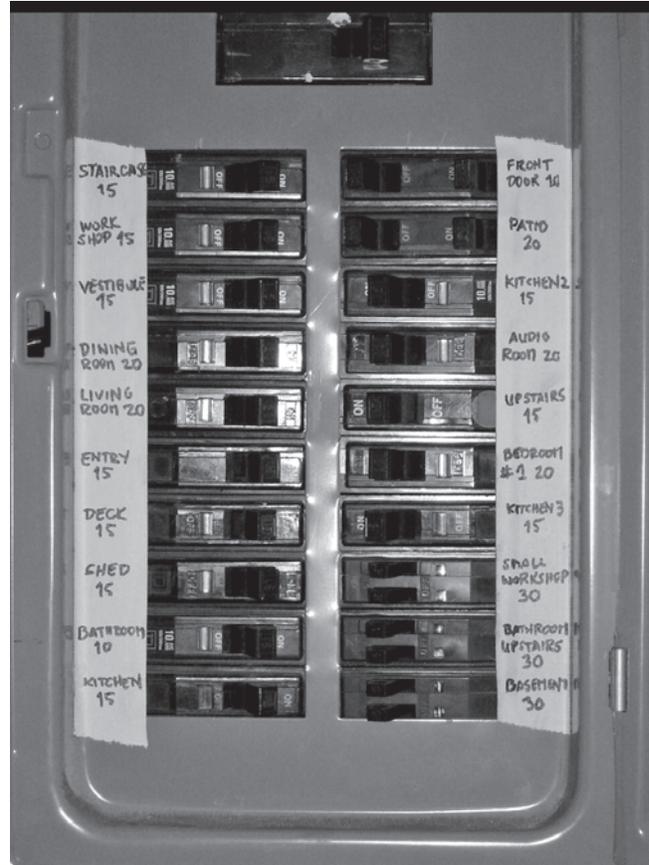
Before you start plugging lights in, you need to determine how much electricity you have at your location and how it's distributed. This will help you figure out how many lights you can work with and where they can be set up and plugged in. This simple procedure for determining how much power you have and where it is should be done during your location survey. It can save you a lot of time and labor by keeping you from lugging more lights than you could possibly use

or by keeping you from having to completely overhaul your lighting scheme when you discover the layout you envisioned at your desk isn't possible, given the facts of electricity distribution on the location:

1. Locate the **breaker box** (or fuse box) for your particular location. A breaker box brings the raw power from the utility company into a building and breaks it out into various circuits distributed throughout the rooms. Each circuit is rated in **amps** (short for amperes) and has a dedicated breaker switch (or fuse) with the amp rating written right on it. The amp rating tells us how much electricity can safely flow through that circuit. Common circuit ratings found in homes and apartments are 15 amps (most rooms) and 20 amps (rooms that use heavy-draw appliances, like kitchens and bathrooms), but you'll need to check your breaker box to be sure. If you exceed the circuit's rating by plugging in too many lights, the breaker will trip and cut the electricity (with a fuse; a metal filament embedded in the fuse melts and breaks the connection). If the breaker trips, you can simply reset it with the flick of a switch, but you also need to reduce the amount of electricity you are drawing on that circuit or it will trip again (fuses must be replaced). The purpose of breakers is to keep the building from burning down. Excess electricity can heat the internal wiring so much that the insulation melts, leaving super hot and exposed wires to start a fire. If you're using extensive lighting and you do not have access to the breaker box, then it may be too risky to shoot at that location; if you blow a fuse, it's lights out for the rest of the shoot (**Figure 18-12**).
2. The next step is to determine which wall outlets are on which circuits. Usually there are several outlets per circuit, but it's impossible to know exactly how many and how they are clustered without testing them. To determine the distribution, simply turn on one breaker at a time and plug a **circuit tester** into each outlet. Take note of which breaker controls which outlet throughout your location. Occasionally breakers will be labeled "kitchen," "living room," "master bedroom," etc., but these labels are often flat-out wrong, so it's best to simply figure out for yourself which outlets are connected to which breaker switch. Also, we use a circuit tester because this tool will reveal if any outlets are improperly wired and therefore dangerous (**Figure 18-13**).
3. Calculate the amount of electricity you can draw on each circuit. To determine how many watts you can plug into any single circuit, use the following formula:

$$\text{watts} = \text{volts} \times \text{amps}$$

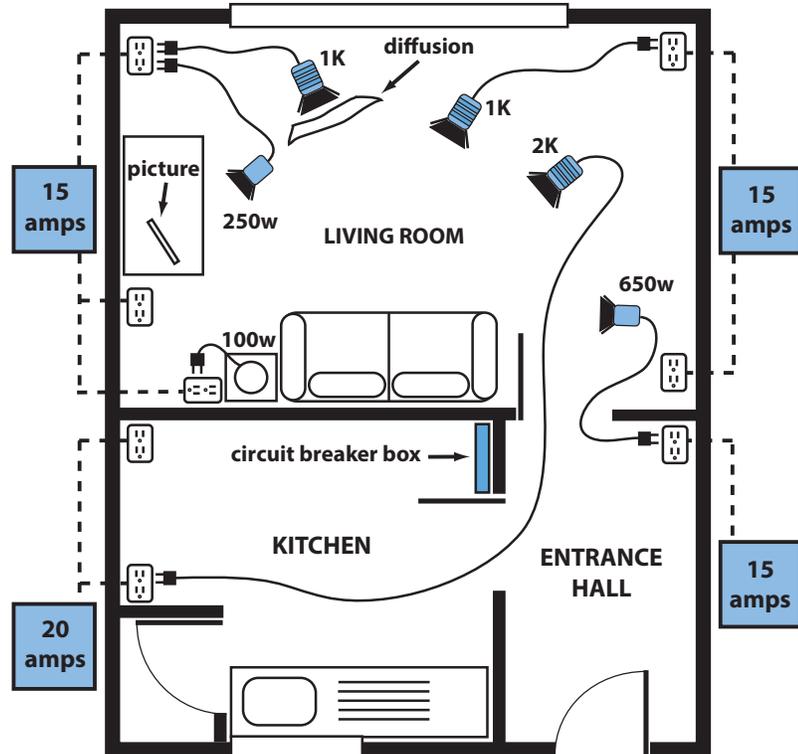
We already know what amps are and their rating can be read straight off the breaker of each circuit. **Volts** (voltage) are the measure of the electromotive force of the electrical current in a system. Volts are standardized by



■ **Figure 18-12** Electricity on location. A lighting crew has carefully labeled this household breaker box after determining where each circuit is located and what the amperage rating is.



■ **Figure 18-13** Circuit testers will tell you if the circuit is properly wired with a "hot," a "return," and a ground. It's not uncommon to find improperly wired outlets.



■ **Figure 18-14** Overhead diagrams that detail both the distribution of electricity at a location and where each lighting unit will be plugged in are essential to keep from tripping breakers during your shoot. Notice that the cumulative wattage plugged in to any given circuit does not exceed its amp rating.

country. In the United States a normal **AC** outlet (for **Alternating Current**) fluctuates from 100 to 120 volts. To give ourselves some margin for safety it's always best to use the conservative figure 110 volts for our calculations:

$$110 \text{ (volts)} \times 15 \text{ (amps)} = 1,650 \text{ (watts)}$$

$$110 \text{ (volts)} \times 20 \text{ (amps)} = 2,200 \text{ (watts)}$$

So, we can plug in up to 1,650 watts of light on each 15-amp circuit and 2,200 watts of electricity on a 20-amp circuit (**Figure 18-14**). However, many gaffers feel that it's not safe to go right up to the limit of any circuit; as wires start to heat up, fuses can blow. Also, be careful to take into account or unplug any appliances at the location that also draw power. It's easy to forget that the refrigerator is plugged into the kitchen's 20-amp circuit. If lights adding up to 2,100 watts are plugged in while the refrigerator compressor is off, invariably the fridge will kick back on just as an actor is delivering the most moving performance of their career, and **BLAM!**—the breaker trips and the lights go out. Cut!

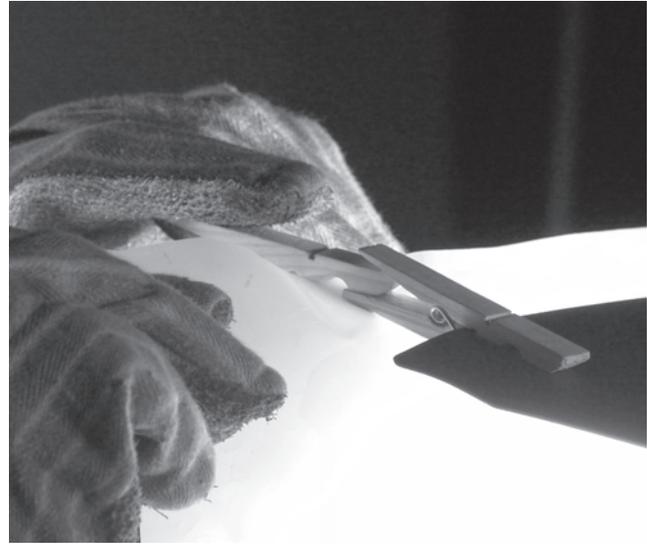
Electrical Loads and Time

The length of time that filmmakers keep lights powered is a factor that can also push a circuit to the breaking point as cables heat up. A provision in the National Electrical Code states that if an electrical load is run continuously for more than three hours (as we often do on a film set) then it must be considered a **continuous load**. A circuit that has a continuous load *must* be de-rated to 80% of the posted protection. So if we plan to power our lights on a 20-amp circuit for more than three hours *continuously*, we must rate that circuit (and do our calculations) at 16 amps ($110 \times 16 = 1,760$ watts). For a circuit that is ordinarily 15 amps, our continuous load calculation must be made with a 12-amp rating ($110 \times 12 = 1,320$ watts).⁴

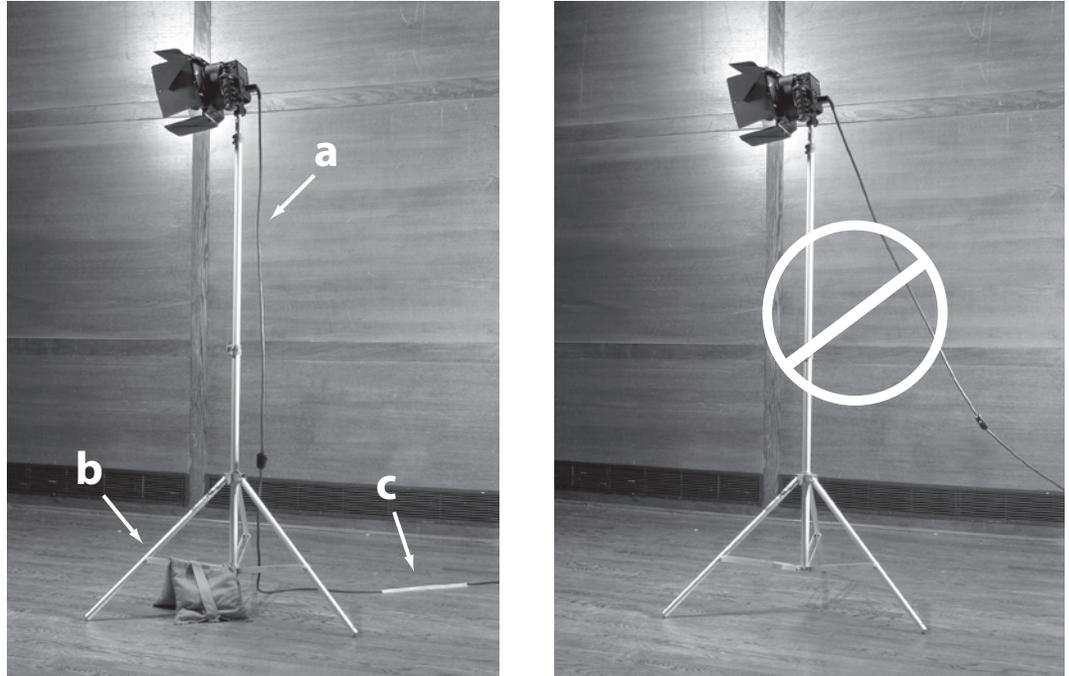
⁴ Many thanks to educator, author, and D.P. Harry Box for his valuable input on this section.

Lighting and Grip Safety Tips

1. The first rule of safety is to use common sense at all times. Things can become quite hectic on a film shoot—but you should always take your time and do things correctly. Never cut corners on safety to save time and don't try to get away with untested, unsafe jerry-rigging.
2. Never attempt to do things that require the expertise of a trained and certified electrician. This includes doing repairs on high wattage units, opening up breaker boxes to tie into the mains, rewiring outlets, and so on. And again, watching a “how-to” video on YouTube does not constitute adequate training. I once had a student who was planning an exterior night shoot and he asked about the possibility of tapping into the power of a public streetlamp. “It can't be that hard,” he said; “I've seen people pop off the covers and rig their own plug-in right on the street.” When he saw the incredulous look on my face he added, “Yeah, maybe it's not such a good idea.” Indeed!
3. Maintain a professional attitude toward your equipment. Abused and manhandled gear will break and, in the case of lighting equipment drawing thousands of watts of electricity, can bite back!
4. Movie lights get very hot and can burn everything from hands to walls. Keep flammable items away from lights. When bouncing lights off walls, keep them back far enough that they will not blister the paint. Be aware of all flammable materials on the set (costumes, set dressing, etc.) and keep lights clear. Always wear leather-palmed grip gloves when handling hot lights. For lighting units of 500 watts and more, never put gaffer's tape or gels in direct contact with the unit's housing or even the barndoors; they will melt. When attaching gels to barndoors, clip several C-47s to the barndoor first and then clip the diffusion to the C-47s (**Figure 18-15**).
5. Gels designated with the word “tough” (tough spun, tough blue, etc.) are flame resistant and can be used near lights but will melt if not mounted properly. Also, carefully handle the scrims that are used in lights to cut the intensity—they also get super hot. Back when I was a student I was on the set of a classmate who removed a scrim from a 1-K baby and dropped it on his mother's carpet. When the shoot was over he went to pick it up and discovered that it had melted the nap and was fused to the carpet. When his mom came home, he lost the one location he thought he could always count on.
6. Always turn off lights when not in use; and after a shoot, turn them off right away and let them cool down completely, on their stands, before you pack them away.
7. Never touch the lamp of a movie light, even if it is cool. Lamps get extremely hot and will obviously burn you. But touching a cool lamp with your bare fingers is also dangerous because your fingers leave oil on the bulb; the oil cooks when the lamp is turned on and eventually causes the bulb to explode. Always use the plastic or paper sheath provided with a new lamp to handle the bulb when you are replacing it.
8. Electricity and water do not mix. Duh! When shooting scenes involving water, like bathtubs and swimming pools, it's best to go with available light. If you must use lighting for interior bathroom scenes, do not set up lights where they could fall into the water. In fact, my students are not allowed to have movie lights in the same room with a full bathtub or running shower. They must bounce light from a unit set up outside the door. In addition, they are required to station a grip at each unit for added safety.
9. When setting up a lighting unit or a C-stand, try to keep the weight as evenly distributed as possible. An unbalanced C-stand can easily topple over; so can a fully extended light stand with a heavy instrument on top. Use a sandbag to stabilize every stand (**Figure 18-16** *left*). Try not to create unbalanced gobo extensions. In addition,



■ **Figure 18-15** Diffusion and gels should be attached to barndoors using a couple of C-47s to avoid melting and fires. Always wear leather-palmed gloves when handling lights.



■ **Figure 18-16** Lights should always be set up with the cable flush against the stand (a), stabilized with sandbags (b), and cables taped to the floor to prevent accidents (c).

rotate the gobo arm such that the weight of the object pulls the gobo arm in the direction of tightening the gobo head. Do not allow gravity to pull the arm in a direction that would loosen the head.

10. Keep your cables neat. Use stingers to allow cables to fall straight down from the unit to the ground rather than stretching out diagonally to reach an outlet (**Figure 18-16** right). In areas where there is a lot of foot traffic, tape down your cables with gaffer's tape (called **dressing cables**). And always coil unused cables and put them out of the way, safely in the staging area.
11. All hanging lights, barndoors, and any other item rigged overhead should be secured with a safety chains.



PART IV TOOLS AND TECHNIQUES: POSTPRODUCTION





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Postproduction Overview: Workflow and the Editing Stages

After the director has gleefully announced, “that’s a wrap,” after the data wrangler has backed up the last memory card three times, after all of the equipment has been packed up and returned, and after you shake the last hand at the wrap party, there’s still a long way to go before you’ve finished making your movie. The next step is postproduction. **Postproduction** encompasses all of those creative and technical processes that go on after the shooting stops.

Most of the editing and finishing stages in postproduction offer tremendous creative potential for the continuing evolution of your motion picture. The possibilities range from large structural changes, like rearranging the events of the plot or even cutting out characters, to subtle alterations in dramatic tone by tweaking the film’s color palette. You can develop new thematic layers by adding a music track that creates subtext or associations with the visuals, or subtly alter the mood of a scene by including evocative ambient sound. In other words, the possibilities are endless.

■ THE POSTPRODUCTION TEAM

Naturally, the director follows the project into postproduction. On short projects, you will often find directors editing their own film; but on feature-length films this is less common. Just as there are creative specialists in the other areas of filmmaking (cinematographers, art directors, sound mixers, writers, etc.), there are also specialists in postproduction who can bring fresh conceptual perspectives, imaginative energy, and technical expertise to the movie.

The leader of the postproduction team is the **editor**, who is responsible for making all the practical and aesthetic decisions during the entire postproduction process from first assembly to sound mix, color grading, and mastering. The editor answers to the director and producer, but being the head of the editorial department, they provide the creative focus for the rest of the specialists on the team, which on a small-budget feature film, often includes: the **assistant editor**, **sound designer/editor**, **composer**, **rerecord mixer**, and the **colorists**. Given the technical and logistical complexities of this process, it’s also not uncommon for a feature film to also have a **postproduction supervisor** who oversees the project workflow, keeping an eye on the budget and ensuring the timely delivery of the final project. Naturally, larger commercial projects will expand this team greatly by incorporating many more specialists.

However, if you are shooting a project for a film class, or producing a short film independently, you will probably do most of the postproduction tasks yourself. In fact, when you are starting out, it’s a good idea to do as much of the postproduction as possible yourself. The more hands-on postproduction tasks you do yourself (especially editing picture and sound), the more you will understand the expressive possibilities of this phase. And it is equally useful to edit footage shot by someone else. In both cases, editing picture and sound will make you a better filmmaker. If you end up on the production side of filmmaking for your career (director, D.P., sound recordist, etc.), you’ll have a better sense for what an editor needs to successfully cut a movie together, or you may just end up loving the creative impact of postproduction so much that it becomes your chosen *métier*. Remember, film is an integrated art form, and editing and sound design are

storytelling tools of equal power and importance to cinematography, directing, screenwriting, and art direction.

■ TECHNICAL WORKFLOW: FROM START TO FINISH

One essential factor that a filmmaker must consider from the very beginning of a project is workflow. **Workflow** is the technical path your project will take from sound and image acquisition to exhibition. This includes the shooting format (audio and video), the editing format, editing software, finishing processes (color grading and sound mixing), mastering format, and your final distribution formats. The postproduction workflow specifically is, to some extent, based on decisions you've already made in production (capture format) and your intentions for exhibition and distribution.

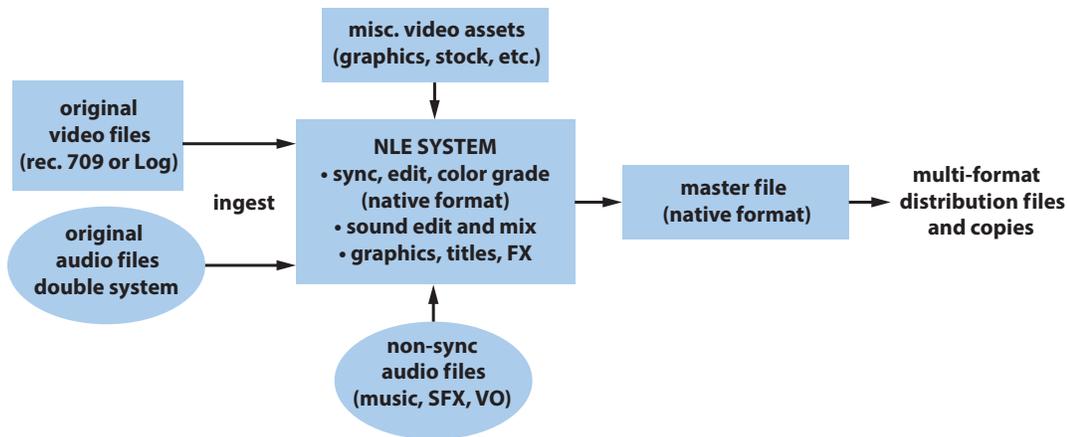
Filmmakers can easily lose their way in the workflow stream, with exasperating and often expensive results. A little bit of research in preproduction into the ways various production and postproduction phases and formats interface with one another will go a long way toward minimizing nasty surprises. It's always recommended that you shoot some **test footage** with the camera you'll be using, and take it all the way through postproduction. While novice filmmakers are usually too impatient to do such a thing, professionals would *never* begin a serious project without first doing tests—this is especially true for projects shooting in RAW or Log formats. But even a beginner, who doesn't intend to incorporate anything extraordinary, can benefit from shooting tests to practice ingesting, syncing, cutting, and outputting their files, if only to ensure that the workflow functions as it should. It's always better to iron out wrinkles in preproduction than encounter them after the cast, crew, and locations are no longer available for reshoots. At the very least, talk to other filmmakers who have gone through a similar workflow, and consult with any postproduction professionals or facilities you'll be working with before you begin your project.

When you are strategizing your workflow in preproduction you must ask yourself these essential questions right up front:

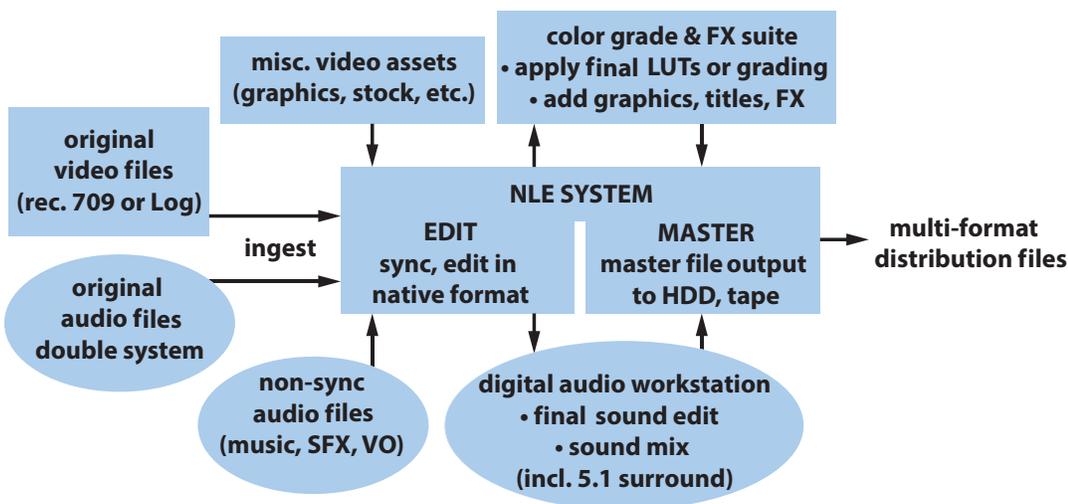
- What is your shooting format (HD, 2K, or 4K)? What is your capture codec, resolution, and frame rate? What color scheme (Rec.709, Log, Rec. 2020)? (Chapter 8)
- What editing software will you use? Does it support your native capture codec? Will you be using specialized software to ingest or sync?
- Will you work at highest (native) resolution throughout, or use low-res proxies of your files (off-line edit) and later link back to the original footage? (pages 450 and 474)
- Do you need to transcode any or all of your assets? (page 449)
- Will you edit and mix sound within your editing system, or use specialized software yourself, or rely on a professional to finish the soundtrack? (Chapter 23)
- Do you want your sound mix to be mono, stereo, or surround sound? (Chapter 23)
- Will you do color correction (or apply LUTs) in the NLE, or will you use specialized third-party software or a professional colorist? (Chapter 24)
- How do you want to master the project: high-res file, tape, DCDM, or a combination? (Chapter 24)
- How do you want to distribute the project (Chapter 24) and what media/file types will be required for exhibition? If you are delivering to a broadcaster or other type of distributor, do they require certain delivery specs?

Low-Budget Workflows

At this point in the evolution of the medium, there are a wide variety of postproduction pathways one can take, and each option has a significant impact on your budget, your work process, your project's look, and ultimately on your exhibition possibilities. Let's look at the workflows for two simple projects aiming to distribute via festival screening, internet streaming, and maybe even pressing DVD/Blu-ray. The first workflow in **Figure 19-1** is common for ultra-low-budget films, shorts, and student projects in which all postproduction tasks (syncing, editing, sound mix, and color grading) are accomplished entirely in the NLE system. The second workflow, plotted out in **Figure 19-2**, incorporates common



■ **Figure 19-1** Workflow for a simple project where all post-pro tasks are accomplished in your NLE: *Shoot*: Rec. 709 or Log. *Edit and color grade*: native footage in your NLE. *Master*: Native format. *Release*: Multiple formats.

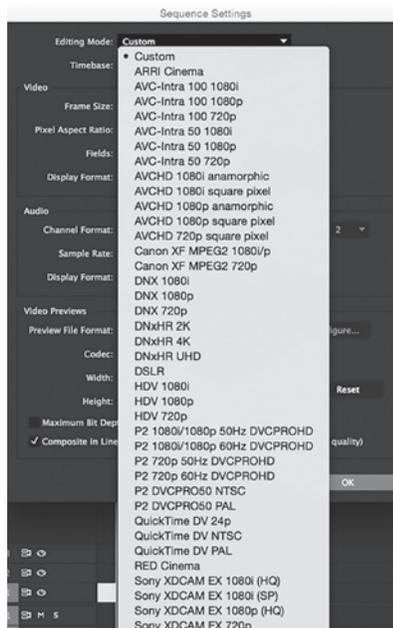


■ **Figure 19-2** Workflow for a project using specialized, third-party platforms for complex tasks. In this case, the edited picture sequence is exported for color grading, graphics, and FX, while the audio sequence is exported separately for sound mixing. They are then re-integrated to create the master.

third-party platforms (and possibly paid specialists) for color grading and sound mix. This is a common workflow for medium budget shorts and low-budget features that seek festival screenings, broadcast, or theatrical distribution. In both cases, the native capture format is used throughout the edit stages and the NLE is used to output the master file (to hard drive and/or tape format). In fact, the NLE can also output your various web streaming formats as well. With these workflows, you'll only require the involvement of a facility if you plan to burn DVDs or Blu-rays for distribution (see page 578).

Format Workflow: Codecs and Containers

As you devise your workflow you need to pay particular attention to your format workflow, meaning the interaction of the various formats and codecs you may encounter along the way. We already explored what codecs are in considerable detail in Chapter 9 (starting on page 212). If you've forgotten, it would be good for you to re-familiarize yourself with this topic. But as a quick reminder, **codecs** (short for compressor/decompressor) are algorithms that compress image data so that the files can be stored, moved, and manipulated with greater speed. There are different standard codecs, such as MPEG-2, H.264/MPEG-4, JPEG 2000, VC-3, ProRes, and DNxHD. Some of these are traditionally thought of as **capture codecs** (like H.264, MPEG-4, JPEG 2000, VC-3) and others are designed



■ **Figure 19-3** This (partial) sequence edit mode menu in Premiere Pro shows that most NLE systems are capable of editing in a wide variety of native capture codecs. Simple workflows often maintain the same codec from capture, to editing, to mastering.

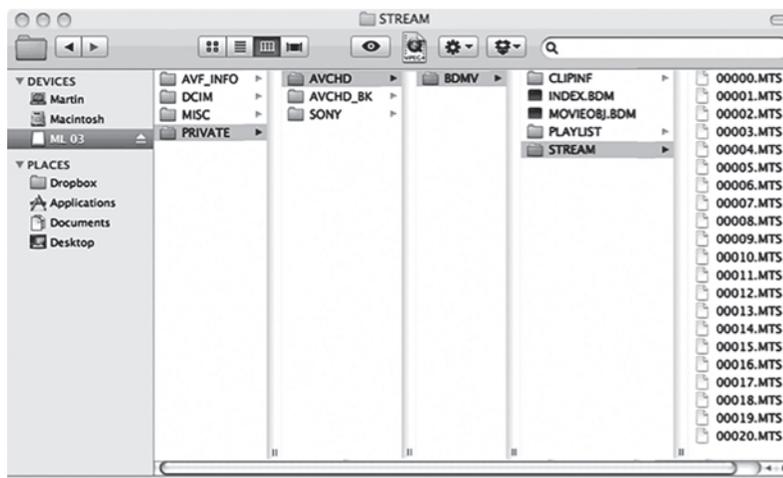
to be **intermediate codecs**, meaning codecs used for editing (like Apple’s ProRes, and Avid’s DNxHD). Then there are codecs conventionally used as **distribution codecs** like MPEG-2 and MPEG 4 (MP4). But these distinctions are breaking down somewhat as hardware manufacturers are including intermediate codecs as a recording option in cameras, monitors, and decks, and NLE systems are increasingly capable of editing in nearly every native capture codec (**Figure 19-3**). Also, distribution codecs are often similar to capture codecs, only scaled to a different resolution. Add to this that the world of codecs and compatibility is in constant flux. This is why, before you even begin production, you need to be clear on four essential codec questions:

- What is the codec used in your shooting format?
- Does your NLE system support that codec natively or will you need to transcode to an intermediate codec?
- What codec will give you maximum quality for mastering your project?
- What codecs are involved in your various distribution paths (festivals, web, disc, etc.)?

It’s not difficult to find out all this information—but it is critical to a smooth workflow because while it is perfectly possible to maintain a single codec throughout the process (to master), it’s not uncommon for you to encounter a variety of codecs on a single project.

Okay, at the risk of giving you serious brain fatigue, let me introduce *one more* type of video format that you’ll see in editing systems: the **container format** (a.k.a. **wrapper format**). All video data ingested into an editing system is “wrapped” within a system container format. Basically, the container format used by an editing system wraps around *all* of the original shooting format data: audio, video, and metadata, so that the system can efficiently “work with” this material. It essentially standardizes the ways the NLE will read and process all that data *without changing the original format encoding and file structure*. The **QuickTime** format (.mov) or the **Windows Media Video** format (.wmv) are the wrappers for all video imported into Premiere Pro, while Avid currently uses the **Material Exchange Format** (.mxf).

Let’s look at the AVCHD shooting format which uses a file structure based on the one developed for Blu-ray discs. Material shot in this format is actually not saved as discrete files, but as streams, which lack the structure of normal files. Some of the information, like timecode, is actually stored in a separate folder (**Figure 19-4**). This means that the media typically has to be wrapped in a container format so that the NLE system can access the clips as individual files.



■ **Figure 19-3** The media in the AVCHD file structure is located in a stream folder as .mts files (right) that necessitates being wrapped in the NLE’s container format for editing.

■ TRANSCODING MEDIA

For simple HD projects that are captured with one of the common codecs, moving your camera original footage into an NLE system is fairly seamless and cutting can begin straight away in your **native format** (original format); this is called **working natively**. But there are times when our original material isn't optimal, or even compatible, for your NLE system. In these cases you need to transcode your footage. **Transcoding** means converting your footage's native encoding to another encoding for editing. Primarily, this process involves converting the actual format of your footage into the intermediate edit codec of the NLE system (i.e., Avid's DNxHD and Apple's ProRes). This can be done right in your NLE during media ingesting, or it can be done with specialized software like Adobe Prelude.

There are three principle reasons to transcode footage:

Incompatibility: You will need to transcode footage when the native format is not compatible with your NLE (meaning that it does not recognize the codec). You will notice this by the NLE either being unable to open up the media, or if the media plays back erratically, drops frames, or loses sync. Given the evolution of NLE systems (which now support most of the popular capture codecs), this problem is less frequent

than it used to be, however if your project involves using archival footage recorded in an obsolete format, you may need to transcode to your footage.

Consistency: For projects that incorporate footage from a number of different sources (e.g., camcorder capturing H.264/MPEG-4 AVC, some Redcode (JPEG2000) footage, GoPro recording VC-3, and archival material in DVCam) it may be advantageous to simply transcode everything to a common intermediate format. Even if your NLE supports all the formats natively, the system could easily get bogged down trying to process this "codec salad" in a real time editing situation.

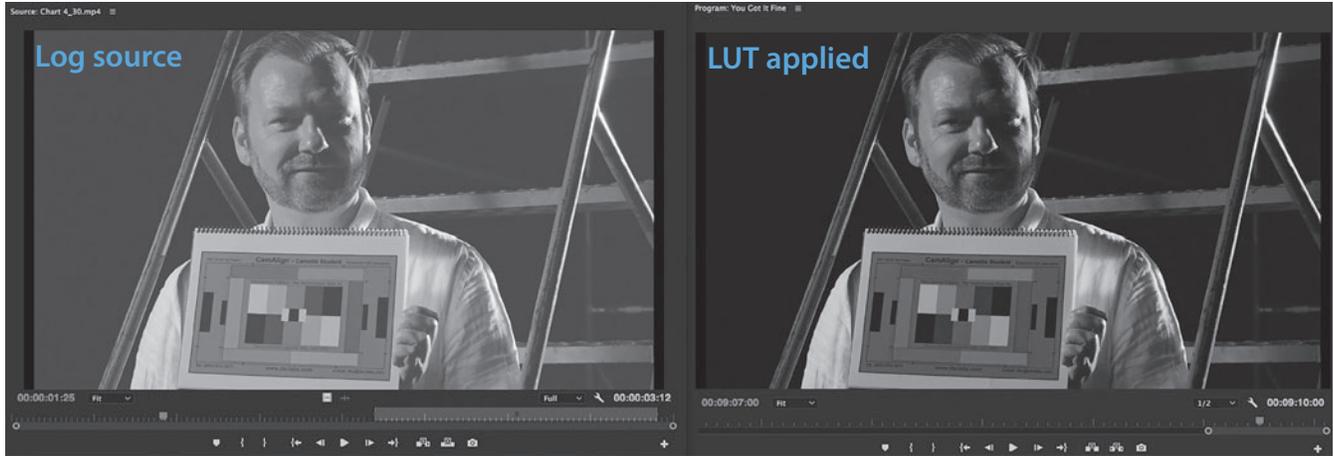
Speed: As resolutions and bit rates grow (RAW, 4K, 6K, 8K!) so do media file sizes. Even if your NLE can support these formats, the files might be so big that it taxes the system and your processing slows down to the point where it's just not efficient to work natively. The fact is, you don't need all that visual information to cut your film. In these cases, you should transcode your footage to make **proxy files** (a.k.a. **clones**). **Proxies** are lower resolution files, usually created with the NLE's intermediate codec, that are identical to the original footage in every way (including metadata) except file size. Their purpose is to make editing faster and easier (see "High-End Workflow" later).

LUTs and Workflow

Projects shooting on one of the common Log formats (see page 217) have an additional workflow step to systematize: when do you apply your LUT? As you know by now, the Log Gamma setting makes the recorded video look flat and gray. It would clearly be disorienting to edit an entire project with straight Log footage, not really knowing what the image looked like. It would also be nearly impossible to fully evaluate your footage in this state. However, there really is no "standard practice" for applying LUTs so that you can see your footage in all its gamma glory. The question of *when* depends on the capabilities of your editing software, your editing setup, and your preferred working method. Here are three common practices for applying LUTs to Log footage.

Apply LUTs at Ingest or Syncing: With some systems you can apply LUTs to footage during the ingesting/importing of your video files, or, as some editors do, apply LUTs globally during the syncing process. This strategy allows you to fully evaluate all of your footage as you build your assembly and rough cuts. Applying LUTs at ingest works best if you have done careful camera and grading tests to determine your custom LUTs ahead of time.

Temp LUTs for Edit, Final LUTs at Grading: You can also apply a simple temp LUT from the NLE's built-in LUT options during the edit process (clip-by-clip); preferably one that is fairly close to your desired look. Then after picture lock, you can remove the temp LUT and color grade your original Log footage to achieve the precise look you're after (Figure 19-5). If your temp LUT is fairly close to your final look, you can simply tweak it to design a custom LUT for your project.



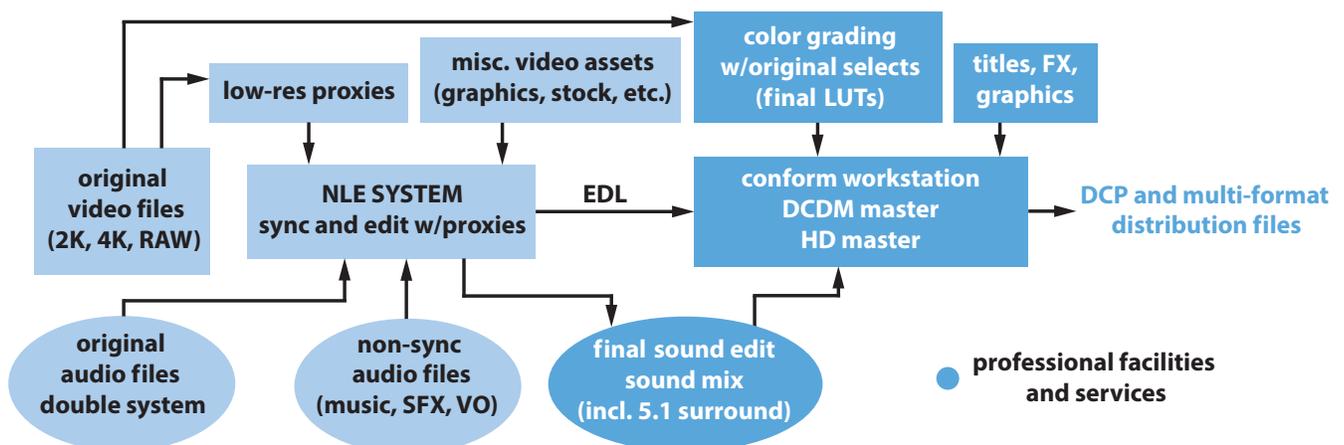
■ **Figure 19-5** This NLE preview window (*left*) shows the original Log footage clip and the sequence window (*right*) shows the same clip from the sequence timeline after a built-in LUT has been applied. See the color insert.

Program Monitor LUTs: Some editing setups include monitors with simple built-in LUTs purely for playback—so while you’re actually editing the native Log clips, you are viewing color processed footage. In this case, the final application of LUTs happens after editing is done, during the color grading stage.

In any case, remember that flexibility is the great advantage of working with Log footage and LUTs. Shooting with Log Gamma provides footage that contains enormous latitude without defined visual parameters (color and brightness) “baked in” to the original files. The idea is to keep the original Log footage available throughout your workflow, right up until the final color grading and output of the program. So figure out where LUTs can best fit in to your workflow and stick with it. See Chapter 24 for more information on using LUTs in postproduction.

High-End Workflow

Film projects that are destined for theatrical release and broadcast are commonly shot at extremely high resolutions. Uncompressed 2K, 4K, and various RAW formats (i.e., ArriRaw, Redcode Raw, etc.) are the norm. **Digital Cinema (D-Cinema)** for short) is the digital theatrical release standard established by the **Digital Cinema Initiative (DCI)** and it requires deliverables that comply with a unique set of high-end specifications. I already discussed the D-Cinema standard in Chapter 8 (starting on page 197), but let’s look at its basic workflow (**Figure 19-6**).



■ **Figure 19-6** Picture and audio paths for a 4K workflow. Shoot uncompressed 4K video; create low-res proxies for off-line editing (or record HD proxies in camera when available); conform back to high-res source; Master DCP and various formats. Audio is surround sound.

If you anticipated finishing to a DCP from the beginning, and shot your film on one of the high-end 2K or 4K video formats (like ArriRaw, RedCode Raw, etc.), then your workflow will involve a few more steps. Primarily, 4K video files are way too large to work with in a standard NLE system setup. Trying to edit natively will only bog down the processing speed of your system. So the footage must be transcoded with an intermediate codec to create lower-resolution copies called **Proxies** (see “Transcoding Media” box earlier). Proxies simply make editing faster and easier. Editing with proxies, rather than the original footage, is called **off-line editing**. In fact, working with proxies is so common for high-end workflows that many D-Cinema cameras and devices (like HD monitors and hard drive recorders) offer simultaneous proxy recording to SD memory cards (ProRes or DNxHD). This clearly allows you to save the time necessary for transcoding (Figure 19-7).



■ **Figure 19-7** The Arri Alexa camera saves uncompressed 2K–4K video to high-capacity hard drives and *simultaneously* records NLE-ready Apple Pro Res proxies to onboard memory cards (arrows) for instant off-line editing.

Once the off-line editing is completed and you’ve reached picture lock with your low-res proxies, you can go back to the original, full-resolution source video and bring only those shots that you’ve used in your final film, called **the selects**, into a color grading session. The **color grading process** is where you add your LUTs and further tweak exposures and color palette to ensure that you have the precise look you want for your film shot for shot and across all your scenes. We only color grade the selects because this is usually a supervised session billed by the hour, so it makes no sense to color correct footage you do not use in the film.

After color grading, you then **re-link** the original source video files to the off-line sequence, which is fairly simple because the low-res proxies and full-res footage share the same metadata like file names and timecode. This full-resolution reassembly of the project is called **conforming** because you are conforming your original footage, now color corrected, to your off-line edit sequence scene for scene, cut for cut, and frame for frame. During the conforming process, the mixed sound track is also brought in and matched to the full-resolution picture.

The output from the conforming workstation can obviously create multiple masters in various formats. But if you follow this high-end workflow all the way to a D-Cinema theatrical release then you’ll need the services of a post facility to create your **Digital Cinema Distribution Master (DCDM)** and the **Digital Cinema Package (DCP)**, which is the required format for theatrical distribution (and many festivals as well) (Figure 19-8 top) (see page 579 for more details on DCDM and DCPs).

The D-Cinema workflow can be expensive, primarily because it often involves color grading and sound mixing specialists (required to create the color graded “look” and the 5.1 surround sound soundtrack). However, it also necessitates a professional post facility to master the project and create the DCP. This is why these latter steps are usually undertaken when a filmmaker *knows* that they have the budget to go this route or after a filmmaker secures theatrical release or is accepted into



■ **Figure 19-8** Films shot with a high-end capture format and destined for theatrical release follow the complete D-Cinema workflow, such as Garland’s *Ex Machina* (2014, Sony F65 4K Raw source format) (top). However, any film, no matter the capture format, can finish as a DCP for theatrical distribution, like Baker’s *Tangerine* (2015, MPEG4 HD source format).

a prestigious festival that requires a DCP. In the case of a film gaining theatrical release, the distribution company will usually foot the bill; in the case of satisfying the requirements of a festival, the filmmaker finds the money in the hope that a distribution deal will result from the exposure. If you anticipate finishing for D-Cinema, you should introduce yourself to your post-house and find a consultant who can guide you through the facility's workflow process.

Any Film Can Distribute as a DCP

Generally, workflows that include high-end (and high expense) finishing and mastering correspond with ultra-high-resolution shooting formats as well; however, premium production technology formats never automatically determined the artistic quality of a movie. Indeed, many, many films shot on low-end formats from standard definition NTSC video to plain vanilla H.264 (with Rec. 709 HD settings) have been of such strong artistic merit that they've garnered theatrical release. Sean Baker's 2015 film *Tangerine* is a good example. This feature was shot entirely on an iPhone 5s in the common H.264 codec (MPEG4), but was finished as a DCP and widely distributed in major festivals and D-Cinema theaters around the world (Figure 19-8 bottom).

Let's say you shot your short film on a DSLR (H.264) and followed the all native, all NLE workflow in Fig. 19-1, and it's good. So you send it to festivals and it's a hit! In fact, you've won a best-in-category prize at an Academy of Motion Picture Arts and Sciences qualifying festival, which makes you eligible for an Academy Award nomination in the live-action short category. Great! However, you read the AMPAS application and it says, "Short films must be submitted to the Academy on 35mm or 70mm film or as a DCP formatted according to the digital qualification standards described in Paragraph III.A.1." No problem, you can easily take the first two workflows on page 447 and conclude them with a DCDM master and DCP release from the workflow in Fig. 19-6. Oh and never forget, most post facilities offer student and prorated independent filmmaker rates.

CELLULOID FILM WORKFLOWS LOCATED ONLINE



Celluloid film is still occasionally used for image capturing and theatrical exhibition; however, its use is most common on commercial feature film projects and even at that, we're seeing the use of film diminish every year. In the last five years or so celluloid film shooting has all but disappeared from college level film programs, with the

exception of specialized cinematography or experimental film tracks. In previous editions of *Voice & Vision I* included lengthy sections on the celluloid film process, including film-to-digital workflows. For readers who are keen on taking the celluloid journey, you can still access and download all of these chapters and information on the *Voice & Vision* companion website under the tab "Celluloid Film System."

THE EDITING STAGES

In anything at all, perfection is finally attained not when there is no longer anything to add, but when there is no longer anything to take away.

Antoine de Saint-Exupéry (From *Wind, Sand and Stars*, 1939)

The editing of narrative films follows a process that has become somewhat standardized over time, yet it remains flexible enough to fit the scale of the specific project and the working preferences of the editor. The filmmaker for a large-budget Hollywood film can easily generate well over 200 hours of raw footage to wade through, consider, evaluate, and edit. Because of the volume of material and the cost of production, most feature film editors begin cutting during the shooting of the film. Even low-budget independent feature films often work with shooting ratios around 15:1 and can record upwards of 100 hours

of footage. After each shooting day, after the data manager backs up all of the camera and sound files, the editor immediately starts syncing and organizing footage for reviewing, and if there is time, the editor may even make an assembly cut of critical scenes. This way, if there are holes in the coverage of scenes, the director can reshoot while the cast, crew, and equipment are still assembled. Even on very low-budget and student films, it is common for filmmakers to shoot by day and quickly cut together the day's scenes that night. So, in this sense, to call editing a "postproduction" process is a bit of a misnomer these days. Yes, it deals with material that emerges from the production process, but it also often commences along with production.

On the other hand, when budgets are low and shooting days are few, compressed, and exhausting, there is often no time to edit along the way, especially if the director is also the producer and editor. In these cases, editing tends to truly be a postproduction process, starting once the shooting is over.

In either case, whether you're dealing with 200 hours of raw footage and a team of editors cutting scenes while the film is in production or just 20 minutes of footage being cut by the director, after the shooting stops, the basic process is very similar.

Edit Process Overview

1. *Prepping for the Edit* (often done during production to create dailies and save time):
 - Set up a new project in your NLE (ingest, edit, and output parameters) (page 473)
 - Ingest/import video and audio files (and other project assets) (page 474)
 - Sync and merge all double-system footage (page 475)
 - Rename clips and organize bin structure (page 478)
 - Review and evaluate footage (dailies) and input notes (page 453).
2. *Editing the Project*:
 - First assembly edit (page 455)
 - Rough cut edits and review screenings (multiple) (pages 455–456)
 - Fine cut and dialogue edit to picture lock (page 457)
 - Complete the sound design (add supplementary tracks) (Chapter 23)
 - Add visual and audio transitions and effects (pages 499 and 557).
3. *Finishing the Project*:
 - Audio mix (page 554)
 - Color grade and add FX, graphics, and credits (Chapter 24)
 - Master final program, and create multi-format distribution copies (Chapter 24).

Viewing Dailies

Yes, we look at dailies together as much as possible [...] He reacts to the footage like an audience would. He's never forgotten that and that's very important in a filmmaker. Then he talks to me constantly and I talk to him about what we're seeing, and what he's feeling. Does he like that take? Why he doesn't like that take, and if he's moving the actor towards a certain performance that we haven't gotten yet. He might think that on take seven he got it. Or he'll say, "I hate that take. Don't ever show that to me again." So he's constantly giving me his reactions to the footages he's shot.

Thelma Schoonmaker (From "Editor Thelma Schoonmaker Talks 'The Wolf of Wall Street' Blu-Ray/DVD," by J. Philbrick, 2014)

All of the video and audio files that are the result of your production process are your **camera original footage** (or **native footage** or **raw footage**). With double-system sound production, we sync all camera takes with their associated production audio at the end of each day to create **dailies** (a.k.a. **rushes**). The term "dailies" comes from the early vernacular of Hollywood studio productions, where film was shot on one day, processed overnight, and viewed the next day, so that any reshoots could be undertaken before the set was taken down. It still works that way today, only now, with digital editing, not only is the raw image being screened, but now camera takes are synced to their audio and,

for certain scenes, rough cuts might be made as well. Dailies are still screened in the evening of early the next day so that, if there are any problems, the director can reshoot while everyone and everything is still on set. However, film shoots on very tight budgets and schedules may not have the time or personnel to screen synced dailies every day—still, you should watch the camera takes without sound or just with the camera mic., scratch audio if you have it. Whatever the case may be, always evaluate your footage as soon as possible—certainly before you wrap.

in practice

When shooting *Bamboozled* (2000), director Spike Lee and his D.P. Ellen Kuras routinely had three digital video cameras, shooting from different angles, running at the same time. The digital video format was used for the “real-world” sections of the film, which constitute nearly 90% of the movie, while the television broadcast segments were photographed on Super 16mm film. In one scene, in which the *Mantan* TV show is filmed along with the live studio audience reactions, Lee and Kuras had 15 (!) cameras running simultaneously: three Super 16mm film cameras and 12 DV camcorders. The scene coverage on *Bamboozled* was staggering; there was more than 200 hours of footage to consider. This is where editor Sam Pollard’s experience editing documentary films, which routinely generate much more footage than narrative films, came in handy. Also, Pollard started editing the day after the first day of shooting, meaning he sifted through and logged the raw



■ **Figure 19-9** For *Bamboozled* Lee used multiple cameras, generating an enormous amount of footage for editor Sam Pollard to work with.

footage, selected and narrowed down all the potential shots he would use, and edited quick rough cuts of scenes, in an effort to remain on top of the avalanche of footage (**Figure 19-9**).

Viewing dailies means watching your footage and evaluating each and every camera take for exposures, composition, scene coverage, and performance. This should be done on the highest-quality monitor you can find so that your image is as clear and true as possible. If you’re shooting Log footage, you should either use a monitor that can apply a built or imported LUT, or the editor can apply a LUT during ingesting or syncing. You should not try to evaluate the quality of your material with ungraded Log footage.

As you view your dailies, take notes on which shots are great, called **selects**, and which shots simply don’t work at all, called **outtakes**. Many clips are neither selects nor outtakes; they are great in one part, but lacking in another. You should note what you liked about the take and what wasn’t working. Everything gets evaluated and your notes should be entered into the “description” area of the clip’s metadata. Also, don’t lose track of your outtakes, just in case you need a piece of one later. It is not unusual to be cutting a scene and remember a quick look or a small gesture from an outtake that would fit perfectly into the edit.

Viewing dailies can be an emotional experience. All of the effort, struggles, victories, and tears from the production process are in that footage, yet filmmakers need to detach themselves from what went on during the shoot and watch the footage as objectively as possible. You need to keep reminding yourself that no one in the audience will know what went into making these shots; no one knows what’s just out of the frame or how you struggled or how much money you spent or how ingenious you were to get that shot. Only the image on the screen counts, and that is exactly what you need to evaluate when you watch dailies. Often, when I mention to a student that a particular shot simply isn’t working, I get the response, “But it took me all day to get that damned shot. I have to put it in the film!”

In addition, it's easy to succumb to the "daily blues," which is a sort of letdown feeling you can have after viewing your raw footage. You've put so much time, effort, and money into production that you'd like to sit down and just watch your movie! But it's not a movie yet. It's still in pieces and there's a lot of work yet to be done. The daily blues happens to me every time. The footage never looks quite as good as I thought it would, and everything seems lifeless and flat. But then once I start editing, and the individual shots start connecting and talking to other images, and the sound track adds its alchemical dimension, the story and emotions start to emerge from the edited sequences, and my original excitement returns as the film becomes what I thought it might be at the beginning.

First Assembly Edit

The first assembly is a first draft. When you first put an assembly together, you put in everything the director shot. You don't try to give it too much shape yet. Then, you attack it in the second cut. So, it's like a first draft of someone's writing.

Thelma Schoonmaker (From "Things I've Learned,"
MovieMaker Magazine, 2014)

The **assemble edit** means placing end-to-end all the shots of a scene, or a sequence of scenes, or even an entire short film, without selecting too precisely the parameters of each shot. The shots are slapped in "very fat" without any finessing. The assemble edit is your first opportunity to see the general order of the shots and scenes, to get a sense of the relationships between scenes and to get a feel for the overall flow of the story. Because it's like a preliminary sketch, rearranging shots and scenes is quick and simple and allows you to see various versions without too much effort. During the assemble edit stage you will ask yourself the larger questions of sequencing: How is the story unfolding scene by scene and shot by shot? Do these scenes belong next to each other? How many shots and which shots should be included to cover a scene? It is more efficient to make structural adjustments in this very broad form, than to waste time carefully finding precise edit points and frame-accurate transitions for five consecutive shots, only to discover that they really don't belong in that order at all.

Rough Cuts

You get to contribute so significantly in the editing room because you shape the movie and the performances ... You help the director bring all the hard work of those who made the film to fruition. You give their work rhythm and pace and sometimes adjust the structure to make the film work—to make it start to flow up there on the screen.

Thelma Schoonmaker (From "The Last Temptation of Thelma"
by L. N. Nguyen, 2005)

Once you've laid down the general structure of the film, it's time to dive into the individual scenes to rearrange, add, eliminate, split, or trim footage to make each scene work on its own. A **rough cut** is a version of the film in which all scenes have been edited fairly tightly, but usually with the basic tools available in the edit system, like straight cuts instead of transition effects. Remember, it's important not to spend too much time with complex cutting or polishing every edit points until you know absolutely that the basic cutting is working as it should. You don't want to spend hours finessing a scene only to undo your work because it doesn't hold together on a fundamental level.

Rough cuts are edited with picture track and the essential audio tracks only. For example, if your scenes involve extensive sync sound dialogue, then you should be editing picture and dialogue; if your film has no dialogue, but instead a music sound track throughout, then you'll cut picture to the music; if voice-over is a major component of a sequence, then you'll need to lay that down on the audio track and cut to it. Sometimes, you'll be editing to **scratch tracks** (aka **temp tracks**) which are tracks that are similar in nature, but not the actual final audio. This is common when cutting to picture to music or voice-over narration,

which often gets written and recorded in the finishing stages. Usually, you will cut several rough edits of your movie, tightening and improving the film with each version.

Rough cuts are where you spend the majority of your time and creative thinking. There is a lot of cutting and re-cutting during this stage as you discover the final style, shape, order, and rhythm of your movie. And as you edit, you become intimately familiar with every frame of your footage. Because of this, new ideas will emerge as you notice more details, connections, and possibilities between shots. Experimenting with different shot-to-shot juxtapositions, as well as scene-to-scene sequencing, will reveal the full potential of your footage over the course of the editing process.

Fresh Eyes and Review Screenings

As an editor, put the most focus on the screening process, and then debriefing people afterwards to find out how the film is affecting them. Then re-cutting and screening again and again until you get it right.

Thelma Schoonmaker

One remarkable and essential skill that all great editors share is the ability to step back and look at the footage and sequences with fresh eyes, like they were watching it for the first time—the way an audience will experience it in a theater. But even experienced editors can become too familiar with their footage, which is a liability at this stage because you start seeing things in the footage or assuming information in a sequence that a first-time viewer would never be aware of. It happens with some frequency that a student will screen a film that, let's say, includes a conversation between two people comprising only close-ups. The audience becomes disoriented, wondering where this scene is taking place, and the director/editor will respond, "They were in her father's house. Didn't you see that the yellow walls behind her head were the same as in the first scene?" The fact is no, we didn't notice the yellow walls. The scene did not establish the location because it all seemed clear enough to the editor who knows the script and has seen the footage a million times, however the audience, drawn in by the close-ups, looked at faces, not walls. Here's another very common consequence of over-familiarity: students who notice, after their 20th time reviewing an edit, that there is a teeny, tiny continuity error, and they'll waste hours trying to fix a problem that no one watching the film would ever notice.

For this reason, it's important to arrange **review screenings** to show rough cuts to a select group of people for a fresh perspective and to get some constructive criticism while you are editing and can do something about it. It's better to have a few people raise red flags during the rough-cut stage than to have a theater full of confusion at your premiere. Your **test audience** should be small (three to five people) and include people you know and trust, but not people with too much familiarity with the project (which would defeat the purpose of the screening). After your screening, guide the conversation into useful territory by asking questions. Your questions should be customized for your film and the issues you're struggling with in the editing room, but here are a few examples:

- What do you think the story is really about?
- Did the movie feel the right length, or was it too long?
- Were there any parts that were unclear or puzzling?
- Which parts felt slow?
- What parts really worked for you?

Listen closely to what the viewers have to say. Some of it will be helpful, some of it may be off base, but some of the feedback that is off base might still point to issues elsewhere that you need to consider. If you find yourself having to explain things so that the audience can understand what happened, then you'll definitely know where you need to do your work. Don't get defensive; listen to it all, take notes, and sort it out later. The review screening feedback will be your guide to make your next rough cut tighter and better.

Repeat this process as necessary until you reach the fine cut stage. Thelma Schoonmaker, our editing guru for this chapter, has stated that she and Scorsese routinely have 12 review screenings for each feature film (Figure 19-10).

Cutting Dialogue

If your film involves extensive dialogue, then you will probably start to cut audio during this stage as well. Remember, all of our film elements, audio and video, are on separate tracks and can be edited and manipulated independently. Therefore, sync audio does not necessarily need to remain with the corresponding images. When editing picture and dialogue there are three basic cutting techniques: the straight cut, the split edit, and the insert cut (Figure 19-11).



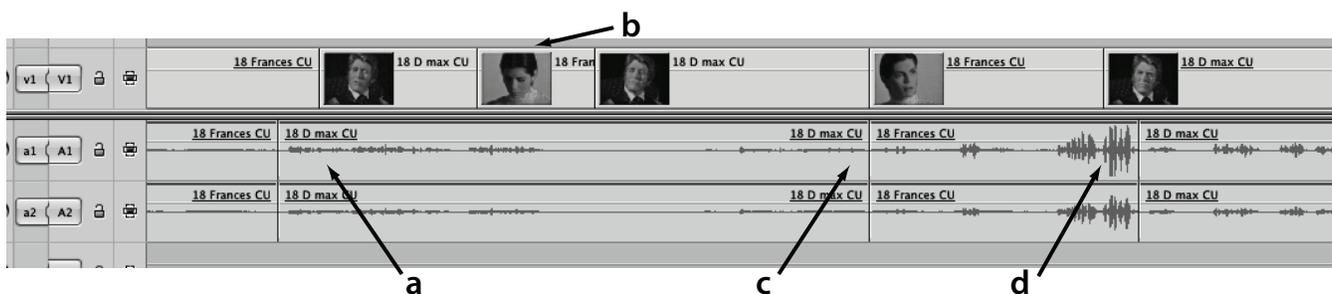
■ **Figure 19-10** The stages of the editing process are fundamentally the same whether you are a student filmmaker or an academy award winner like Thelma Schoonmaker.

Basically, the **straight cut** cuts the picture and sound on the same frame. When using straight cuts for dialogue, we go from one person speaking to the other speaking, then back to the first person speaking and so on. This sort of back-and-forth dialogue cutting has a certain rhythm that can be effective, but in most instances the predictable edits, always coming between lines of dialogue, are too monotonous to use for an entire scene. **Split edits** makes the image cut happen at a different time than the audio transition (either image cuts first and audio after, or audio cuts first and image follows later). The timing of these edits—how many frames or seconds to displace the cut in image versus the cut in audio—depends on both creative and some practical factors. An **insert cut** involves completely disconnecting either the sync audio or video from its original linked clip and inserting it over a shot that is continuous. This is commonly done with reaction shots where you wish to continue one person’s dialogue during the reaction of the other person and then return to the image of the first person talking.

There is definitely a practical aspect to dialogue editing, like eliminating unnecessary dialogue or maintaining continuity from shot to shot, but the art of dialogue editing is complex and plays a critical role in establishing the internal rhythm of an encounter, the dramatic timing of reactions, and the construction of character point of view, which are all key storytelling considerations. Good dialogue editing can also infuse a scene with subtext and emotional associations. We explore the various dialogue editing options in more detail starting on page 480.

The Fine Cut and Picture Lock

Once you’re happy with the basic editing of your film, and all of the sequences are working the way you need them to work, and you’ve determined that there will be no more big changes to the film, you can start to fine-tune the rough cut. **The fine cut** involves



■ **Figure 19-11** A variety of dialogue edits within a single scene. Sound cuts in before the picture in a J-cut (a), an insert edit simply places an image over the ongoing sound of a shot (b), sound and picture cut at the same time in a straight cut (c), and picture cuts in before sound in an L-cut (d).

finessing all of the edits one by one. Now is the time to make those small refinements and adjustments to, for instance, get that cut on action just right, add the dissolve between two scenes, or trim a few frames off a POV shot to get the timing of the reaction just perfect. The fine cut is also where we make final decisions concerning visual effects and transitions. Although you can see most effects while you edit, like fades and dissolves, many need to be rendered before you can output them to your master. **Rendering** is the process of combining the video and audio with the applied effect to create a new media file. For example, a dissolve involves a slow fade-in of the incoming shot simultaneously with the slow fade-out of the outgoing shot. We can see two images superimposed for the duration of the dissolve. But there is no actual media like this, so, by rendering, the edit system creates this media. It's most efficient to render during the fine-cutting stage after you've decided on the type and duration of your effects and when you can simply render all of the effects on any single track at the same time.

This stage is also where you can swap out scratch tracks for final audio (e.g., music or voice-over) if you have them, and add additional important sound tracks (like sound effects and music) to layer the sound design's most critical tracks, which might have an effect on timing. Once the film is perfect, all of the creative editing decisions are done, and you've decided you will not trim a single frame more, you have arrived at **picture lock**.

in practice**■ CHROMA KEY (GREEN SCREEN) EFFECTS**

The principle behind the **chroma key** effect is simple: shoot a subject in front of a solid color background (or include a solid color in a portion of the frame) and in postproduction place this shot on one video track in the timeline and digitally remove the color of the background. Then, place footage of a background of your choosing on a second video track, and this image will replace (or show through) the areas where the color was removed giving you a new background (or new image in the previously colored area). Theoretically, you can key out just about any color, but the most popular and technically successful background color used for this effect is **green screen** (and **blue screen** but less so these days) primarily because the brilliant green is far from human skin tones so the distinction is vivid and sharp. In fact, green screens are used so often, that people refer to this technique as "green screen" more often than "chroma key." Most of us are familiar with chroma key effects: the simplest one we see is during weather forecasts to insert a weather map background behind the meteorologist. Ultra complex green screen effects are frequently used in big-budget Hollywood fantasy extravaganzas for which many sequences are shot on a sound stage that is *completely* chroma green and then an entire environment is created, wholly or partially, through computer generated imaging (CGI). Quite literally, the final visual result represents a postproduction digital construction rather than images captured with a

camera. This is an elaborate and expensive manifestation of the green screen process. However, much simpler applications are commonly used for low-budget films to put your subject in a virtual location when it would be impractical for you and your crew to use the real one. For example, Duncan Jones' 2011 film *Source Code* made extensive use of a very simple green screen effect in order to make production faster and more flexible (**Figure 19-12**). The train interior was constructed on a sound stage with a green screen outside the train window. The green in the window was later keyed-out and replaced with a landscape rushing past the train. This allowed the filmmakers to create a train set with no ceiling and removable walls so that they could position lights and camera with greater freedom than if they shot on a real train.

While we're all familiar with green screen technique for creating whole environments and backgrounds, the green screen principle can also be used for small, special effects, like in George Miller's *Mad Max: Fury Road* (2015) where Charlize Theron wore a simple green sleeve over her left hand and arm so that they could be removed digitally and replaced with a variety of artificial appendages (**Figure 19-13**). The *Voice & Vision* example short film *The Black Hole* by Phil and Olly also uses a green key to create the "black hole special effect." Can you figure out how it was done? Go to the *Voice & Vision* companion website to see the film and then check out *The Black Hole* storyboards for clues.



■ **Figure 19-12** Duncan Jones used a simple green screen effect in *Source Code* to create a moving background for a stationary train set built on a sound stage. See the color insert.



■ **Figure 19-13** In Miller's *Mad Max: Fury Road*, Imperator Furiosa's left arm could be digitally removed in post thanks to the green screen sleeve worn over Theron's arm.¹ See the color insert.

Technical Tips

The chroma key process is done in postproduction with the **chroma keyer** (found under video filters). After you initially key-out the color (green) you should see your background emerge behind the subject—but you'll still see color artifacts lining the edges of your subject. It often takes a considerable amount of tweaking with the chroma, luminance, and saturation sliders (and adjustments with the edging and softening tools) to get a clean key. However, the real secret to a clean, convincing key is in the lighting of the subject and chroma background:

- Use a soft source to light the chroma background independently and make sure there are no shadows, wrinkles, or hot spots.
- Light your subject in a way that matches the background image.
- Be careful that there are no reflective surfaces on the set or subject (like eyeglasses) that will catch the chroma color—these patches will also key-out.
- Keep your subject 5 feet or more from the green screen to keep the green tint from spilling on their skin.
- Avoid set and wardrobe colors that are close to the key color.



¹ Production still from *Mad Max: Fury Road: Choreographing Complex Stunts & Car Chases*, Design FX (posted on YouTube by WIRED, June 2015)

Finishing

Picture lock does not mean all of the creative the work is over, however. The film still needs finishing, which means that you turn your attention to three areas: the sound design, the visual effects, and color grading.

Once all of the images are locked in place and the film has been edited to the essential sound tracks, you can then start to do the serious work of building the broader **sound design**, which includes removing scratch tracks and adding final music, sound effects, and ambience tracks, which will ultimately lead to the **mix-down** of all of the audio tracks onto the master sound track. The sound design for a film is a major creative endeavor, and

I have devoted two chapters to the art and craft of postproduction sound (see Chapters 22 and 23).

Visual effects finishing, like **green screen keys** or inserted graphics, are fine tuned during this stage as well as color grading. **Color grading** is the process of tweaking the tonalities and exposures in each scene for balance and consistency and to polish the final visual impression of the film. If you've shot Log footage, then here is where you apply your final LUTs and tweak them from scene to scene. Digital editing systems like Premiere Pro and Media Composer are more and more sophisticated in their color correction capabilities. For most short and low-budget films, there is more than enough power to make your final adjustments within your editing system. If you are finishing specifically for Digital Cinema (2K, 4K), however, you may want to go the extra mile and hire a professional **colorist** using a stand-alone color grading system, like DaVinci Resolve. Color grading is covered in more detail in Chapter 24

Mastering

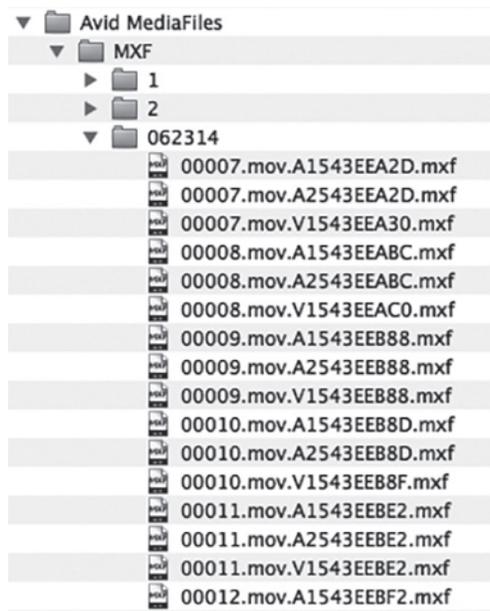
The final step in the editing process is to master the film. This means outputting the final program to a sturdy, archivally sound digital form from which distribution copies can be made. Although most NLE systems offer a wide range of output options, you will, no doubt, want to master to a format that does not involve any further video data compression. These days, many people still master to the robust HD tape formats, while most master to archive grade hard drives, with several backups. And, of course, many people do both for safety (see Chapter 24).

Digital Editing Fundamentals

Virtually all film projects, whether they're destined for broadcast, web streaming, or theatrical release, are edited on a **digital, nonlinear editing system** (or **NLE** for short). Editing in the digital domain means that all visual and sound components of the project, no matter what their original form, must be transferred as digital data called **media files** and brought into a computer running specialized editing software. In data form, any piece of visual footage or any piece of sound can be instantly accessed through a computer's **random access** capability and easily labeled, organized, duplicated, cut, arranged, rearranged, trimmed, mixed, and manipulated with a mere drag and click of a mouse.

So why *do* they call it **nonlinear editing**? The label “nonlinear” basically means that we are not limited by the linear characteristic of the previous incarnation of video editing—videotape. If you want to preview a shot in a digital editing system, just a click will open it up on the screen in a flash, and another click will instantly position you on any frame within that shot. A nonlinear system allows us to move around in the footage in any direction, instantaneously. On videotape, if the shot we wanted to preview happened to be at the end of the tape, we would have to wait while the tape fast forwarded to the cue point; and if the next shot we wanted to preview happened to be at the head of the tape, we'd have to rewind all the way to the beginning again. Even more significantly, however, is the fact that, with digital editing, we can delete (or insert) a shot anywhere along our edited sequence and all succeeding shots will move up to close the gap or push down to accommodate the new shot. In short, inserting or deleting shots has no effect on the other shots in the sequence. At this point, I can imagine a young film student, weaned exclusively on hard drives and data, blinking hard and saying, “Yeah? So?” The fact is, there are those of us who, in the dark ages, struggled with tape-to-tape video editing, which is essentially a process of rerecording material from a source tape directly onto a record tape. We remember a time when you would string together, say, 25 edits, only to realize that you wanted to insert a new shot after edit #4. Videotape's “linearity problem” meant that every time you inserted or deleted a shot in an existing sequence you had to re-lay every shot that came after that point (i.e., shots #5–#25). I'd rather not contemplate the hours of my life I lost doing exactly this in videotape editing rooms. Digital editing, on the other hand, never actually records any media down onto anything until you are completely done editing and you output your program. Instead, it uses the computer's **random access memory (RAM)** to essentially “preview” all of the edits in your program. You can insert shots, delete shots, rearrange sequences, and build several versions and still make it home in time to get eight hours of sleep. So the term “nonlinear editing” was introduced to announce that it didn't have video's “linearity problem,” and hearing this, we all traded in our play deck and record decks, and our RM440 edit controllers, for a mouse and a hard drive—and fast!

Digital NLE is also referred to as “**non-destructive**” editing, which means that any cutting, arranging, and effects you might perform occur only virtually. Your original media files are not altered in any way (Figure 20-1). All editing is done via **media file indicators**, which use **timecode** (see page 195) and clip names to “point” to the original data without ever changing the underlying media files themselves. For example, let's say you have a camera take that is ten seconds long and you want to use two seconds from the middle of that file in your cut. You simply indicate the timecode numbers where you want the shot to begin (the **in-point**) and end (the **out-point**). Then you edit that portion of the shot into the program sequence. As you do this, however, you are in fact not cutting any actual media.



■ **Figure 20-1** With non-destructive editing, media files are never actually altered during editing. Pictured are the .mxf files for a project in Avid Media Composer, located in a file called “Avid Media Files” on an external hard drive.

Rather, your in-point and out-point numbers tell the computer what piece of that media file to play back at a particular point in your cut. This is why it’s easy to trim a shot a few frames longer or shorter, or try numerous versions of a **sequence** using the same shots in a different order. You are simply altering data indicators, not the underlying media files. This, of course, goes for audio files as well. In your sequence you can change audio levels, and even apply equalization (EQ) filters that will affect the way your program sounds, but will not alter the original media in any way.

All of the editing decisions you make—length of shots, order of shots, layering of audio, and so on—constitute your **edit decision list (EDL)**. The EDL is one of the major components of your **project file**. The project file will have an extension based on the NLE program you are using, like .prproj for Premiere Pro, or .avp for Avid Media Composer. Unlike media files, which are big, project files are small because they only contain the EDLs for your various sequences, source media information, **user preferences**, and **settings**. Because they are small, project files can be sent easily from one computer to another. It is not uncommon, therefore, to have multiple people working on the same project in different locations. As long as they each have a set of hard drives with the identical source media files on them, they can email the project file back and forth, or simply share a project file in the cloud (on cloud-based editing systems).

Again, this may seem like no big deal to a young person entering the media making world now, but those of us who remember the days when film was edited on celluloid film know very well that “cutting” on film literally meant cutting, with a blade, a strip of cellulose acetate to define the shots you wanted to edit into the film and then taping (or gluing) those shots together. If you changed your mind often and recut many times, you had little pieces of film scattered across the flatbed like spilled cornflakes, and every one of these frames had to be saved and labeled just in case you changed your mind and wanted to add them back again.



■ **Figure 20-2** The upright Moviola. Even though countless wonderful movies have been edited on this machine, it is thankfully a relic of a bygone era.

Nonlinear and non-destructive editing solved two of the most pernicious drawbacks of previous editing methods, which is why NLE systems pushed both film and video editing into obsolescence very quickly. Add to this the fact that the cost for all of this digital power and flexibility is considerably cheaper than for the old processes, because so many procedures and capabilities have been taken out of the hands of labs, rental facilities, and technical specialists (and their assistants) and placed in our hands, making the process of filmmaking easier, faster, more accessible, and cheaper, and that’s great. But the digital revolution is not without its own drawbacks.

■ TOO MUCH OF A GOOD THING?

These days I can edit a short film, with titles, effects, sound mix, and color grading by myself, in no time flat and in the comfort of my own home or even in a café with my laptop. So what’s to complain about? In the past, I’ve done a lot of editing on both film and video. My first three student films were edited on a cantankerous machine called an upright Moviola (**Figure 20-2**). Our professor kept telling us not to complain when the “green monster,” as we called it, ate our film. He’d remind us, “Think of all the great movies that were made

on machines just like this one, including *Citizen Kane!*” At the mention of *Citizen Kane*, we were all obliged to stop our whining. We’d looked at the green monster and conclude that Orson Welles should be considered a genius, if only for his ability to actually finish a movie with this beast! I, for one, will tell you that if I never have to get on my hands and knees to hunt for three missing film frames that dropped behind the flatbed or spend an hour re-laying 20 edits just so I could add one new shot in a videotape sequence, it will be too soon (Figure 20-3).

However, if you’re starting out with one of the latest versions of one of the popular, relatively inexpensive NLE programs, and you need to figure out the fundamentals like how to use it, you’ll likely turn to the user manual first. In the case of Avid Media Composer, the latest user editing guide is 1,600 pages! There are several commercial publications that make the information more digestible, but those come in around 500 plus pages as well. Turning to the online tutorials, you’ll find dozens and dozens of them—from Avid, Lynda.com, and YouTube videos made independently by helpful people. Some of these are free, others may cost a fee, some are very instructive, others not so—and the same is essentially true for Adobe’s Premiere Pro. Wherever you turn, there is no getting around it, these are very complex and powerful programs.

Looking through the countless menus, windows, boxes, options, and settings for things like video transitions and effects, color grading, audio mixing and equalization, special key effects, and on and on, I sometimes wonder, will all this technology really make me a better filmmaker? Is *all* of it even necessary? Does one need to read all 1,500+ pages and endure countless hours of tutorials before one can call oneself an editor? Sometimes, when I sit in front of my hyper-turbo-charged editing software and feel the burden of an excess of riches, I think about the editing resources truly great filmmakers like Robert Bresson, Yasujiro Ozu, Roberto Rossellini, and Satyajit Ray had when they were making the films that profoundly resonated around the world and established cinema as an artistic force. Take a look at any one film from each director (*A Man Escaped* (1956), *Tokyo Story* (1953), *Rome, Open City* (1945), and *The World of Apu* (1959)) and you’ll see mostly simple cuts and occasionally you’ll see a fade-out or fade-in, maybe a few dissolves, and only very, very rarely a slow motion shot. But you’ll *never* see a “shattering-glass” transition effect, or a “chroma key composite” layering two images, one with a “radial blur filter” and the other with a “ripple effect” and both spinning through space inside a “cube-spin 3D motion effect.” I can do that! I can do what these legendary filmmakers never imagined, in a matter of minutes. But how important is this ability, truly? (Figure 20-4)

What you *will* see in these films is eloquent and thoughtful visual storytelling using simple, precise, and fundamental editing techniques that have become the essential vocabulary for anyone wishing to make movies. With all this technology, *how* we make a dissolve is super easy, but *why* we use a dissolve is still the most important question, the complexity of which cannot be changed by technology. If we are not careful with all of this technological power we are gaining, we run the risk of losing much (Figure 20-5).



■ **Figure 20-3** The convenience of today’s editing software. Two students do some last-minute cutting in the hallway before their film production class begins.



■ **Figure 20-4** Ozu’s masterpiece *Tokyo Story* (1953) is told using only straight cuts, two fades, and no “spinning 3D cubes.”



■ **Figure 20-5** The NLE surplus. Does anyone truly need the “checkerboard wipe” (*left*) or the “jaws wipe” (*right*) to tell a good story?

■ HOW TO APPROACH SURPLUS TECHNOLOGY

The boon and the burden of the digital revolution is the remarkable ease with which we can manipulate sound and image. We are offered so many bells and whistles in our editing software, not because we *asked* for six different kinds of image blur filters, but simply because engineers could easily include them. The best way to approach your software is to learn the basic functions first, the essential tools. Learn how to choose the shots you want, how to perform cuts and make a sequence. Learn how to arrange those shots and how to trim them longer or shorter as you need. Learn how to layer a few tracks of audio and adjust sound levels and keep your footage in sync. Maybe try a dissolve or two. That’s all you really need for a while. One beginner’s tutorial will suffice. Now go make a movie. If your shots don’t work together with a cut, then a “page-peel” transition isn’t going to help. If your images aren’t carefully composed, spinning them across the screen won’t make them more eloquent. If your actors aren’t convincing, not one of the numerous image-effect filters will make their performance ring more true. Strengthen your fundamental storytelling techniques and use only what you need to tell your story. Don’t worry, all those user manuals are waiting for you. At some point you may discover that you truly need a fancier transition or effect; at that point you can learn how to do it. Luckily for you, there are tutorials online for pretty much everything you will want to learn. When you find that your film will be improved by adding an image filter to reduce contrast, it’s there, it’s not hard, go learn it at that point. There may come a day when you want to try a green screen key effect, no problem, it’ll be there when you need it. As you make your movies, you will be adding (and learning) one useful technique at a time—but on your schedule and as your movies require. But, the tail should not wag the dog. Make the technology work for your ideas and resist the temptation to let snazzy technology lead the way.

in practice

The film director Michel Gondry developed his filmmaking skills in the world of music videos before he tackled feature-length narrative films. He created memorable videos for such pop musicians as Björk, the Chemical Brothers, Cibo Matto, and others. Although he has a reputation for fairly low-tech special effects, his music video works are nonetheless highly stylized and technically flamboyant. However, when it came to feature-film storytelling, the music video director surprisingly used no extreme digital technology or even fancy transitions in his 2004 film *Eternal Sunshine of the Spotless*

Mind. In telling a complex story—which traces the labyrinth of a man’s mind as he slowly loses his memories of a woman through a scientific process designed to erase her from his brain—Gondry opted for a highly stripped down style including a handheld camera and natural lighting. His editing approach is equally simple. In the entire film, Gondry uses exclusively straight cuts with only four exceptions: one fade-in, two fades to black, and one fade to white. It is the structure of the film itself that conveys the layered storyline, and not the flashy effects (**Figure 20-6 left**).

The Dardenne Brothers' highly influential film *La Promesse* (1996) (Figure 20-6 right) presents a fictional drama in a cinema vérité documentary style. The film derives its realism and credibility from the immediacy of the raw, unembellished documentary approach. In this case, the use of digital effects, dissolves, or other fancy transitions in video or audio would be completely inappropriate for the realist content and corresponding style and would weaken the film's impact.

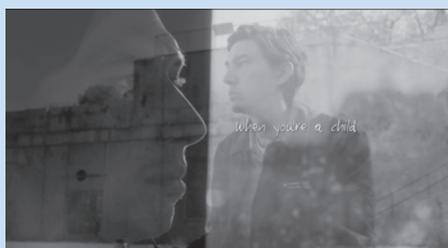
Jim Jarmusch's early films, like *Stranger Than Paradise* (1984), were lessons in editorial minimalism. He often used one shot per scene and only straight cuts between scenes. Over the years Jarmusch's visual style and scene coverage has become more complex, but even so, he pretty much sticks to a spare editing style using cuts and a few dissolves when necessary. His 2016 film *Paterson*, however, includes a number of evocative image superimpositions. The story of *Paterson* is simple; it follows a city bus driver and poet for one week, tracing the banal daily routines of modern life and the opportunities that ordinary life provides for revelation, inspiration, and imagination. As Paterson observes the delicate beauty of his surroundings, he is compelled to jot down a few lines of free verse. It is in these small lyrical moments when Jarmusch's

editing style shifts from simple cuts to something that, for him, is quite flamboyant; multiple superimposed images that includes written text. These overlaid visual layers reflect the levels of texture, meaning, and emotion embedded in the compressed language of poetry; like a collage of creative associations and impressions. It is through these sublime moments that the film becomes about something more than the weekly routine of a bus driver; it becomes about seeing the real beauty in the ordinary, and about art and observation, and how all this makes life worth living (Figure 20-7 left).

Indeed, the fundamentals are critical to understand thoroughly; however, I certainly wouldn't want to close off any of a filmmaker's potential creative avenues. If your story will benefit from all of the bells and whistles, if the fancy transitions, key effects, and digital processing are appropriate and can actually enhance your story, then by all means use them. In *The Matrix* trilogy (1999–2004) (Figure 20-7 right), the Wachowskis certainly exploited technology for all it was worth in creating the matrix, an entire world in which human consciousness itself is a complete construction of technology. In this case the filmmakers are practically obligated by the subject matter and themes of the film to push high technology to its limits.



■ **Figure 20-6** Michel Gondry needed little more than straight cuts to intricately explore the mind and memories of Joel (Jim Carrey) in *Eternal Sunshine of the Spotless Mind* (left). In *La Promesse*, the Dardenne Brothers tell the story of Igor's (Jérémié Renier) moral awakening in a documentary style, devoid of any flashy techniques that would detract from the gritty realism of the film (right).



■ **Figure 20-7** In his film *Paterson*, Jarmusch uses layers of superimposed images and text in a lyrical flow of associations to visualize the poetry of Paterson the bus driver (left). The Wachowskis had to push the limits of filmmaking technology to render the dystopian future world of *The Matrix* (right).

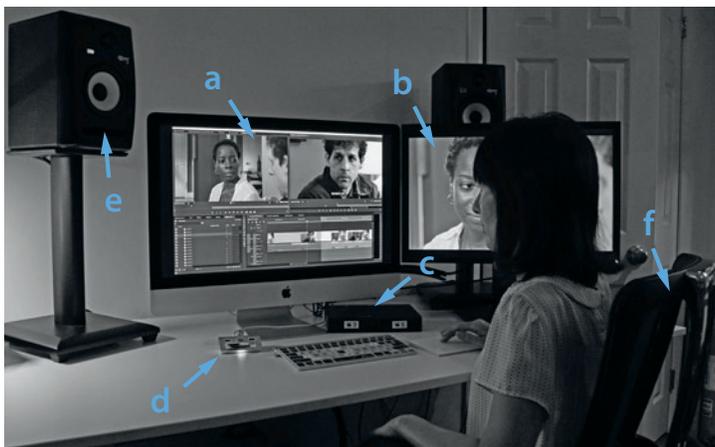
■ THE BASIC NLE SYSTEM

Currently, there are a number of purely consumer level programs, like Apple's iMovie and Sony's Vegas, which are inexpensive and very easy to learn. These programs are fun, but not flexible enough for anyone who seriously wishes to make accomplished narrative films. Professional programs, like Adobe's Premiere Pro and Avid's Media Composer, are more expensive but have much greater capability in terms of editing sound and picture, handling large projects, and integrating with professional finishing workflows for color correction and sound mixing. All professional NLE programs tend to work on the same basic principles and use similar interfaces, but for the purposes of this book, we will use examples from these two systems because they are currently the most popular NLE programs with film schools and professional editors.

The Hardware Setup

While small projects can be accomplished on a laptop computer, most serious editing setups use a desktop computer. **Figure 20-8** shows the hardware setup for a typical NLE station. It consists of six essential components:

1. *The Computer:* NLE software is big and requires substantial CPU and hard drive capacity. You'll need a powerful personal computer with adequate RAM or you will encounter frequent delays while the system crunches data. You should always check your NLE software's minimum hardware requirements when you're putting your system together and try to exceed them.
2. *High-Res Monitor(s):* A basic NLE setup can get away with one high-resolution monitor. But if you're doing color grading or effects work you'll find that the space gets crammed. For this reason, many setups involve two monitors, with an HD monitor dedicated to a full-screen display of the program, while the other contains the NLE edit windows, bins, and timeline.
3. *External Hard Drives:* Most NLE software instructions recommend that you don't put media files onto the internal drive of your computer where your software resides, so you should always save your media and project files on a portable hard drive. This is a speed issue and also a convenience issue. External drives can be used with any editing station running the same software anywhere. External hard drives connect to your computer using either Thunderbolt or USB 3.0. and store your video, audio, and project files, as well as render files (media created to accomplish video and audio effects like dissolves). Media and render files are very large, so having adequate storage space for your entire project is essential. You must calculate storage needs before you start working with your footage. Storage space depends entirely on your editing format. For example, five minutes of 1080/60i HD footage in a codec like Apple ProRes HQ will require 5 GB of drive space. There are several free format/storage



■ **Figure 20-8** A typical NLE system setup: (a) computer, (b) hi-res monitor or two, (c) external hard drives (edit drive and backup), (d) multi-format card reader, (e) reference speakers, and (f) comfortable chair.

calculators available that can help you figure out the storage needs for your format's codec and data rate (page 215). It's also important that your hard drive has a spindle speed of 7200 rpm. Many less expensive drives run at the slower 5200 rpm speed, which is inadequate for playing back HD footage. Currently a new type of solid-state drive (SSD) can offer even higher data transfer speeds, but the high price and small size makes this less likely to be found in an editing context. Finally, a backup hard drive is always recommended.

4. *Media Transfer Device:* A media transfer device is used to download your footage into the NLE system. Again, this depends on your shooting format and process. Obviously, you'll need to have the appropriate card reader to import footage that remains on

memory cards. It's not difficult to find multi-format card readers that handle just about any media storage card currently in use (e.g., SD, SxS, CF, P2, etc.). Keep in mind, however, that if you've done your job right on the set and had a data wrangler (or Digital Imaging Technician) managing your data as you shot, then one of the three backup drives will be delivered to the editor—ready to plug in and ingest (page 415). I should add too that if you've shot on a DV tape format, you'll need a video deck (or your camera) to interface with the computer for footage capture.

5. *Speakers (and Headphones)*: A good set of speakers is important to get a true sense of your audio. If you are working in a room where there are other people, you'll be forced to edit with headphones. Headphones are fine while you're constructing the rough cuts of your movie, but the final soundtrack mix should always be done with high-quality speakers to get an accurate sense of how the balance and presence of the audio will sound to an audience who will be listening to your movie through speakers. In particular, problematic bass sounds that you will be unaware of listening to headphones will become obvious when your tracks are played through good studio speakers.
6. *Comfy Chair*: A comfortable chair is a must. The familiar film industry saying, "Never trust an editor with a tan," reminds us that editing requires that you remain inside an editing room, sitting on your behind, in front of an NLE system for hours and days on end. In this situation, repetitive stress injuries, back issues, and neck problems are a very real concern. For this reason an adjustable, ergonomically designed chair is important. A comfortable editor is a happy, creative, and productive editor; an uncomfortable editor takes frequent breaks to go to the beach.

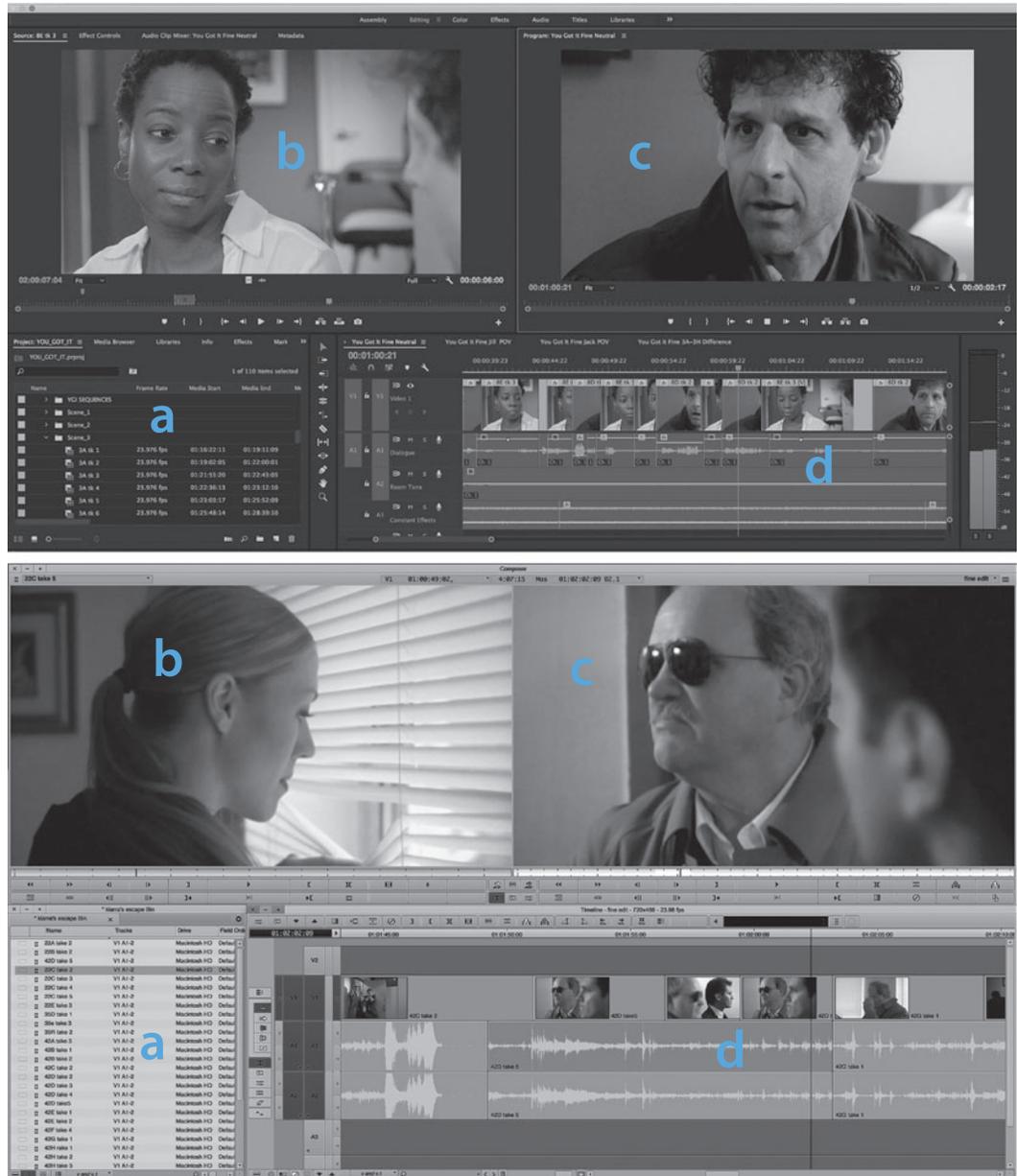
The Software Interface

Both popular NLE systems offer a variety of **workspaces**, which are edit environments (or desktops) that are designed for specific functions, like picture editing, sound mixing, color grading, and so on. The vast majority of your time in the editing room will involve working within the basic **picture editing workspace**, and most NLE systems divide this environment into four main windows. The names given to these windows in Adobe's Premiere Pro (PP) and Avid's Media Composer (MC) are slightly different, but their basic functions are identical ([Figure 20-9](#)):

A: The Project Panel (PP) or Project Window (MC)

The **project panel** or **project window** is the main window for ingesting, storing, organizing, and accessing all of the visual and audio assets for your project. **Project assets** include **video clips** (the individual camera takes), **audio clips** (music, sound effects, voice-over, etc.) and **graphics files** (photos, text, animations, etc.). Each type of sound and picture element has a unique icon that identifies it and all of these assets are organized in folders called **bins** (see "Using Bins to Organize," page 479). Remember, these are just reference information, not actual media—they simply point to the actual media files that are stored on an external hard drive. Another important element you will find in this window is the **sequence**, which refers to your edited material as represented in the timeline (see later).

Most NLE systems provide great flexibility for customizing, organizing, and identifying project assets within the project window. You can create as many bins as you need and **clip metadata** can include the scene, take and roll number, descriptions, date filmed, screening notes, in and out timecode numbers, duration, number of audio channels, frame rate, compression codec, pixel ratio, and so on. You can also customize how you see metadata information, and use it to sort your clips and sequences ([Figure 20-10](#)). Bins can be opened like normal folders, or you can create tabs for each bin you're working with for quick access. In addition, you can choose to view your assets in list view (a tidy list of file names) or in icon view, which will show you a little thumbnail image of each clip. Thumbnail view is very handy for your bins because you can quickly see (by scrubbing over the thumbnail with the mouse) your slate information (see page 479).



■ **Figure 20-9** The four main editing windows are essentially the same in Premiere Pro (*top*) and Avid Media Composer (*bottom*): (a) the project panel (PP) or project window (MC); (b) the source panel (PP) or preview monitor (MC); (c) the program panel (PP) or sequence monitor (MC); and (d) the timeline.

B: The Source Panel (PP) or Preview Monitor (MC)

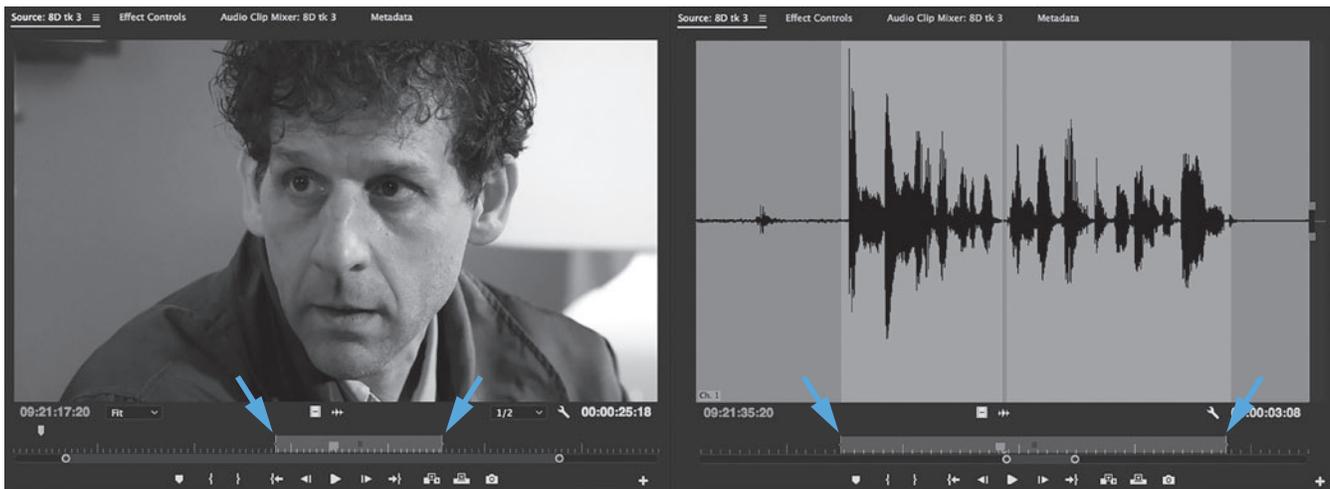
This window is where you view your source clips, and then set in-points and out-points to delineate the exact piece of footage from the longer shot that you want to edit into your film. You can also bring sound clips into the viewer to see a magnified view of the audio waveform. This can be helpful for finding beats or sound peaks to determining precise edit points in your audio (**Figure 20-11**).

C: The Timeline Window (PP and MC)

Once you've decided on the specific parameters of the shot you'd like to insert into your film, you place it into the **timeline**. The timeline is where you truly edit your movie by inserting, deleting, arranging, rearranging, and fine-tuning your clips as you build your movie, both sound and image, one cut at a time.

Name	Comment	Media Duration	Media Start	Media End	Frame Rate	Video Info	Audio Info	Video In Point	Video Out Point
3D tk 5	GD. Sound weak on JK	00:00:16:23	02:29:39:14	02:29:56:12	23.976 fps	1920 x 1080 (1.0)	48000 Hz - 24-bit - 4 Mono	02:29:47:03	02:29:49:08
3D tk 6	GD.	00:00:15:00	02:29:56:13	02:30:11:12	23.976 fps	1920 x 1080 (1.0)	48000 Hz - 24-bit - 4 Mono	02:29:56:13	02:30:11:04
3D tk 7	Keeper	00:00:17:23	02:30:11:13	02:30:29:11	23.976 fps	1920 x 1080 (1.0)	48000 Hz - 24-bit - 4 Mono	02:30:12:19	02:30:29:05
3E tk 1	N.G reframe	00:01:57:17	01:31:50:16	01:33:48:08	23.976 fps	1920 x 1080 (1.0)	48000 Hz - Mono	01:33:01:05	01:33:05:00
3E tk 2	slate called wrong	00:01:53:05	01:33:40:13	01:35:33:17	23.976 fps	1920 x 1080 (1.0)	48000 Hz - Mono	01:33:40:13	01:35:33:17
3E tk 3	GD. boom shadow 2nd	00:01:51:11	01:35:27:18	01:37:19:04	23.976 fps	1920 x 1080 (1.0)	48000 Hz - Mono	01:36:30:04	01:36:36:18
3E tk 4	Keeper	00:01:50:02	01:37:10:12	01:39:00:13	23.976 fps	1920 x 1080 (1.0)	48000 Hz - Mono	01:37:45:22	01:39:00:13
3F tk 1	wrong slate in frame	00:00:41:06	07:47:54:18	07:48:35:23	23.976 fps	1920 x 1080 (1.0)	48000 Hz - Mono	07:47:54:18	07:48:35:23
3F tk 2	GD. BG sounds	00:01:34:08	07:49:19:23	07:50:54:06	23.976 fps	1920 x 1080 (1.0)	48000 Hz - Mono	07:49:19:23	07:50:54:06
3F tk 3	Slow pace	00:02:08:10	07:52:50:16	07:54:59:01	23.976 fps	1920 x 1080 (1.0)	48000 Hz - Mono	07:54:24:10	07:54:59:01
3F tk 4	GD 1st half	00:01:44:14	07:57:23:14	07:59:08:03	23.976 fps	1920 x 1080 (1.0)	48000 Hz - Mono	07:57:23:14	07:59:08:03
3F tk 5	Keeper	00:01:42:00	08:01:28:05	08:03:10:04	23.976 fps	1920 x 1080 (1.0)	48000 Hz - Mono	08:02:49:10	08:02:52:11
3G tk 2	camera pans to edel?	00:01:34:08	01:39:23:12	01:40:57:19	23.976 fps	1920 x 1080 (1.0)	48000 Hz - Mono	01:40:21:16	01:40:29:16
3G tk 3	Poor cam. move	00:02:08:10	01:40:30:11	01:42:38:20	23.976 fps	1920 x 1080 (1.0)	48000 Hz - Mono	01:41:55:11	01:42:04:07
3G tk 4	GD. esp. Jack	00:01:44:14	01:42:37:01	01:44:21:14	23.976 fps	1920 x 1080 (1.0)	48000 Hz - Mono	01:42:37:01	01:44:21:14
3G tk 5	Keeper	00:01:41:23	01:44:17:18	01:45:59:16	23.976 fps	1920 x 1080 (1.0)	48000 Hz - Mono	01:44:17:18	01:45:59:16

■ **Figure 20-10** Clip metadata options are vast and include: scene, take and roll number, comments, media duration, in and out point timecode, video and audio information, creation date, frame rate, compression codec, and on and on. You should customize metadata information so that it helps you organize assets and find media quickly.

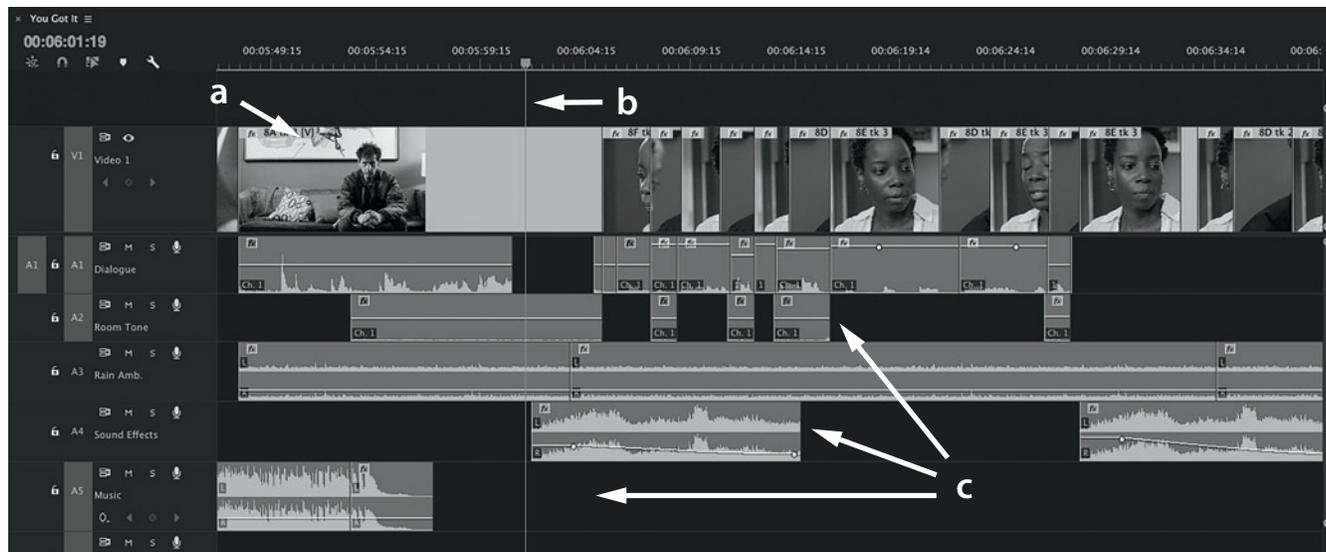


■ **Figure 20-11** The source panel (PP) (or preview monitor in MC) can toggle between picture view (*left*) and soundtrack view (*right*). The in-point and out-point on the clip timeline (*arrows*) show exactly what portion of the entire clip you have chosen to use.

The timeline is divided into discrete **video** and **audio tracks** for maximum creative flexibility. A typical timeline will automatically provide one video track and two audio tracks when you start a project, but you can add as many tracks as you need. You have the option to cut, rearrange, or apply effects to only the picture, or only the sound, or any combination of picture and sound tracks. Obviously, audio tracks can be layered to create complex sound design, but you can also create multi-layered video tracks as well, which can be used to create titles over picture, dissolves, superimpositions, and other visual layering effects (**Figure 20-12**).

As you lay down a string of shots and audio tracks in the timeline, you are creating a **sequence**, which is a graphical representation of your edited movie. Sequences should be clearly named and saved frequently. Sequences are also saved in the browser, along with the clips. One of the great flexible advantages of digital editing is that you can create multiple sequences, copy sequences, create versions of sequences, and treat a sequence like a clip and insert it into other sequences.

Inside the timeline is a **playhead**, which is a horizontally scrolling vertical line running through all edited tracks. The playhead tells you where you are in the timeline and is used to move around your sequence quickly. You can also use the playhead to determine where



■ **Figure 20-12** The timeline consists of the picture track (a), sound tracks (c), and playhead (b). It's very common to layer multiple audio tracks, but you can also add multiple picture tracks for text or superimpositions.

edit points are placed and where shots are inserted. With the mouse, you can drag the playhead across the sequence to locate a specific shot quickly, or, if you hit play, the playhead moves across the sequence in real time.

In all NLE programs, the number of tools and the possibilities for working in the timeline are staggering. Some capabilities, like the ability to trim shots shorter or longer with frame precision, are essential tools for editing; other timeline functions you will use only occasionally, and others you may never need at all. It is not possible to cover timeline functions in detail in this book, so I refer you to the software instruction manuals. All NLE programs have some form of “Getting Started” manual, which is the best place to begin. Also, there are many similar tutorials online and third-party books on the market that address basics editing functions.

D: The Program Panel (PP) or Sequence Monitor (Avid)

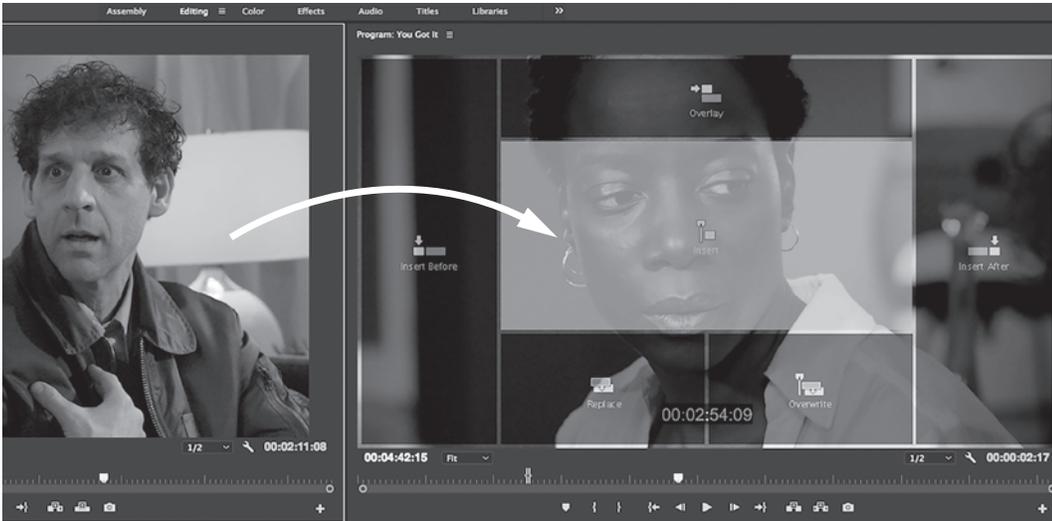
This window is where you watch your sequence as you build it. Wherever the timeline playhead rests, that frame of video is viewable in the **sequence monitor/program panel**. You can move through the sequence in real time, slowly or quickly, or frame by frame using the transport control buttons at the bottom of the window. You can also drag the playhead to move around the sequence extremely quickly. The playhead in this window is a duplicate of the playhead in the timeline window. This means that you can set timeline in-point and out-points in this window as well. It's very common for editors to make their edits by simply dragging each new shot from the source panel into the program panel where you will be given a series of options, including overwrite and insert edit types (see page 482) (**Figure 20-13**).

Auxiliary Windows

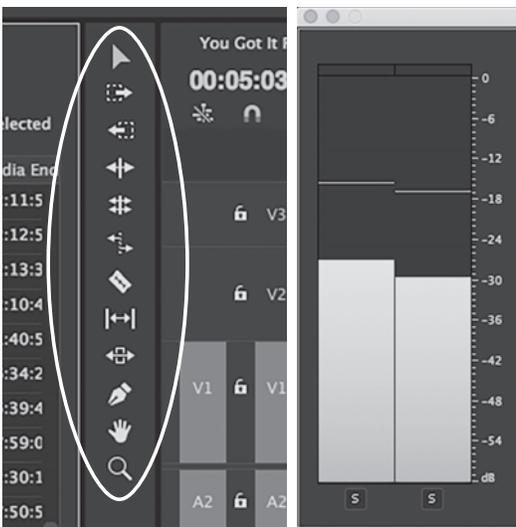
In addition to the four main windows, there are other auxiliary windows that you can include on your desktop for the sake of convenience. Two particularly important auxiliary windows are the audio level meter and the tool palette. The **audio level meter** enables you to monitor audio levels for source clips, individual clips in the timeline, and your multi-track sequence. The **tool palette** allows you to access important timeline tools with the click of your mouse (**Figure 20-14**).

NLE Workspaces

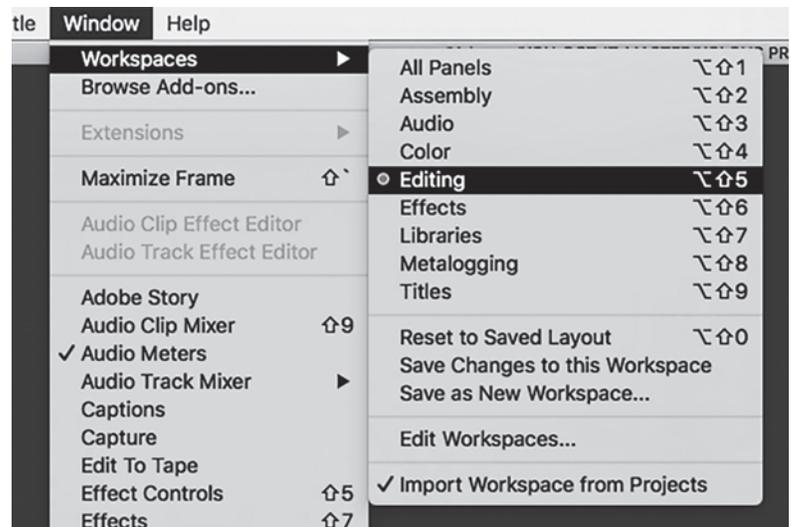
As I mentioned at the beginning of this interface overview, both popular NLE systems offer a variety of **workspaces**, which are edit environments (or desktops) that are



■ **Figure 20-13** By simply dragging a clip (already defined by an in- and out-point) from the source panel into the program panel, you will be given a number of commonly used edit options, including insert edit (*center*), replace or overwrite (*bottom*), insert before (*left*) and insert after (*right*) (PP).



■ **Figure 20-14** Important auxiliary panels within the edit workspace include the toolbox (*left, circled*) and audio level meter (*right*), both panels can be “undocked” from the layout and moved anywhere that is convenient.



■ **Figure 20-15** All popular NLE systems offer workspace options that are designed specifically for the postproduction task. Even further, as this menu shows (PP), you can customize your workspace and save it as a custom layout.

designed for specific functions. So far in this chapter, we have been looking closely at the picture editing workspace, because this is where the lion’s share of time and creative work is spent. However, after editing is completed and you move on to more specialized tasks, you can shift over to a workspace layout that is more appropriate to your needs. Both Premiere Pro and Media Composer have workspaces for: **picture editing**, **audio editing/mixing**, **effects editing**, **color correction**, and **capture and logging** (Figure 20-15). We will encounter a few of these other workspaces in the chapters that address these tasks specifically. As you become more familiar with these environments and with the way you like to work, you can even customize the window sizes and layout in all of these workspaces. Sometimes small customization, like moving the audio level meter to another spot on the desktop, or enlarging one window or a bin, can make a big difference in comfort and speed.

■ **SUMMARY: THE FOUR BASIC NLE WINDOWS**

- **Project Panel (PP)/Project Window (MC):** This is where you ingest, store, and organize your editing assets into bins: video clips, audio clips, graphics files, and sequences.
- **Source Panel (PP)/Preview Monitor (MC):** This is where you preview clips and determine in-points and out-points for your shots.
- **Timeline:** This is where you edit and arrange your image and sound files to create a sequence.
- **Program Panel (PP)/Sequence Monitor (MC):** This is where you view your edited sequence and mark in-points and out-points on the timeline.

Menu, Icon, or Keyboard: Take Your Pick

One thing you'll discover on all NLE systems is that there are usually *three* ways of doing exactly the same thing. You can find any given command inside **pulldown menus** or you can trigger the same command by clicking an **icon** on the desktop, or you can use a **keyboard shortcut** for the same action. For example, in Premiere Pro setting in- and out-points on a source clip can be accomplished three ways: by hitting the "i" or "o" button on the keyboard, by clicking on the *mark in/mark out* icons in the source panel, or by scrolling down the "mark" menu to the "mark in" or "mark out" command (**Figure 20-16**). You don't need to memorize all three ways of doing every task. If you don't like to take your fingers off the keyboard, then learn the keyboard shortcuts; if you're a mouse person who loves to click on icons, learn what the icon symbols stand for; if your brain organizes the world through lists and menus, then use the pulldown menus; or, if you're like me, and like to mix it up, then go that way. In short, customize your process, find the easiest and fastest route (for you) for each function and ignore the alternatives!

That said, there are two special keyboard functions that are extremely handy to know:

1. The **J, K, and L keys** are universal, transport control buttons. J plays in reverse at normal speed, K is pause, and L plays forward at normal speed. Pressing J and L multiple times increases or decreases the play speed from normal speed (one press) to 2x to 4x to 8x (four presses). Holding down the K key and pressing J or L will give you slow motion playback (**Figure 20-17**).
2. The **command + Z** keystroke combination instantly undoes your last action. Inevitably, as you edit, you will click a wrong icon or drag and drop something where it doesn't belong, or accidentally delete an entire sequence. If you've made a mistake, simply hit command-Z, and voilà!—all is forgiven and put back where it was before your little



■ **Figure 20-16** Many functions can be accomplished in multiple ways. For example, you can set in- and out-points on the keyboard (*left*), through a menu (*middle*), or by clicking icons. Choose the way that is most efficient for you and stick with it.

blunder. I've often wished for a command-Z function in the less technological areas of life, but alas most things are not so easily undone.

■ EDITING ESSENTIALS I: GETTING STARTED

Before you jump into cutting picture and sound there are a few preliminary steps you must take care of whenever you begin a new project: (1) setting up a new project; (2) importing media assets; (3) syncing your footage; and (4) organizing your media into bins. For you to have a smooth, efficient, organized editing process, you must take the time up front to do all of these steps correctly.

Setting Up Your NLE Project

When you create a new project in your NLE, your first task is to set it up so that the program understands your basic technical parameters. Setting up a project is done in the **new project settings dialog box** and it is saved in your project file along with the references (or pointers) to your media files and all your editing decisions. There are a number of critical parameters you need to establish:

Project name is obviously important, but you'd be surprised by how many people just skip this step and end up working on "New Project." Give it a proper name.

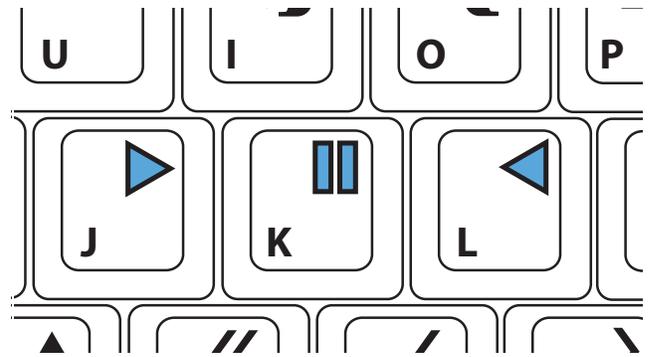
Project location determines where your project file will be saved. You could save your project to your hard drive or an external drive. It's usually advised that project files and media asset files be stored in the same project folder on an external drive—especially if you're in a shared edit station situation, like a school editing lab.

Format. Some NLE systems give you a format option and it relates to several things, the first is the format of the video and audio assets you will be ingesting, which includes resolution and frame rate (HD1080 24p, HD 720 60i, or 2K 24p, etc.). It also relates to the format of the program you'll be creating in the timeline. Ultimately, because you can ingest and work with practically any video format, what you're setting up is the workflow that leads to a specific output. So you should work backwards to a certain extent, knowing your optimum output format is how you'll choose your project format setup. If you're outputting a straight up HD 1080, 24p then that's what your project format should be. If you're going high end 4K DCI output, then you'll set it up for that workflow. You can ingest just about any format and the setup will determine if and how it will be converted when you bring it into your NLE (see **Fig. 19-3**).

Scratch disk (PP) or **capture drive (MC)** establishes where your NLE will store all of the project assets that are ingested, or those that are created during syncing and editing (like render files). Setting your scratch disk location is the first step in organizing your footage, so it's important to set this correctly, and check it every time you edit, or you run the risk of spraying footage throughout your system and ultimately losing files. Again, this setting is usually the project folder in your external media drive. Essentially the same location as your project file (which on Premiere Pro is the default setting).

Autosave is an important setting to find and turn on before you start working. This will ensure that your work is not lost should there be equipment or power failure while you're cutting your film.

Clearly, different NLE systems have different project setting options, but these are the most common and important ones. You'll need to consult your NLE manual or tutorial for more details about your system's setup requirements.

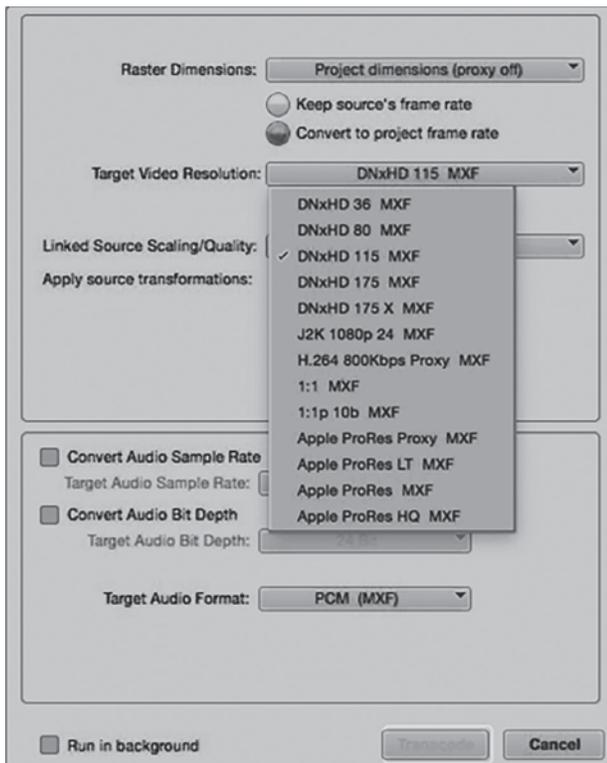


■ **Figure 20-17** Many keyboard shortcuts, like the J, K, and L buttons for playing footage, can save you a lot of time.

Importing Video and Audio Assets

Once you've set up your new project, you're ready to bring the audio and video media into that project. If you're working with file-based media (either from a hard drive or from memory cards) then you are **ingesting/importing** those files. If you're working on a HD tape format, then the process of creating clip files from videotape footage is called **capturing**.¹ So, what's the difference between ingesting and importing? That's a tricky question because the terms are often used interchangeably—but Premiere Pro makes a distinction—if you're using your NLE software to copy media that's still on memory cards to a new location (i.e., a media drive) and/or you require proxy files or any sort of media transcoding (see page 449) then you're **ingesting**. If you have your media already dumped onto a dedicated media drive (and you're not shooting in one of the ultra-high-end formats that requires offline editing) then you simply bring those clips into the edit environment by **importing**.

After your data wrangler has dumped all your audio and video memory cards onto a hard drive, and made two additional backups, one of these drives is delivered to the editor for import/ingest. As I mentioned on page 416, the data wrangler never alters any of the media files or names, but they should organize the files into a folder structure like this: **Project > Shooting Day > Camera Card # & Audio Card # > all media clips**. If you didn't do this on the set, and you're faced with a bunch of camera and audio memory cards to ingest, it's best that you copy the cards to an external hard drive using this standard organizing method (and then make two backups) before you import. This will make for a more systematic process and easier importing/ingesting.



■ **Figure 20-18** Offline editing is done with low-res proxy files of the high-res original footage. Pictured are some of the proxy file options in the Avid Media Composer transcode window.

When you connect your external media drive to your computer your drive content should be visible in the media browser (in the project window) and now you're ready to import/ingest your assets into your project. For narrative projects, you should import each "Day" folder (i.e., Day1, Day2, Day3, and so on). That way all the video and the associated production audio files will be collected together in the same folder. There are a number of ways to accomplish the actual folder importing: there is a drag 'n' drop method, a menu method, an icon, and so on. Check your user manual—but the important thing to understand is that this process does not actually duplicate the media files into your project, you have imported just the pointers to the actual media that is on your drive. In other words, you have the data that associates those clips to the actual media that remains on your media drive. If you disconnect your drive, you will not be able to edit because you will have removed the media.

Working with Proxies (Offline Editing and Conforming)

When shooting with high-resolution formats like 4K, the media files can be so large, especially if you're working on a feature film, that your NLE will have a hard time processing all that data—not to mention the terabytes of storage necessary. In this case, it may be advantageous to create **proxies**, which are lower resolution replicas of your high-resolution media files. Proxies take up much



¹ Capturing from videotape is so rare these days that I have left this process out of the chapter, but if your workflow includes tape formats, you can find this information on the website, in the celluloid film section.

less storage space and are far less demanding on the computer's CPU. The idea behind proxies is to speed up the editing process. You edit with these low-res proxies, called **offline editing**, and then once your creative editing is done and you're at picture lock, you go back to the original files, bring them into your project and use the edit decisions in the timeline to reconstitute your program with the high-resolution footage. This is called **conforming** (see pages 450 and 579).

If you are working with Avid, the system can automatically transcode your source material into the Avid DNxHD proprietary format when you ingest. You can select from a variety of compression levels, expressed as bandwidths (Mbps). A high-quality level would be DNxHD 220 (10-bit, full image quality, with a 220 Mbps bandwidth), while a compressed proxy could be DNxHD36 (8-bit, lower image quality, with a 36 Mbps bandwidth) (**Figure 20-18**).

Similarly, Premiere Pro has a "Create Proxies" command in the Ingestion Settings panel, and the Media Encoder menu offers numerous resolution options for your proxy format. Apple ProRes 4:2:2 is a very common proxy format for Premiere Pro high-end workflows.



■ BACK IT UP!

The Media Drive: One of the biggest problems with modern digital media, in comparison with earlier forms such as film or analog video, is that digital image storage is not particularly robust. Stories of hard drive crashes, malfunctions, accidental erasures, and physical damage are all too common. On the other hand, the great thing about digital media is that it's easy to make multiple exact duplicates of data drives. So it's important that you make backups of all your media, and it's simple too. If you have followed the procedures outlined in the Data Management section of this book (page 415) then you're covered. In the event that your edit drive crashes, or you accidentally drop it down a stairway, then you simply plug in a backup drive and your project file will find and re-connect with the footage on the drive without problems. If you haven't done your data management in the field, then you should certainly make two backup drives before you start editing.

The Project File: Your project file is critical; it contains the organization of your assets, your project setup parameters, your sequences, and every single edit decision you make. And all of this data is linked to your drive. As you edit, you'll be working

with the same project file you created at the project setup, but if you've only been saving the project file on your external media drive and that drive gets lost, damaged, or stolen, then sure, you'll have backup *media*, but all your editing work is lost ... unless you back that up too. It's critical that you always backup your project file to a second location that is not your media drive and put a date on it (i.e., *Title_4_30_17-prproj*) so that you don't mistake an old project file for the current one. Most editors routinely save a backup after every edit session. The project file is so small that you can back it up anywhere: your desktop, a thumb drive, or, like me, you can backup a project file to a dedicated Dropbox folder. Why? Well, Dropbox saves files in the cloud and on your hard drive simultaneously. Additionally, my computer is connected to an Apple Time Machine backup system which saves all changes made in my personal computer drive several times a day. So that means my project file is backed up three times! That's safety.

In any case, establish your own backup protocol for backing up your media and your project file, and stick to it. There is nothing more crushing than permanently losing media or creative editing work—and that's a catastrophe that's so easily avoidable.

Syncing Footage

Standard procedure on a narrative film is to shoot double-system sound to get best quality audio. As we discussed in Chapter 15, this means that audio is captured by a separate recording device, to its own media card, and transferred to its own folder (as .wav or .aiff files) on the media drive. In this workflow, each camera take must be **synced** with its corresponding sound clip to create a **merged sync sound clip** in your project folder. If, for some reason, you've shot single-system sound, the audio will be ingested in sync along with the picture and you can skip this step.

There isn't really one "standard" way to sync your footage, except that you need to be organized, systematized, and consistent—oh, and efficient too. But, the two things that you really should do, no matter the system you employ, are these: (1) you should re-name every newly created merged sync clip by its scene/shot/take identification (from the slate) and (2) save them to a newly created bin called something like "Sync Clips." That way, when all your syncing is completed, you'll be ready to organize your bins further. Be sure to sync and properly label ALL your takes, then after evaluating them all in sync, you can decide which are useful takes and which are outtakes.

Here are two very common methods for syncing clips, the details, of course, may be different depending on your specific NLE system:

Syncing Dailies Method 1: Footage with Scratch Audio

Sometimes when shooting double-system sound, your camera also records single-system audio through the on-board mic, often the case with DSLR or camcorder shooting. This audio is clearly unusable for your soundtrack, but it's already in sync with the picture and can be very useful for syncing your double-system audio. The secret here is that, despite the poor quality, the scratch audio waveforms are similar to the waveforms on the good sound recording, and some programs can match those waveforms automatically.

This procedure can be done entirely in the project panel:

1. Select a video clip from the video folder (say, scene/shot 12-A, take 1) **and** select the corresponding audio (also, 12A, take 1) from the audio folder. The thumbnail image of the video clip should show the slate with the scene information, but you may need to listen to the audio to make sure you've got the right sound clip (also keep camera and sound logs nearby).
2. Choose "merge clips" (PP) and in the "merge clips" window choose "audio" as your synchronize point. And of course, name the merged clip with the shot and take # (e.g., 12A tk1).
3. Hit "OK" and voilà, the NLE aligns the good audio waveforms to the scratch audio and your clip is now in sync. And a brand new, merged sync sound clip is created with the name of the shot and take. (If you've chosen "Remove audio from AV clip" then the lousy camera mic audio is removed. Good idea.)
4. You should always check the new sync clip for sync accuracy. If all is good, move on to the next clip, and the next ... until you're done. However, sometimes the scratch audio waveforms are just not strong enough and the system cannot align them. In that case, you'll need to go to the next method. And remember to save all merged clips in your "Sync Clips" bin.

Merging clips based on waveforms is one of the great functions in Premiere Pro, but as of the writing of this edition, Media Composer doesn't offer anything like this. However, the third-party software, **Pluraleyes**, works much the same way and interfaces with Avid or Premiere Pro.

Syncing Dailies Method 2: Manual Sync with Clip Markers

Many video cameras designed for narrative filmmaking do not have any on-board mic for recording scratch audio, so it's quite common to sync your audio manually using the slate (in fact this is precisely what the slate is for!). This method works perfectly fine for both Premiere Pro and Media Composer, but takes a bit more time ([Figure 20-19](#)).

This procedure uses the project panel and source window:

1. Open a clip from the video folder in the source window (say, scene/shot 12-A, take 1).
2. Place the playhead on the exact frame where the clapper arm on the slate closes, and put a marker on that frame with the "clip marker" function.
3. Open the corresponding audio clip from the audio folder (also, 12A, take 1) in the source monitor and find the exact point where the "clap" occurs and place a marker on that frame with the "clip marker" function. You should see a sharp attack profile on the



■ **Figure 20-19** The marker button (a) is extremely helpful for lining up the slate closing frame with the slate closing sound (bottom arrows) when syncing dailies.

waveform. Audio scrub, which allows you to hear frame-by-frame audio as you drag the playhead, is also helpful.

4. Select the video and audio tracks in the project panel and, using the “autosync” (MC) or “merge clips” (PP) command, create a single synced clip. This time, be sure you select “clip marker” as the sync-point in the dialogue box. And, of course, name the merged clip with the shot and take # (for example, 12A tk1).
5. Hit “OK” and voilà, the NLE lines up the video and audio markers and a brand new, merged sync sound clip is created with the name of the shot and take.
6. You should always check the new sync clip for sync accuracy. If all is good, move on to the next clip, and the next ... until you’re done. And remember to save all merged clips in your “Sync Clips” bin.

Other Syncing Methods: Timecode, In-Points, and using the Timeline

Creating synced merged clips with waveforms or markers are only two methods for syncing double-system sound footage. If you’ve shot your footage with timecode and a timecode slate (page 371) you can choose to use “timecode” as your sync point reference in the “autosync” (MC) or “merge clips” (PP) dialog box. Then, simply enter the timecode frozen at the slate clap frame and the audio clip will be aligned to match it. There are also methods for using clip “in-points” as your sync point reference.

And some folks like to speed things up by syncing in the timeline. First, they’ll bring all of a day’s footage (say Day1) into the timeline—yes *all* the video clips at once. Then they’ll

bring in the audio clips one by one and line them up to the corresponding video clips using in-points or markers and systematically merge clip after clip after clip, down the line. The possibilities are many—but the principle here is to select a working method that is easiest and most efficient for your footage, and use it consistently.

■ RE-NAMING CLIPS

You'll notice that the original media files on your media drive have cryptic names like A004_C015_071023_001.mov (video) and 3A_0004S12.WAV (audio). That's because most cameras and recorders designed for filmmaking assign a unique name to every file over the life of the device—no two media files will *ever* have the same name. These file names are essential for connecting the original media to your program at a number of steps in your workflow. It's very important to stress this; you may re-name clips in the project panel after importing or syncing, but **never re-name the original media files on your media drive!** Remember that digital editing is non-destructive, so everything you do, from cutting portions of a clip into your program, applying effects, and even re-naming assets in the project panel after import, happens virtually and only references the original media without actually changing it.

We've been talking in this section about creating merged clips with audio and video in sync. Even these newly created merged clips are not actually media; rather they are pointers that are associated to the original media files (the ones with the cryptic

names). That's why you may re-name sync clips in the project panel to whatever you wish, but, if you re-name the actual media files on your media drive, then the connection between your project and its media will be severed and your clips and sequences will not be able to locate the media.

As you make the merged sync clips you will need to re-name them for convenience sake. In fact, you'll also need to re-name any MOS footage (non-sync sound video) you've shot too. For narrative filmmaking, the naming protocol is to identify each and every clip (sync clip or MOS) by its slate identification, meaning, the scene, shot, and take number loaded on the clapper. This will help you organize your footage according to the screenplay and locate footage quickly. As you make these clips, be sure to save them to a dedicated bin (away from the other media assets). Many editors create a bin called "Sync Clips" and another bin for "MOS clips" and another bin for "Non-Sync Audio" (e.g., production sound effects, room tone, music, etc.). Once you've imported, synced, and placed your footage and sound in these bins, you're ready to really organize all of your project assets for editing.

Organizing Your Footage

Good organization is the basis of all good editing. Unfortunately, many inexperienced editors, awash in the anticipation of seeing their footage in the context of an edit, will ingest their media and immediately start cutting without thinking through the organization of their material. This is a critical stage, especially with file-based media. If your material is not named and organized well, you can easily lose track of it. Good organization makes it easy to see what you have and find things you need. Developing good habits now will pay off throughout your career, and will save you time and money on any film project, big or small.

After the process of ingesting/importing, and then syncing/re-naming your production footage, you will have a number of folders already in your project panel (**Figure 20-20**). For example:

- You will have all the production files in folders labeled by day (DAY_1, DAY_2, and so on). The clips in these folders retain their original names.
- You will have a folder with the new Merged Sync Clips, re-named according to the scene/shot/take information.
- You may also have a folder for "MOS Video," and a folder with "Non-Sync Audio" and maybe even a folder with "Music" (all assets also re-named according to scenes).

The next step is to organize your editing assets into a logical bin structure. A little extra time up front will save a lot of time later as you hunt for clips during the editing stage.

Using Bins to Organize

Organizing edit assets is done by creating a series of bins in the program panel. **Bins** are essentially folders that can contain clip files or other folders, but we call them bins after the “film bins” used to hang strips of celluloid film during the film editing era. Anyway, the main thing to keep in mind is that you can make as many bins as you like to organize your footage. With a logical project bin structure, you can locate any shot, piece of music, room tone clip, or sound effect you need easily and quickly (**Figure 20-20**):

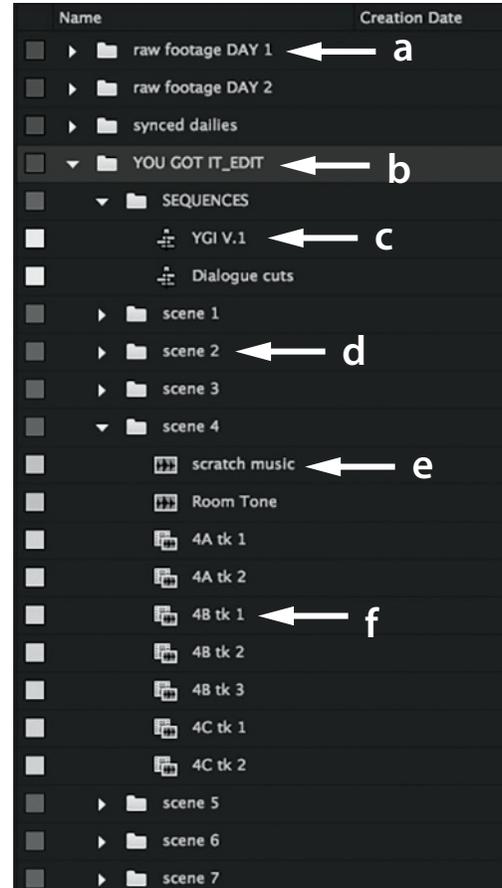
- First, it’s a good idea to create a **master project bin** that contains all of your scene bins and organized editing elements, so that everything you’ll be using to edit your film is discrete from the material that you don’t need (like the original footage import folders). This master project folder is usually labeled with the full name of the film.
- Inside the master project bin are a series of **scene bins** that are organized so that you have *one bin per scene* and labeled simply: *scene 1*, *scene 2*, *scene 3*, and so on.
- Inside each scene bin are all of the **scene assets** necessary to cut that particular scene, including: merged sync clips, MOS clips, non-sync audio clips (SFX, ambience, music, etc.). All assets are, of course, labeled by scene info.
- Also, in the master folder, create a **Sequence bin** to contain all of your sequences. One of the great benefits of NLE systems is that you can save different versions of your film (or even parts of your film) by creating multiple sequences. You can have as many sequences as you like—but be sure to label them carefully or you could mistake an experimental sequence for your main program sequence. Label rough cut version sequences something like: “*Title-rough_1*,” “*Title-rough_2*,” or “*Title-v1*,” “*Title-v2*,” etc. Just be sure to keep your naming conventions consistent.
- Finally, if you’re dealing with a lot of footage, you may want to create an **outtakes bin** to keep all your unusable takes from cluttering up your scene folders—yet still in a place where you can locate them just in case you decide that a piece of an outtake can be useful. Outtakes should also be properly labeled, of course.

Also keep in mind that you can view any bin in list view or icon view. **List view** shows you the file names only and is very compact. **Icon view** shows a large file-type icon or if it’s a video clip you’ll see an image thumbnail. Many editors use list view for the project panel and icon view whenever they open a bin in its own window (**Figure 20-21**).

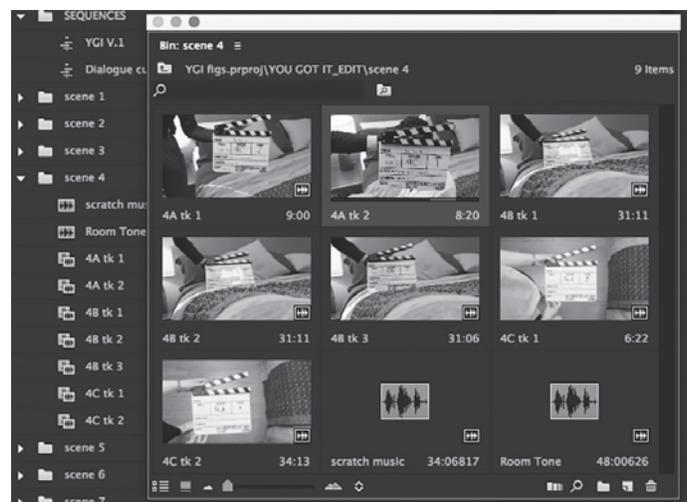
EDITING ESSENTIALS II: MAKING SIMPLE EDITS

Basic Edit Types

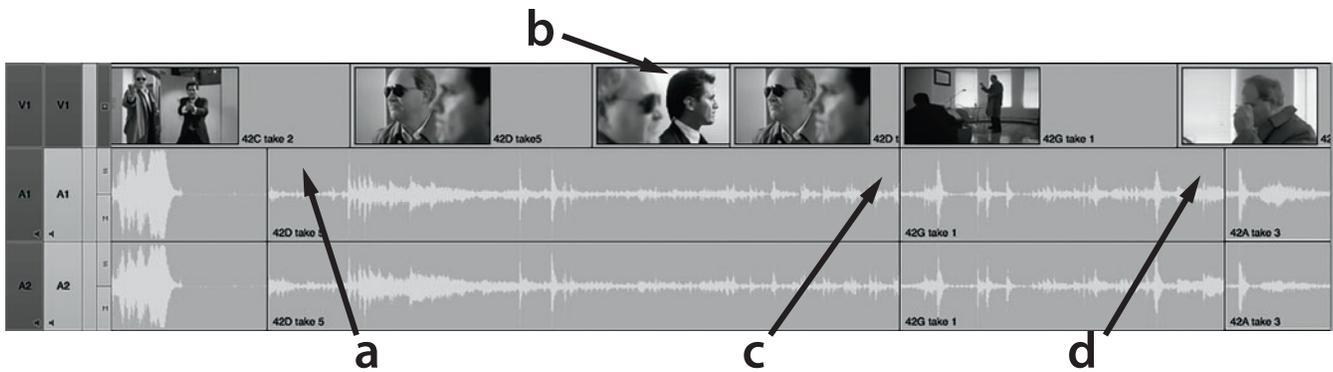
As complex as editing can be in terms of arranging the events of your narrative and creating meaningful image/image and image/sound juxtapositions, in terms of actual edit types, there are really only a few indispensable, bread-and-butter cuts: the straight



■ **Figure 20-20** The organization of all project files in an NLE: Raw footage and the sync dailies are kept in discrete folders (a). The master project folder (b) contains all of the bins involved with editing including an edit sequence bin (c) and individual scene bins (d). Each scene bin contains all of the necessary assets to edit that scene including audio files (e), scene clips (f) and graphic files.



■ **Figure 20-21** Icon view shows each clip as an image thumbnail. Many editors use list view for the project panel and icon view whenever they open a scene bin in its own window.



■ **Figure 20-22** A variety of dialogue edits within a single scene. Sound cuts in before the picture in a J-cut (a), an insert edit simply places an image over the ongoing sound of a shot (b), sound and picture cut at the same time in a straight cut (c), and picture cuts in before sound in an L-cut (d).

cut, the insert shot, and the split edit. Many films, short and features, are completed with only these three essential edit types (**Figure 20-22**):

- **The straight cut** (a.k.a. **hard cut**) cuts the picture and sound on the same frame at the edit point. The **edit point** is where the **tail** of the previous shot (the last frame) meets the **head** of the incoming shot (the first frame). With a straight cut, when the picture cuts to another shot, the sound does as well.
- **Split edits** (L-cut and J-cut) are edits in which the image and audio edit points are offset—meaning that the image cut happens at a different time than the audio cut. In an **L-cut**, the picture cuts to the next shot first, and the audio cut occurs later (video leads the audio). The **J-cut** is the opposite: the audio cuts first, while the picture plays a bit longer before cutting to the next shot (audio leads the video). The timing of split edits—how many frames or seconds to offset the image and audio cut points—depends on a number of factors, some creative and some practical.
- An **insert shot** involves completely disconnecting either the sync audio or video from its original linked clip and inserting it over a shot that is continuous. This is commonly done with reaction shots where you wish to continue one person’s dialogue during the reaction of the other person and then return to the image of the first person talking. All that’s needed in this case is the reaction image placed over the running dialogue. Conversely, you can insert someone else’s dialogue only, without ever cutting to their image. Other common insert edits include POV shots (see page 85) and cutaways (see page 82).

Let’s look at the use of these three edit types in the context of a brief dialogue scene: Bob and Ruth are coworkers out for lunch, and Bob takes the opportunity to announce that he’s in love with Ruth, who is, unfortunately for Bob, not interested.

First, let’s look at the simplest and bluntest of approaches—all straight cuts. **Figure 20-23** shows the scene as a series of straight cuts dictated by the dialogue shifts. Whenever a character speaks both image and sound cut to their shot. This sort of back-and-forth dialogue cutting has a certain rhythm that can be effective at times, but in most instances the predictable edits, always coming between lines of dialogue, are too monotonous and too clunky to use for an entire scene. It also gives us no clues as to the scene’s POV, mean-



■ **Figure 20-23** A scene with all straight cuts on dialogue has a predictable pattern and rhythm.

ing, whose scene is this and with whom are we encouraged to sympathize? So, while this “straight cuts only” version does follow the dialogue, it also presents the moment in a very neutral way.

To create greater tension, or humor, or meaning, most films liberally combine J-cuts, L-cuts, and insert cuts even within the same scene. Split edits are an essential technique for dialogue (and action) editing and play an important role in establishing the internal rhythm of an encounter, the dramatic timing of reactions, and the construction of character POV, which are all key storytelling considerations. For example, holding the image on a character’s face a few seconds longer as someone else speaks can elicit audience identification with a character at that moment; likewise, cutting to someone on just the right word can create a juxtaposition that encourages subtextual and emotional associations.

Figure 20-24 is an example of three additional versions of the same scene, with exactly the same dialogue, but cut using split edits and insert shots to alter the tone and POV of the dramatic moment. The cutting in **Figure 20-24 a**, creates two moments where we see Ruth react while Bob delivers his most ardent lines. The L-cut in particular brings Ruth in at a crucial moment (“I love you”), giving her a great moment for a reaction. This dialogue edit announces that Ruth’s reaction is more important than Bob’s proclamation and therefore draws the audience into a closer identification with Ruth, who clearly does not share Bob’s feelings. The second version (**Figure 20-24 b**) draws us closer to Bob’s POV, who now gets to respond to what Ruth is saying. The last insert shot, in particular, leaves us witnessing Bob’s forlorn reaction at the end of the scene. The final version (**Figure 20-24 c**) is all Ruth’s POV: not only does she get that strong L-cut reaction on “I love you,” but Ruth also gets the rest of the scene, in a close-up, and we get to watch her struggle with Bob’s declaration of love. As you can see with these simple illustrations, given the exact same scene content, small editing adjustments can have a substantial impact on the interpretation of a scene.

 To explore the impact that the various edit types can have on dialogue editing, go to the *Voice & Vision* companion website, where a dialogue portion of the example scene “You Got It” has been edited several different ways.

On a more practical note, split edits are frequently used to finesse continuity, especially when matching action from shot to shot or to hide continuity errors altogether. Although



Figure 20-24 Dialogue editing. These three versions of the same scene illustrate how simple J-cuts, L-cuts, and inserts provide an editor with a great deal of control over the POV and emotional impact of a scene.



■ **Figure 20-25** Nichols and editor O'Steen included a clever split audio edit in *The Graduate* to make a father's innocuous question about laziness resonate meaningfully in young Benjamin's wayward private life: "Ben, what are you doing?"

the dialogue may cut perfectly on a particular point, a physical gesture in the image might not exactly match, so simply trimming only the video a few frames earlier or later than the audio cut might just give you either the perfect action match or the ability to avoid the problematic movement all together.

Split edits are also commonly used as scene transitions where the audio portion of the incoming scene may precede the image transition, or conversely, the audio from the previous scene may play over the image from the incoming scene for a time. Mike Nichols' *The Graduate* (edited by Sam O'Steen, 1967) has a wonderful example of a J-cut scene transition used for humor. The last shot of a montage that shows recent college graduate Ben Braddock (Dustin Hoffman) spending his summer frittering away his time around the house and carrying on a sordid, illicit affair with Mrs. Robinson (a long time friend of his parents) reveals Ben in a hotel room bed with Mrs. Robinson. As he turns to his side we hear Ben's father's voice ask, "Ben, what are you doing?" But when the corresponding image of Mr. Braddock (William Daniels) finally cuts in, we realize that the question is actually being posed not in the hotel room, but outside by the family pool where Ben is lazily drifting while his father reproaches him (Figure 20-25). In this case, the J-cut is used to humorously illustrate Ben's inner self-reproach whenever he's with Mrs. Robinson.

Basic Cutting

The more you edit, the more tools, techniques, and short-cuts you will incorporate into your routine. As I mentioned earlier, the best way to learn software is one function at a

time, as the need arises. It only takes editing a few short films before you have a solid knowledge of a NLE program's capabilities. However, the place to start, where you'll do the majority of your editing, is using the four basic windows in the edit workspace to do simple cuts. Let's go through the basic process for making our bread-and-butter edits.

The Simple Cut

As you build your program shot by shot, edit by edit, you will find that you fall into certain working patterns—processes that you repeat often and that become so familiar that they feel almost automatic. First, let's look at the simplest type of cut, a straight cut, to understand the basic editing process:

1. *Load the clip and evaluate the take.*
In your clip bins (within the project window), you will locate the shot you wish to cut into the film, and there may be a number of possible takes of that shot that you'll want to consider. Double click on the clip and it will be loaded into the preview (source) monitor. If the clip includes sync sound, then both sound and image will be loaded. Load and play through all of the possible takes for each shot in the viewer to decide which works best in the program—judging for performance, technical and aesthetic elements, and continuity issues.
2. *Set in- and out-points.* Once you have determined which take you prefer, watch it again a few times in the preview monitor to determine what specific portion of the clip you want to edit into the film. When you have a sense for where you want the shot to start and end, set an in-point by clicking the **mark in** button (or by hitting the "i" key on the keyboard) and an out-point by clicking the **mark out** button (or by hitting the "o" key on the keyboard).
3. *Make the edit.* Once the parameters of the shot have been established, you can simply drag the shot from the preview monitor into the timeline and place it where you'd like it

(Figure 20-26). This drag and drop editing approach is used primarily for simply putting one shot after another. But, you can “take” this edit in other ways (keyboard or menu or dragging it into the sequence monitor). If the shot includes sync sound, you will simultaneously be dragging and adding the picture track and the sync audio tracks. However, whenever necessary you may also use the “video only” and “audio only” icons in the preview monitor to drag and drop either the video or audio element separately into the timeline.

4. *Evaluate the edit.* Play through your timeline and watch your edit in the sequence (program) window. How does the shot work with the other shots in the sequence? Is it right? Does it belong there? How is the rhythm? Perhaps the shot order is great, but the actual edit point, where the two shots meet, is a little off and needs adjusting (for the sake of timing or continuity). Again, we don’t bother too much with fine tuning in the early rough cuts—but as you refine your scene you will want to make more precise cuts. Adjusting the out- and in-points of adjacent shots is called **trimming**, and that’s the next step.

5. *Trimming (fine-tune the edit).* A down ‘n’ dirty way to trim your edits is to use your **trim tools** right in the timeline, but to truly finesse your cuts you should enter the **trim mode**. Double clicking on the edit point in the timeline will convert the sequence window into a two screen **trim panel**. The left image shows the very last frame of the first shot and the right screen shows the very first frame of the next shot—in other words the exact edit point where the shots meet. Here you can trim the edit points of either or both shots. In trim mode you can easily add or subtract one or five frames at a time to your out-point or in-point or you can use any one of your trim tools (Figure 20-27). (See “Essential Trim Tools” box later.)

6. *Trimming for split edits.* Simple trimming involves adjusting the in- and out-points of both video and audio tracks simultaneously. However, trim mode is also where we can easily create split edits. By selecting only the video track or only the audio track for trimming in the trim window you can precisely offset the edit points between two shots to create either an L-cut or a J-cut. And as with all trimming, this can also be accomplished right in the timeline as well (Figure 20-28). Creating split edits is usually something that you do in the latter rough cut and fine cut stages, where you finesse dialogue editing and scene transitions.



■ **Figure 20-26** Simple edits can be accomplished by choosing your clip from the scene bin (a), setting your in- and out-points in the source panel (preview window) (b), and drag and dropping the clip image into your timeline (c). Don’t forget that you can drag both picture and sound, or dropping in picture or sound separately, by dragging the appropriate icon (circled).



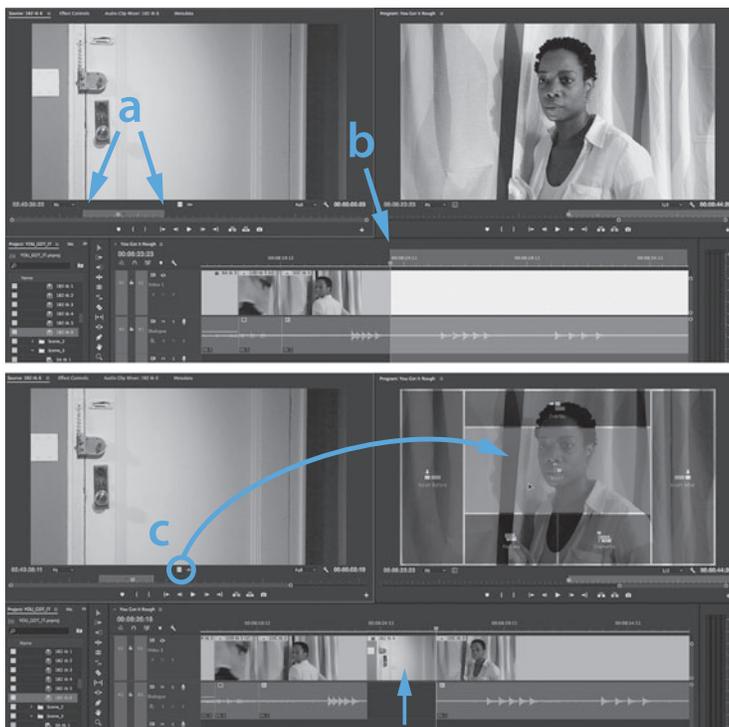
■ **Figure 20-27** When you place your playhead on an edit point and enter trim mode (a), you will get two windows that show the very last frame of the outgoing shot (b) and the very first frame of the incoming shot (c), allowing you to adjust the cut with frame accuracy (d).



■ **Figure 20-28** You can use your trim tools right in the timeline to create quick split edits. Pictured is the roll edit tool being used to extend the audio of one shot into the video of the following shot to create an L-cut.

within a single shot you are essentially splitting that shot in two and creating a three-shot sequence.

👉 For example, at the end of the sample scene “You Got It” Jill is at the window peering out when there is an ominous KNOCK on her door, she spins around and looks at / the closed door, and there is another KNOCK / and Jill reacts with increasing distress (Figure 20-29). In fact, the window/spinning and the reaction moments are actually a single camera take which was laid down as an unbroken shot in the timeline first, then a simple three-point edit was used to insert the POV shot of the door at just the right moment, splitting the window shot in two and giving us a classic, looking shot / POV shot / reaction shot sequence (see “You Got It” on the companion website).



■ **Figure 20-29** Inserting a shot with a typical three-point edit: (a) mark the in- and out-points of the shot you wish to cut in; (b) mark only the in-point on the timeline where you wish to place that shot; (c) drag the clip (here it’s a POV shot of a door) to make an “insert edit.” Notice how the looking and reaction (along sync audio) has been split into two shots by the newly inserted POV shot.

The Three-Point Edit

The three-point edit technique is useful for introducing new shots within a timeline that has already been constructed, or breaking up a long shot by inserting another shot within it. The **three-point edit** involves all the basic steps outlined earlier, including selecting an in-point and an out-point for the clip in the preview monitor, but adds an additional (third) in-point on the timeline—sometimes between shots previously edited together or, very often, *inside a single shot in the timeline*. So, rather than simply butting a new clip sequentially next to the last edited shot, you can strategically place a new clip inside the sequence and thereby split the timeline to accommodate the new shot. And when you insert a new clip

within a single shot you are essentially splitting that shot in two and creating a three-shot sequence.

Three-point edits are a very common technique for several types of insert-shots like *reaction shots* (inserting a character’s reaction while another character speaks and then returning to the speaker); *POV shots* (inserting what a character sees and then returning to their reaction); *action detail inserts* (inserting a close-up detail of an action, then returning to the wider shot while maintaining continuity); and *cutaways* (briefly cutting away to an off-action scene detail and then back to the action). The example film “You Got It” on the *Voice & Vision* companion website has an example of all of these types of edits.

Insert versus Overwrite and Extract versus Lift

In every NLE system the vast majority of your editing will involve four basic edits functions: *insert* and *overwrite* for adding material, and *extract* and *lift* for removing material.

Adding clips into or between existing shots in your timeline requires choosing between two ways to take an edit: insert or overwrite. **Insert**

edits open up a space in the timeline for the new clip by pushing all of the footage and its audio located after the edit point further down the timeline. Insert cuts do not delete any of the previously laid shot. If you make a picture only insert edit, as we did in **Fig. 20-29**, a gap opens up in the audio for the duration of the new clip. **Overwrite** edits are different in that they lay the new shot *over* the existing material, thus replacing whatever was in the timeline for the duration of the new shot. With picture only overwrite edits, you lose footage in the previous shot to the new clip, and you will not get a gap in the audio track because nothing is pushed further down the timeline. Which edit type is most appropriate depends on the circumstance. For example, if you're dropping in a close-up action detail that duplicates the very same action in the wide shot, you could just use an overwrite edit since you don't want repeated action.

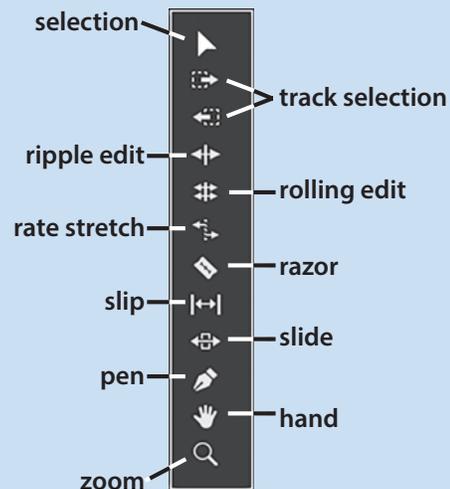
It's also important to remember that there are *many* times when, instead of adding things to the timeline, you want to delete material. For example, let's say you realize after you've edited a sequence that you should end a scene several seconds earlier, to avoid an awkward moment, or maybe you see an unnecessary transition shot that needs to be removed. To delete material from the timeline you can place an in-point and an out-point on the timeline to delineate the material you want to remove (or if you wish to remove an entire clip you can simply choose it with a click of your mouse). But now you must choose between two methods for removing material. A **lift edit** will remove the material, but leave a space in the timeline where the deleted material used to be. If you remove four seconds of material, you'll have a four-second gap in your timeline. An **extract edit** will not only remove the selection, but it will close the gap that is left behind by pulling up the sequence after the cut point. All NLEs have shortcut keys or buttons that perform any one of these four edit functions. Once you become familiar and practice just a little with insert, overwrite, extract, and lift edits, you'll be ready to edit your film with precision and efficiency.

in practice

■ **ESSENTIAL TRIM TOOLS**

Some of the most effective, workhorse editing tools in an NLE system are the **trim function tools**. Trim tools are used to fine-tune edits right at each edit point, by moving, sliding, rolling, adding, and subtracting frames from either the outgoing shot or the incoming shot, or both simultaneously. Specific trim tools can be selected from the icons in the **toolbox window** or with shortcut keys (**Figure 20-30**). Trim tools not only make your editing more precise and more efficient, but the more familiar you are with trim functions the more your editing becomes intuitive, allowing your creative ideas to flow.

Trimming can be done right in the timeline, but for greater accuracy, it's a good idea to enter **trim mode** which shows you the last and first frames of adjacent shots side by side (see **Fig. 20-27**). The other helpful thing about the trim mode window is that it plays back the edit point in a loop so that you can better determine what adjustments are necessary. At first, trim mode can be tricky, but with a little practice, this tool becomes the editor's primary implement for fine-tuning edit points and creating split edits. Explaining how certain trim tools work is



■ **Figure 20-30** The toolbox window places all of the essential trim tools within easy reach in the edit workspace.

nearly impossible to do with words, but you'll figure it out *very* quickly when you actually get your hands on them; so to familiarize yourself with trim tools, take a moment and place three shots on a timeline and just play around to see for yourself exactly what they do.

<p>Selection Tool: Grabs an in-point (trim-in) or out-point (trim-out) and drags the clip longer or shorter. Only affects the clip’s edit point and not the adjacent clip at all, so will leave a gap in the timeline when cutting frames.</p>	<p>Slide Tool: Slides a clip earlier or later in the timeline. The sliding clip remains the same, but the frames of adjacent shots are either increased or trimmed to accommodate the sliding clip.</p>
<p>Ripple Edit: Same as the selection tool but the rest of the timeline moves to close any gaps caused by trimming.</p>	<p>Zoom Tool: Allows you to zoom-in to a specific area of the timeline. Useful if you are trimming audio and must see waveforms clearly.</p>
<p>Rolling Edit: Trims the out-point and in-point of adjacent shots simultaneously, by the same number of frames. Great for split edits.</p>	<p>Rate Stretch: Changes the playback rate of the clip. Shortens a clip by speeding it up, or lengthens it by slowing it down. In- and out-points of the clip remain unchanged.</p>
<p>Slip Tool: Trims a clip’s in-point and out-point simultaneously, by the same amount, yet keeps the clip in the same place on the timeline.</p>	<p>Pen Tool: Sets keyframes in the timeline sound tracks to create multiple audio level adjustment points (see page 561).</p>

■ EDIT BASICS SUMMARY

These editing basics cover the vast majority of functions you need to know for editing your rough cuts. Here is what you should learn first:

- Loading clips into the source window for review
- Marking clip in-points and out-points
- Marking sequence in-point (for three-point editing)
- Making insert edits
- Making overlay edits
- Cutting material by extracting
- Cutting material by lifting
- Making audio only and video only edits
- Trimming to adjust edit points (timeline and trim window)
- Trimming to create split edits (L-cuts and J-cuts) (timeline and trim window).

There are clearly many other tools, functions, and capabilities in your NLE system. You will no doubt become familiar with them as you need to use them.

Think!

Everything we’ve discussed in this chapter and the previous one has revolved around editing workflow, process, and technology, but I have saved discussing the most essential part of the editing process for last—creative thinking, imagining how the film will hold together, and thinking about how one shot will work next to another shot. This is not something you do with your fingers on a keyboard or something that is saved for one specific moment in the workflow. Imagining the way the story will reveal itself and the way the film will play out on the screen is something that is done, as one of my students said, with the “technology of the mind.”

In his book *In the Blink of an Eye*, editor Walter Murch devotes a chapter to figuring out how much time he (and his editing associates) actually spent *physically* cutting Coppola’s *Apocalypse Now*. His calculations included the number of days the editors worked divided by the number of cuts in the finished film. The rate of cuts, per editor for each 12-hour day, came out to 1.47. He then goes on to figure that for each cut in the film, there were probably five “shadow splices,” which were cuts that were undone. His conclusion?

Since it takes under ten seconds to make one-and-a-half splices, the admittedly special case of Apocalypse Now serves to throw into exaggerated relief that fact that editing—even on a “normal” film—is not so much a putting together as it is a discovery of a path,

and that the overwhelming majority of an editor's time is not spent actually splicing film. [T]he remaining eleven hours and fifty-eight minutes of each working day were spent in activities that, in their various ways, served to clear and illuminate the path ahead of us: screenings, discussions, rewinding, re-screenings, meetings, scheduling, filing trims, note-taking, bookkeeping and lots of plain deliberative thought.

Walter Murch (From *In the Blink of an Eye*, 2001)

What Murch is telling us is that, like all other aspects of filmmaking, the creative work of the editor is not about the technology, it's about the ideas and the imagination, which are then expressed through the technology. Interestingly, he reminds us that all of those seemingly mundane organizational tasks, like logging and bookkeeping, have their role in allowing us to think, consider, and reflect (**Figure 20-31**).

Murch also makes the point that making an actual cut on film takes no time at all, and this is doubly true in the digital age. It's so easy to perform many editing procedures these days that we run the risk of confusing the creative task of the editor, which takes time, with the practical task of making a cut, which takes no time at all. Sam Pollard expressed it this way in an interview with Jennifer M. Wood:

What's happened now with the digital medium, because everything can be done so fast, is that people don't have the tendency to understand that editing is really about what you think—not about what you do physically. It's really how you think in terms of conceptualizing the way a sequence should unfold. [...] How the sequence should build structurally—it's a real thinking process. To me that's the one downside to digital technology. People are so impatient now and things are on TV so quickly, there's no opportunity to think.

(From "Life with Spike," *MovieMaker Magazine*)

An editor should never lose sight of the fact that "why" we make an edit is much more important than "how" we make an edit. This is as important and powerful a question as "Why put the camera here, instead of there?" or "Why use this lens, instead of that lens?" or "Why cast this person in the role instead of that person?" In the next chapter we'll look at the "why" of it, the creative and storytelling dimension of the art of editing.



■ **Figure 20-31** Editor and sound designer Walter Murch. Still from Apple's *The Cutting Edge* (2004).



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The Art and Technique of Editing

■ THE GOLDEN RULE OF POSTPRODUCTION

The one piece of advice that I would impart to anybody who is looking to be an editor or any other aspect of this business is always remember that making movies is about investigating all possibilities. You should always be open to different options. If you get focused into making something one way, you may not make the best film. The thing that you learn when you're writing a film is that it's the template; it's the foundation. [...] Then when you go into the editing room, that process is the next level of the template. First you have it on paper, now you have it visually and then you have to make it a film.

Sam Pollard (From "Things I've Learned as a Filmmaker,"
MovieMaker Magazine)

Professionals who work in postproduction—primarily directors, editors, and sound designers—understand this one fundamental principle: *make the film from what you have, not solely from what is written in the script*. Some time ago I was discussing the process of editing with Sam Pollard (**Figure 21-1**)—an accomplished editor (*Mo' Better Blues*, *Juice*, *Bamboozled*), producer (*When the Levees Broke*, *The Blues: "Feel Like Going Home"*), and educator—who told me that he tries not to read the script more than once or twice before he starts to edit, and after that he rarely refers to the script again. Why would this be? There are two reasons:

First, if the director, cinematographer, and art director have done their jobs correctly, they will have improvised here and there and altered details to improve the film from its incarnation as a screenplay. So the actual results—the scenes, performances, footage—coming from production may be quite different from the script. Hopefully the footage reflects a beneficial transformation of the material and one that has taken the editing process into account. Second, as anyone who has been on film sets will tell you, “stuff happens.” Just as you may find shots and scenes that weren't in the script that improve the project, you might equally have run out of time and left a few things out or even forgotten a detail or two; the sound from one day can be junk, or an actor had an off day, or the camera was running at 30 frames per second and no one noticed—it happens to everyone. This certainly doesn't mean you don't have a film; it just means you have a slightly different film, one that you will find in the editing process. Whether the footage contains everything called for in the shot list and then some, or is missing pieces here and there, the bottom line is that when you bring your footage into postproduction, stay loose and work from what you have. Don't stubbornly hang on to preproduction ideas that are not in the footage, or even if they are, let the movie evolve. And look for new possibilities that will emerge during the cutting and sound design process—they will present themselves to you.

A perfect example of this principle can be seen at the very beginning of Francis Ford Coppola's *Apocalypse Now* (1979, edited by Walter Murch). The famous opening sequence with Cpt. Willard (Martin Sheen) plunging into a drunken, emotional abyss, overlaid with images of the Vietnamese jungle exploding into flames, while stone Buddhas watch and Hueys glide overhead, was not in the script or even planned during



■ **Figure 21-1** Producer and editor, Sam Pollard, works extensively in both narrative and documentary forms.

the shooting. Instead, the sequence, which perfectly establishes the film's tone, environment, and main character, emerged from both Coppola and Murch being acutely alert to the extended possibilities of the footage they already had in the can (**Figure 21-2**). Here is Murch recalling the creation of the sequence:

They weren't in the original screenplay. They derived from an early sequence shot for the film, in which Kilgore (Duvall) orders a napalm strike because he wants to suppress the mortar fire preventing his soldiers from surfing. That napalm explosion was photographed by six or eight cameras. One camera, far removed from the action, had a long telephoto lens and was running at high speed. When Francis watched the dailies of the material, something about that camera angle – the calm jungle, flattened by the long lens, suddenly, in slow motion, erupting in flames, and those hallucinogenic pterodactyls of helicopters passing in front at odd angles – captivated him and made him think of it as an opening image for the film.

He'd also shot, as an exercise in getting at the character, a scene with Marty Sheen (Willard) trapped in his hotel room, pacing, fuming, drinking, smashing the mirror in which he had been studying himself. It had been shot with two cameras even though it was not intended for the film, and yet turned out to be so powerful that Francis wondered if there was a way to bring that unintended shot of the jungle bursting into flames together with the unintended scene of Willard drunk in his hotel room. [...] And I browsed around in the footage from the end of the film to see if there was something I could steal to give hints about the end at the beginning – the massive stone head of the Cambodian Buddha, [...] This whole overture emerged organically out of the filming. It then became my responsibility to execute it, to take those diverse elements and devise something that serviced the film in an interesting way.

(From "Walter Murch in Conversation with Joy Katz,"
PARNASSUS Poetry in Review, 1997)

One of the primary reasons that filmmakers break a film-in-process down into little pieces—every shot separate from the others and every type of audio distinct from the others and from the picture—is to allow for maximum creative flexibility in postproduction. We can put any shot next to any other shot as we see fit, we can lay down any audio track under any sequence, or we can layer tracks and tracks of audio in any configura-



■ **Figure 21-2** Coppola and Murch crafted the memorable opening montage for *Apocalypse Now* in postproduction from an array of footage shot for other purposes, some of which was never intended to be in the film.

tion that our heart desires—whatever works best for the film. So remember: postproduction isn't just the mechanical re-construction of the original idea, but postproduction also constitutes the further creative development of your story. It is often said that "editing is your second chance at directing." Something happens when you start connecting one shot with another—a whole new chemistry occurs and new storytelling options emerge. And when you put a piece of music behind your sequences or a slightly different ambient background, the film takes on new life and new energy again. That's the power of postproduction.

■ “FIXING IT IN POST”

We’ve all heard the old adage that we can learn as much, or more, from our mistakes as from our successes; but just like Alexander Fleming’s accidental discovery of penicillin, mistakes can be more than hard-knock lessons: they can also be blessings in disguise—if you stay open to the creative possibilities available in postproduction.

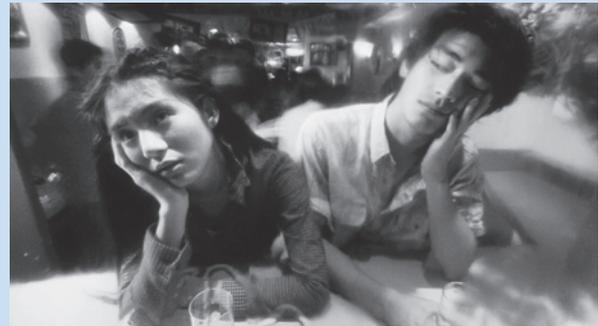
Bad Color, Good Concept

Wong Kar-Wai’s 1995 movie *Fallen Angels* is widely considered to be the most visually bold, original, and groundbreaking of his early films. The deliriously hedonistic, over-the-top visual style of *Fallen Angels*, which was shot by cinematographer Christopher Doyle, was celebrated by critics and audiences alike (Figure 21-3).

“We f***** up with the film stock. It was old,” said Doyle in an interview with Vicente Rodriguez-Ortega (“Zen Palette,” *reverse shot online*, 2004). “We couldn’t reshoot . . . so of course it was foggy in color. We said: ‘maybe this can represent something so let’s pick some other pieces,’ and that’s what we did. Because of a mistake, a certain structure came out of the film. . . . What happened was that we gave it a system, so we made the most important parts of each scene in black-and-white. But that was a solution to the problem, not an original concept. We just appropriated the mistake and made it work.” It not only worked but it also firmly established the Kar-Wai/Doyle team as a force of stylistic innovation in international cinema. Turning your mistakes into cinematic achievement in the edit . . . *that* really is innovative.

Sound Design Saves the Picture

In the bold documentary/narrative hybrid film *Close Up* (1990), Abbas Kiarostami follows the real trial of Hossain Sabzian, a man who posed as the famous Iranian film director Mohsen Makhmalbaf, and ingeniously intercuts this documentary footage with a recreation of the events of the crime—showing how the man gradually insinuated himself into the good graces and home of the unsuspecting Ahankhah family. Sabzian and the family portray themselves in these reenactments. Kiarostami planned all along to have the film culminate with a surprise meeting between Sabzian (the imposter) and the real Makhmalbaf on the day he is released from jail. Like the rest of the film, this scene was shot in a documentary style, but with a telephoto lens, from



■ **Figure 21-3** Christopher Doyle and director Wong turned a mistake into stylistic innovation by artfully integrating footage shot on bad film stock in *Fallen Angels*.



■ **Figure 21-4** A faux microphone malfunction, created in postproduction, allowed Kiarostami to salvage the emotional climax at the end of his film *Close Up*.

a long distance so that the men wouldn’t feel as if they were under a microscope. Each man was wired with a wireless lavalier to pick up his dialogue from a distance as Kiarostami’s film and sound crew follow them, in a trailing van, as they drive from the jailhouse to the home of the Ahankhah family on a small motorcycle (Figure 21-4).

The first moment is shattering. When Sabzian encounters Makhmalbaf outside the jail, he breaks down in tears and embraces his idol, whom he impersonated. But then, as Kiarostami tells it, Makhmalbaf dominated the conversation and it veered into territory that dissipated the intensity and honesty of Sabzian’s moment. Kiarostami felt that his climactic scene was ruined and with it his entire film. This was not a scene that could possibly be reshot, and he felt that he had lost the only possible ending for his movie. Kiarostami says that he went four sleepless

nights wondering how he could salvage his film. Then the solution came to him: creative postproduction sound mixing. Kiarostami created a staticky sound effect as if there was a bad microphone connection, which allowed him to simply cut the sound intermittently whenever he chose. He then inserted the off-screen voices of the ostensible “director” and the “sound man,” from the trailing van, complaining about the bad connection and about the sound coming in and out. The contrived sound equipment

malfunction allowed Kiarostami to preserve what was best about the scene and eliminate what might have destroyed it. It was also a device completely in keeping with the *vérité* style of the movie. In the end the climax remains Sabzian’s moment—utterly moving. *Close Up* went on to establish Kiarostami as one of the foremost directors in the world. The filmmaker himself has said that this is one of his favorite moments in all of his films.

■ WHY WE EDIT I: NARRATIVE ORDER AND EMPHASIS

For my style, for my vision of cinema, editing is not simply one aspect; it is the aspect.

Orson Welles (From “Entretiens avec Orson Welles,” by A. Bazin et al., *Cahiers du Cinéma*, 1958)

As an editor, you decide the meaning the spectator is going to get from the combination of pictures and sounds you give. Film [is not] a film until it is edited and that’s so important you almost don’t see it.

Mathilde Bonnefoy (editor, *Run, Lola, Run*; From *Edge Codes.com: The Art of Motion Picture Editing*, 2004, film directed by A. Shuper)

I love editing. I think I like it more than any other phase of filmmaking. If I wanted to be frivolous, I might say that everything that precedes editing is merely a way of producing film to edit. Editing is the only unique aspect of filmmaking which does not resemble any other art form—a point so important it cannot be overstressed. (I know I’ve already stressed it!) It can make or break a film.

Stanley Kubrick (From *Stanley Kubrick Directs*, by Alexander Walker)

When I was a student, I remember taking an introductory editing class in which the teacher gave seven students exactly the same batch of found footage (which, in fact, consisted of outtakes from several films). Using the outtakes, each student created a film. It was a surprise to the students that the same footage yielded seven very different films; one was even a comedy, while another was edited as a mystery. Now, as a professor, having seen this phenomenon repeated many times, the range of films that can emerge from the very same footage comes as no surprise at all. The differences between all of those student films, made from the same raw materials, were the result of the conceptual plasticity and creative flexibility of the editing process.

The art of telling a story, even a verbal or written story, involves carefully ordering the events of that tale, controlling the unfolding information, and elevating certain dramatic details over other, more utilitarian, details. We, as filmmakers, don’t just objectively show actions; we narrate, which means interpreting the story through the voice of a storyteller. And much of the filmmaker’s voice is located in the domain of the editing process. The primary reason we edit is to tell a particular story in our unique way: to guide the audience to see what we want them to see, to understand what we want them to understand, and at the moment when we want them to see and understand it. And, of course, all of this story manipulation is to get them to feel what we want them to feel.

Although one could write volumes trying to define the art of editing in narrative filmmaking, for the sake of concise definitions we could say that **editing** is the process of selecting,

arranging, and assembling the essential visual and sound elements to tell a unique version of the story of the film.

Editing for Story Order

Here is a simple three-shot sequence:

- a. Sandra drives up to her house and gets out of her car.
- b. Sandra walks to the front door, opens it, and discovers ...
- c. A burglar is in her house stealing her TV!

These three shots (Figure 21-5), put in this order, tell us the story of Sandra, who comes home one day and discovers a burglar in her house. The film is told strictly from Sandra's POV, and because of that, we discover the burglary at the same moment she discovers it. It's a shock to all of us, character and audience, when that front door opens.

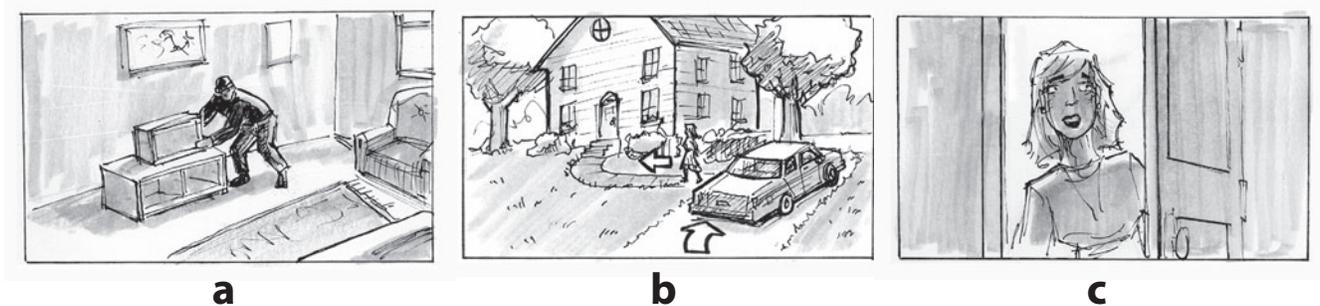
One of the broader and essential creative considerations in the editing process is **story order**: the shot by shot and scene by scene unfolding of the events of the story. The same material can yield very different approaches to the same story when placed in a different order. Let's reedit the preceding sequence by simply rearranging the order of shots (Figure 21-6):

- a. A burglar is in Sandra's house stealing her TV!
- b. Sandra drives up to her house and gets out of her car.
- c. Sandra walks to the front door, opens it, and discovers the burglar.

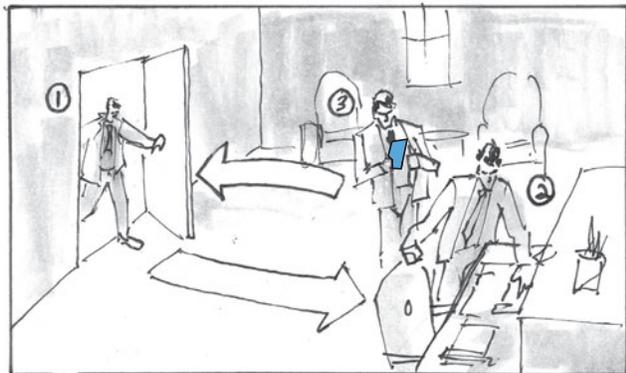
This sequence no longer develops strictly from Sandra's POV. Showing the burglary in progress to the audience, before Sandra herself discovers it, gives the audience more information than Sandra has. And what will the audience do with this information? Well, they will certainly anticipate Sandra stumbling upon the burglary in progress, and we hope that they start to fear for her, to worry about what will happen when she opens that door. This is the essence of suspense: give the audience a little bit more information than the character has so that they anticipate the conflict. Not only has the audience's perspective on the events been completely altered simply by rearranging the same shots, but the emotional effect changes also. In the first sequence the emotional effect is surprise, and in the second it is suspense. Both are powerful, so now the director and editor need to choose which one works best for the story.



■ Figure 21-5



■ Figure 21-6



■ Figure 21-7

Editing for Dramatic Emphasis

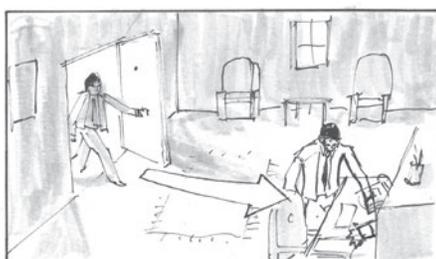
Imagine the inside of an office in someone's home (**Figure 21-7**):

LONG SHOT: A man enters the office and crosses to the desk. Looking for something, he moves stuff around the desktop, knocks a picture frame over, and then opens a drawer and pulls out a letter. He stuffs it into his pocket and leaves.

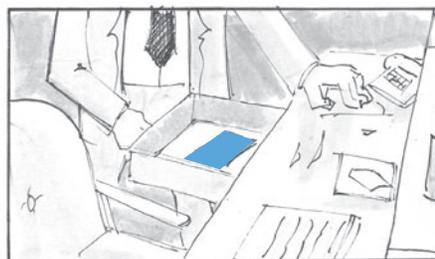
Surely we can present this scene in real time—long shot, from one angle, in one single take, with no edits—much the way we would see it in live theater. Some might say that this would be the most democratic way

to present the scene, allowing the audience to pick and choose what they wanted to look at and when. But now, let's add emphasis by "cutting into" the scene and highlighting certain details. Here's one interpretation of the preceding scene (**Figure 21-8**):

- a. **LONG SHOT:** A man enters the office and crosses to a desk. Looking for something, he moves stuff around the desktop and knocks a picture frame over.
- b. **CUT TO a MEDIUM CLOSE-UP** on the drawer as he opens it, revealing a letter.
- c. **CUT TO a CLOSE-UP** of his face looking at the letter; we can see sweat forming on his anxious brow.
- d. We **CUT** back to the drawer (CU) as his trembling hand enters the frame and takes the letter out.
- e. **CUT** back to our **LONG SHOT**; the man stuffs the letter into his pocket and leaves.



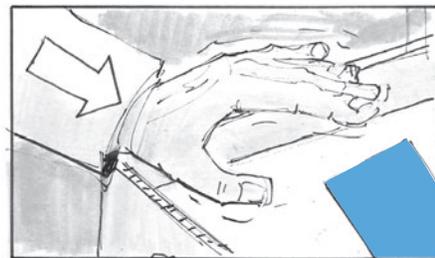
a



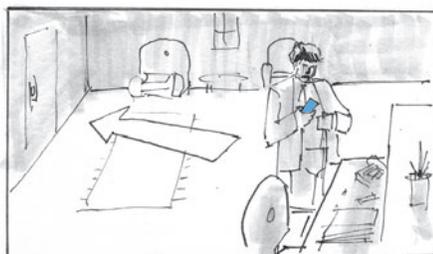
b



c

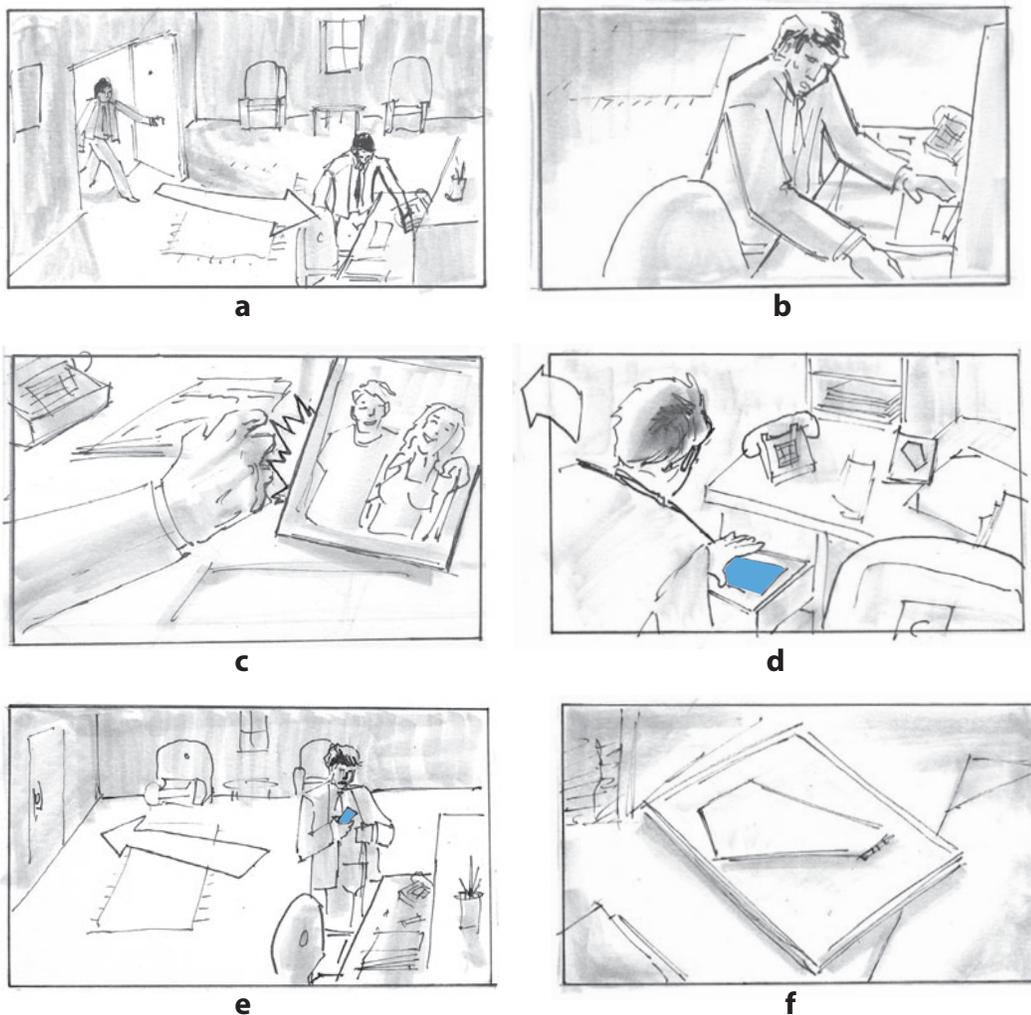


d



e

■ Figure 21-8



■ Figure 21-9

Cutting into the scene with close-ups at just the right moments creates **dramatic emphasis**, a moment of discovery, and turns that letter into a LETTER! In addition, the back to back close-ups of the man’s anxious face and the letter imply a complicated relationship; it may not be explicit, but clearly that letter is of great importance to him, and we’ve already started a mystery. The audience is led to wonder, “What is it with that letter?”

Now, let’s try another interpretation through cutting (**Figure 21-9**):

- a. LONG SHOT: A man enters the office and crosses to a desk.
- b. CUT to a MEDIUM shot as he moves stuff around the desktop, looking for something.
- c. CUT TO a CLOSE-UP of a framed photograph of him and a beautiful woman; he carelessly knocks over the photo.
- d. CUT back to the MEDIUM shot; as he opens the drawer, pulls out a letter, and stuffs it in his pocket.
- d. As he leaves the room we CUT back to the CLOSE-UP (f) of the picture frame, tipped over on its face.

Now the scene is no longer about the letter, it’s about that photo. We’re no longer asking why the man is so anxious about getting that letter; we’re asking what it means that he knocked over the photo. We suspect that it will become a clue—someone will know he was here when they notice the photograph knocked out of place. We might even be wondering who that woman is in the photograph.

Beyond the editing, these interpretations obviously also involve slightly different scene coverage, and this is where shooting and editing are absolutely linked. When shooting a scene we must anticipate what the editor will need to create the particular emphasis we are after. This is why the director and D.P. need to “think like editors” on the set—and editing your own films in the beginning will help you understand, in a practical way, what editors need.

In telling a story, the task of a director is to emphasize what is significant by underemphasizing what is less so. The actor’s performances, the camera’s coverage of the performances and the film editor’s re-construction of these during post-production: all are designed to make certain things more significant than others to an audience.

Alexander Mackendrick (From *On Filmmaking*, 2004)

Although Mackendrick is talking about the larger task of the director as storyteller, there is a significant lesson in this quote for the editing stage. Films rely extensively on editing to create those dramatically elevated moments and details. However, you can’t have dramatic peaks without a few valleys. Most films have moments that must be elevated through expressive or stylized editing to reveal their true dramatic importance, with, say, a well-timed cut to a close-up, or a series of graphically stunning juxtapositions, or energetically disjunctive jump cuts, or whatever visual acrobatics the scene needs. But all narrative films also have many fairly utilitarian passages that just get us from narrative point A to narrative point B, and these should be cut simply and efficiently. And then there are those scenes of enormous dramatic importance that acquire their power *without* the intervention of editing. In these cases, the primary dramatic weight is not necessarily carried by the editing but perhaps instead by the dialogue or the *mise-en-scène*. These scenes, too, are either cut very simply or, in some cases, not edited at all. Keep in mind that *not* cutting is an editorial decision, too, and it can be a powerful one.

Martin Scorsese’s *Raging Bull* (1980) brilliantly illustrates the use of stylized editing, functional editing, and expressive nonediting approaches, all within the same film. Editor Thelma Schoonmaker, a long-time collaborator with Scorsese, won an Academy Award in 1980 for her work on *Raging Bull*, which itself constitutes a complete textbook on editing and sound design.

■ STYLIZED EDITING: “SUGAR RAY ROBINSON, ROUND 13”

Among the great achievements in cinema for editing (and sound design) is the “Sugar Ray Robinson, Round 13” fight scene (Figure 21-10). It stands as a tour de force of rhythm, energy, and raw impact accomplished through editing and sound. This scene is central in the movie because it is more than a boxing match: it is the moment when Jake LaMotta allows Robinson to savagely beat him as an act of contrition and sacrifice for the violence he has visited on the people he loves, namely his wife Vickie and his brother Joey. In planning the scene, Scorsese looked to the famous “shower” murder sequence in Hitchcock’s *Psycho* for inspiration. What he admired about that scene was that “every shot had its own

energy.” Scorsese meticulously storyboarded each and every shot in the fight sequence himself—shot size, movement, and angle. Continuity was not a huge concern for this sequence, as Scorsese said during a filmmaking master class: “I wanted every shot to have enough raw energy that we could edit them in any configuration and it would work.”

Thelma Schoonmaker worked with that visual energy and employed everything from perfectly matched action edits to intentional jump cuts to convey to the audience what it must feel like to be in a ring with a prizefighter who is trying to knock you out. In her hands, time becomes completely elastic; moments are extended by packing in multiple shots between a raised fist and its crushing blow, yet later a flurry of ferocious punches are cut so quickly that they all seem to land on LaMotta’s face within a fraction of a second. Relatively long shots are juxtaposed with images just a few frames long; Schoonmaker duplicates actions and creates jarring edits between radically different angles and different frame rates. Scorsese and Schoonmaker vividly create an altered state in which time itself alternately slows down and abruptly lurches forward. There’s pain, numbness,



■ **Figure 21-10** The speed, power, ferocity, and pain as Jake LaMotta (Robert De Niro) is pummeled by Sugar Ray Robinson (Johnny Barnes) is vividly conveyed through the stylized editing of Thelma Schoonmaker.

power, brutality, and beauty. The walls spin, punches come out of nowhere; what you thought was up is down. This is precisely the feeling they wanted to convey. Strict adherence to rules of continuity and the 180° line would be antithetical to the chaotic, visceral experience of being in the boxing ring getting your head beaten in.

■ **SIMPLE EDITING, SHOT/REVERSE SHOT: “PELHAM PARKWAY, 1950”**

Earlier in the film, after Jake wins the boxing title from Cerdan, his personal life completely falls apart and he succumbs to jealous paranoia about his wife being unfaithful. One scene (Figure 21-11), which begins innocuously with Jake and his brother trying to get a TV to work, carefully traces the workings

of his deluded mind as he falls so deeply into suspicion that he asks his own brother if he’s had sex with his wife. This scene is the beginning of a slow burn sequence that culminates, several scenes later, in a violent rage against those who love Jake the most. Here we recognize the point of the scene through the dialogue, which reveals the tangled logic of a dangerously warped mind. The scene is shot and edited in a simple shot/reverse shot structure—starting wide and moving in tighter as the conversation becomes more intense. It adheres to the principles of continuity, maintaining proper looking direction and angles and never once crossing the line of action. Understanding that the dialogue is doing the heavy lifting in the scene, Thelma Schoonmaker knows that the editing doesn’t need to be acrobatic, despite the tension and



■ **Figure 21-11** The unobtrusive editing in the “Pelham Parkway, 1950” scene supports the tension that is simmering in the dialogue.



■ **Figure 21-12** A good editor also understands when it is more powerful *not* to cut into a scene, as in the “Dade County Stockade” scene (*left*). Editor Thelma Schoonmaker with Martin Scorsese in the editing room (*right*).

simmering violence, and should simply support the rhythms of this disturbing interrogation.

■ UNBROKEN SHOTS: “DADE COUNTY STOCKADE”

Toward the very end of the film, Jake LaMotta’s fall from glory is nearly total. He’s an overweight has-been running a tacky nightclub in Florida. He has no friends and has long alienated anyone who once loved him, most importantly Vickie and Joey. He is picked up by the police for allowing a 14-year-old girl into his nightclub and is thrown into the Dade County stockade. Totally alone, stuck in a cage, Jake hits rock bottom. The realization of what he is and what he’s done overwhelms him and he releases his anger onto himself. Screaming “Why, why, why?” and calling himself “stupid,” he ferociously beats his head and fists against the concrete walls of the jail cell (**Figure 21-12**), inflicting the same physical punishment on himself that he’s inflicted on everyone else throughout the film, whether a boxing opponent or family member. When his anger is spent, he col-

lapses onto the jail cell bed and cries, “I’m not an animal.” In this devastating scene, a man is realizing that he is an animal, like a raging bull, and Robert De Niro’s performance is shattering. The scene lasts for over two minutes and there is only one discrete cut. Knowing that editing would diffuse the power of the scene, Scorsese and Schoonmaker allow the moment to play out, in real time—essentially unbroken. Because the scene is unbroken, the audience becomes not so much viewers but witnesses to this man’s most private and pathetic pain. It’s so uncomfortable for the audience that we want to look away; we’re begging for a cut to show us something else, and we secretly want a little bit of “editing style” as an emotional buffer, reminding us that it’s only a movie. We need anything that could take us away from Jake’s naked misery. But Scorsese and Schoonmaker don’t cut away and they don’t flinch; they keep us right in there, in that cell with Jake as he reaches the nadir of his life. We thought it was tough being in the boxing ring with Jake, with all of those punches coming out of nowhere, but the Dade County stockade proves to be much rougher.

We have already discussed many of the fundamental shooting and editing patterns in Chapters 3 and 4. It might be helpful to review them again in the context of this editing chapter:

- Shots, sequences, and scenes (page 45)
- Juxtaposition and cumulative meaning (page 46)
- Continuity shooting and editing (Chapter 4)
- 180° principle and the 20mm/30° rule (pages 74–76)
- Match action cuts (page 76)
- Shot/reverse shot technique (pages 79–83)
- POV sequences (page 85)
- Moving people through space and elliptical editing (pages 87–90)
- Meeting and chase/follow sequences (page 91)
- Parallel action sequences (including temporal, graphic, and action matches) (page 92)
- Jump cuts and long takes (pages 101–104).

FUNDAMENTAL IMAGE-TO-IMAGE TRANSITIONS

To be sure, there are many ways to get from one shot to another, but in the world of narrative filmmaking, there are really only three bread-and-butter transitions that constitute the vast majority of visual transitions in films throughout history: the cut, the dissolve, and the fade. Sure, there are others transitions, but they're specialty effects that are concocted when the need arises from a special circumstance. But these three—cuts, dissolves, and fades—are the core.

The Cut

For the most part in this chapter and in the previous chapters, we're exploring the function, power, and versatility of the cut, which is the joining of two shots such that the last frame of the first shot is directly spliced to the first frame of the next shot. The visual shift in a cut from one shot to the next is sequential, instantaneous, and complete. First we're looking at a man running out of an apartment . . . CUT; now we're looking at a picture frame on a desk. A direct cut is by far the most commonly used shot-to-shot transition in film, and we have already explored some of the vast spatial, temporal, and narrative associations created by adjoining two images and some of the numerous techniques for making a cut work. This chapter sheds some light on a few additional creative considerations, beyond the formally conventional, for making cuts work expressively in your films.

in practice

One of the most famous cuts in motion picture history is the elliptical edit from Kubrick's *2001: A Space Odyssey* (1968) which cuts from a bone thrown into the air by a man-ape, to an orbiting space satellite. This single cut leaps over millions of years in time, taking us from man's first major evolutionary step, the discovery of "tools" (a bone notably used as a weapon), to our next evolutionary step, where man's consciousness ultimately transcends his powerful tools and is pushed beyond the limits of time, space, and matter. Both evolutionary leaps are precipitated by the unfathomable presence of a black monolith, which is perhaps an alien intelligence, perhaps a deity. This single instantaneous edit seems to imply, by skipping over our entire history, that everything in between these two evolutionary points was comparatively insignificant, amounting simply to the development of more tools with which to conquer nature on earth, in space, and even man's own nature (Figure 21-13).

This is an **intellectual edit**; yes, it moves the story forward, fast forward as it were, but it also invites us to think thematically about why these two particular moments are juxtaposed. Encouraging this deeper connection is the fact that this is a **formal edit**; it is both a **match on action cut** (see page 70) and a **graphic match** (see page 510). The physical similarities between the shape of the bone and the orbiting nuclear-powered satellite make the point that the primitive tool and the sophisticated satellite are fundamentally more similar than they are different. Kubrick does not want us to be awash in emotions in this film; he wants us to put the pieces together, and, in encouraging us to think about the relationship between shots and events of the story, we are also inevitably led to ponder our own place in the universe.



■ **Figure 21-13** Elliptical edit, from Kubrick's *2001: A Space Odyssey* (editor, Ray Lovejoy). This single cut takes us from the "dawn of man" to the end of mankind as we've known it.

The Dissolve

The **dissolve** is a transition in which the first shot gradually disappears (fades out) as the second shot gradually appears (fades in). With a dissolve we see, for a moment, the merging of both images on the screen simultaneously. A dissolve can have any duration the filmmaker needs, from a few frames that overlap to dissolves that occur over many seconds, becoming a prolonged **superimposition** (two images layered over one another) before giving way to the second shot entirely. Because the dissolve holds both images and is a shot-to-shot transition that occurs over time, the audience is invited to think about the deeper relationship between the two shots. Dissolves are often used to imply a temporal shift, or a change in location on a more thematic level. They're also used as a transitional device that implies a character-based psychological motivation for the transition, like moving into a memory, dream, or fantasy. A dissolve is a transition that promises something to the audience. It says, "look at these two images merging, think about it"; the complex associative relationship between these images is developing.

in practice

■ THE DISSOLVE

Anthony Minghella's *The English Patient* (1996) (edited by Walter Murch) is set during the final days of World War II and revolves around the memories of Hungarian Count Almásy, a cartographer, who has been severely burned in a plane crash. Almásy recounts to his attending nurse the story of his complex and tragic involvement with Katherine Clifton. Dissolves are often used to bring us into and out of the flashback sequences, which take place much earlier in North Africa (**Figure 21-14**).

In one flashback scene Almásy and Katherine are stranded in a truck during a fierce sandstorm. As Almásy talks to her, Katherine reaches up and touches the window of the truck, behind which the sandstorm is raging. This image dissolves slowly into the horribly burned face of the "present day" Almásy, bring-

ing us out of the memory. The merging of her hand and his face looks for a moment as if she, a woman who in the present tense is dead, is caressing his face. The dissolve not only brings us back in time, but it intimately and viscerally connects Almásy to his now dead lover. It is as if he, by conjuring her memory, can still feel Katherine's caress, her hand on his face.

Michael Ondaatje, the author of the novel on which the film was based, said of that specific dissolve: "It's a remarkable scene and it suggests so many things, of compassion and forgiveness; all of these things that are there, again, is that emotional result of that technical device that makes it work" (from *Edge Codes.com: The Art of Motion Picture Editing* (2004; directed by A. Shuper)). Once again we hear expressed the interconnection between technology and artistic expression.



■ **Figure 21-14** In Minghella's *The English Patient*, a dissolve merges the images of a dying man (Ralph Fiennes) and his dead lover (Kristin Scott Thomas) so that, for a moment, it appears that past and present are merging in this flashback.

The dissolve can be a powerful transition, but it is frequently abused, especially in the era of digital editing where a simple movement of a mouse can create a dissolve. Any film professor can tell you stories of students whose footage isn't cutting together well and who simply plop a dissolve between every shot, hoping to "smooth out" the rough edges. The effect of using dissolves willy-nilly is to strip them of their expressive potential, which they can retain only through careful and restrained use.

The Fade

The **fade-out** is a slow disappearing of an image into a color, and a **fade-in** is the slow appearing of the image from a color. Most commonly, one sees a fade to (or from) black, and a little less frequently, a fade to (or from) white. Very often a fade-out and fade-in are used back to back as a transition from one image to another. In other words, from the first image we fade to black and then we fade up from black to bring in the second image. Again, the duration of the fades and the black between the images can be short or long, depending on the effect you want. The **fade-out/fade-in** technique is frequently used as a time ellipse or to punctuate a major shift in the dramatic direction of the movie. There is a strong sense of closure after a fade-out, and if followed by a fade-in, the audience feels a sense of a new beginning.



■ THE FADE

Orson Welles' seminal film *Citizen Kane* (1941) tells the fictional life story of the powerful and imposing Charles Foster Kane through the device of a reporter, Mr. Thompson, who is trying to solve the mystery of the last word Kane uttered on his deathbed, "Rosebud." Thompson follows up on numerous leads, hoping to discover the essence of Kane's life, primarily by interviewing anyone who knew Kane personally. In the end, the film compiles an intricate and multifaceted portrait of a man through multiple perspectives. Each source of information is handled as a separate chapter, and Welles often uses fades to delineate these various accounts. For example,

early in the film Thompson tries to interview Susan Alexander Kane, "the second Mrs. Kane." But Miss Alexander is drunk and in no mood to talk. When it's clear that the "Alexander chapter" has yielded everything it can concerning "Rosebud," which is essentially nothing, Welles fades out to black and then fades up on a statue of Walter Parks Thatcher at the Thatcher memorial library, where Thompson is given access to Mr. Thatcher's journals. We then begin a new account of Charles Foster Kane from the perspective of Thatcher's diary, pages 83 to 142 to be precise. The use of this fade-out/fade-in is Welles' way of turning the page, closing off one chapter and opening on the next (Figure 21-15).



■ **Figure 21-15** This fade-out/fade-in from *Citizen Kane* effectively closes off one investigative lead and introduces another "chapter" (Editor, Robert Wise).

■ WHY WE EDIT II: EXTRA-NARRATIVE CONSIDERATIONS

Although we've looked at some of the more systematic approaches to cutting shots and sequences in previous chapters, let's now fill in some of the gaps and add a few more creative considerations that inform editing decisions. Editing for dramatic structure or continuity is only part of the editor's expressive vocabulary. When you listen to professional editors talk, they often use words like "rhythm," "feeling," "pace," and "energy." Great editors and great musicians are a lot alike: great musicians, while thoroughly understanding the formal aspects of their craft (i.e., how to play their instrument, musical scales, harmonic modulation), also play from their gut to "get it right." As jazz great Duke Ellington reminds us, "It don't mean a thing if it ain't got that swing." Well, it's the same with filmmaking, and the editing process is where a movie finds its "swing."

Given that editing is a craft that involves sequencing, action, and movement played out over time, there are limits to what can be illustrated with words and still frames. I have used a lot of examples from films in this section and encourage the reader (the serious student



■ **Figure 21-16** Varda's *Cleo from 5 to 7* is one of a handful of films that play out in real time.



■ **Figure 21-17** The verbal banter is totally banal in this long static shot from Mungiu's *4 Months, 3 Weeks, 2 Days*, yet the dramatic tension is excruciating as we must sit at the table with Otilia (Anamaria Marinca) for a full 11 minutes knowing she is desperately needed elsewhere but cannot leave.

of film) to rent the films and watch these examples play out in time and in the context of the larger story, to really fill out these lessons.

Temporal Editing: Condensing and Expanding Time

Time is an endlessly elastic entity in the hands of a screenwriter, director, and editor. Some films tell a story whose events take place over two hours, in two hours; these are **real-time** films. Other films will take two hours to tell stories that occur over two days, or two years, or two hundred years. Some people call this **reel time** (alluding to a film reel). Look at the example from *2001: A Space Odyssey* (see **Fig. 21-13**): one edit covers 200,000 years!

There are a few notable examples in the history of cinema of entire feature films that play out in real time—Hitchcock's *Rope* (1948), Chantal Akerman's *Jeanne Dielman, 23 Quai du Commerce, 1080 Bruxelles* (1976), Aleksandr Sokurov's *Russian Ark* (2002), and Agnès Varda's *Cleo from 5 to 7* (1961) (**Figure 21-16**), to name a few. But for the most part, these films are exceptions, even within the broader oeuvres of these particular filmmakers. When speaking about examples of real time, it is far more common to see films that follow a one-shot-per-scene pattern. For many filmmakers, like Jim Jarmusch, Abbas Kiarostami, Agnès Varda, Andrei Tarkovsky, Tsai Ming-Liang, and Hou Hsiao-Hsien (to name

only a few), most scenes (short or long) unfold in real time with unedited shots—then it is only the cut from one scene to the next that provides any sort of time ellipsis from one moment to the next. The one-shot-per-scene strategy often requires careful choreography between camera and subjects (especially if both are moving) and can provide a direct connection between the viewer and the actions on the screen because it feels as if there is no third-party intermediary manipulating space, time, or our attention through editing. Cristian Mungiu's 2007 film *4 Months, 3 Weeks, 2 Days* is a brilliant example of the intense intimacy that can be created by this method (**Figure 21-17**).

We decided from the beginning to have, as much as possible, one shot per scene. There are a lot of ways to shoot one shot per scene. Finally, we decided what would serve the story was not to make ourselves visible as authors. We wanted to tell the story so the audience would feel that they witness the emotions of the girls in front of them. [...] We couldn't make any sketches or storyboard because we had to stage everything like in theater. There is no editing, basically. It's important to find the right rhythm of the film and figure out the right place to put the camera for which to capture the scene; this generated the position of the characters.

Cristian Mungiu (From "Q&A: Cristian Mungiu" by P. Z. McGavin, *StopSmiling Online*, 2008)

One primary task of film editing, from larger structural choices to cutting within scenes, is to **compress time** for efficiency's sake, and we've already explored the temporal and spatial economy of elliptical editing (see page 89). However, beyond simple storytelling efficiency (i.e., taking out the unnecessary bits), the elliptical edit can also be used as a



■ **Figure 21-18** In *Syriana*, the six shots of Bob Barnes' (George Clooney) kidnapping are edited with rapid jump cuts to connect the audience to the confusion that Barnes must be experiencing, as well as to the professional efficiency of this brutal act.

strategy to create highly expressive moments. A great example is the abduction scene from Stephen Gaghan's *Syriana* (2005) (edited by Tim Squyres). The scene (**Figure 21-18**) begins with CIA operative Bob Barnes returning to his hotel room, having just been told by another CIA agent that the Prince Nasir Al-Subaai will be kidnapped and killed. While standing at his window, watching for evidence of the pending kidnapping, Barnes is suddenly grabbed from behind by four men who throw him to the ground, tie him up, drag him out of his room, and toss him into the back of a waiting SUV. Barnes was set up. It was he who was the kidnapping target after all. But by whom? Why?

The kidnapping sequence, which in real time would likely take several minutes at least, takes 35 seconds and is accomplished in 18 quick shots. The quickness of the actions and rapid edits reinforces the fact that this was totally unexpected and takes Barnes (and us) completely by surprise. The action is over “in a flash,” certainly before he (or we) can figure out what's going on. Just like Barnes, we're left in a state of breathless confusion about what just happened. The highly elliptical, noncontinuity, rapid cutting also infuses the scene with the “feeling” of the brutal efficiency and the instantaneous change of fortunes on this level of espionage.

In a central scene in Soderbergh's *Traffic* (2000) (edited by Stephen Mirrione), the drug czar's daughter, Caroline (Erika Christensen), and her friends are having a drug party in her living room. This scene uses two different edit transitions to imply the passing of time (**Figure 21-19**). Frequent jump cuts lurch us forward in little, discontinuous bits of time, while slow dissolves give us the feeling that hours and hours are passing while these kids do nothing but drink, snort coke, and engage in mindless banter. The cumulative effect of these two elliptical devices is remarkable because, while the editing does in fact greatly condense time (the scene lasts only 3 minutes and 10 seconds), it “feels” like they, and we,



■ **Figure 21-19** Dissolves (*top*) and jump cuts (*bottom*) are used in this party scene from Soderbergh's *Traffic* to both condense time and convey a sense of drug-induced disorientation.

have been in that living room all night long. In addition, the jump cuts reinforce the partiers' disorientation as a result of their drug-induced state.

Although the majority of temporal editing is done to condense time, editing also has the ability to **expand** or even **suspend time** as well. There are more or less obvious ways to use this technique, depending on how apparent you want the device to be. Rob Reiner's *Misery* (1990) (edited by Robert Leighton) employs a subtle but effective time expansion device that is commonly used to heighten suspense. The famous novelist Paul Sheldon is wheelchair bound and literally imprisoned by the violently unpredictable Annie, his most ardent fan, after she rescues him from a terrible car accident. In one scene, while Annie is away, Paul picks the lock on the door of his room and ventures into the rest of the house to find a way out. He is some distance from his room when he hears Annie's car coming up the driveway.

Paul must not be discovered out of his room or he'll face Annie's wrath, so he races down the hallway to his room, and that action is intercut with Annie walking to the house and up the front stairs (**Figure 21-20**). But each time we cut back to Paul, furiously rolling his wheelchair down the hall, he seems to be getting nowhere; it's taking him forever to get down that short little hallway! Editorially speaking, each time we cut to Paul he is a bit farther back than we left him in the previous shot, so he is in fact traveling over some of the same territory. So not only time but also distance seems to be elongating for Paul, while Annie makes quick progress to the front door of the house. The longer it takes Paul to get down the hallway, the more anxiety the audience feels for him. The editor expands Paul's trip down the hallway, not so much that it's visibly obvious, but just enough that we feel the suspense more intensely, causing us to scream to ourselves, "Go faster, Paul. Go!" Horror, action, and mystery genres thrive on this sort of emotional manipulation, this delicious, suspenseful anxiety.

Overlap editing is one of the more stylistically overt devices for suspending time, and it is often used to punctuate a heightened moment. **Overlap editing** is the obvious repetition of the same moment, action, or gesture several times—sometimes from different camera angles. In Mike Nichols' *The Graduate* (1967) (edited by Sam O'Steen), the recently graduated Benjamin finds himself alone with Mrs. Robinson, an old friend of his parents, in her house. She proceeds to seduce the highly confused Benjamin. When he refuses her advances, she slyly manages to get him into her daughter's bedroom, where she pounces. The moment Mrs. Robinson enters the bedroom, totally naked, and locks the door behind her, Benjamin's head turns in total surprise—not once, not twice, but three complete times



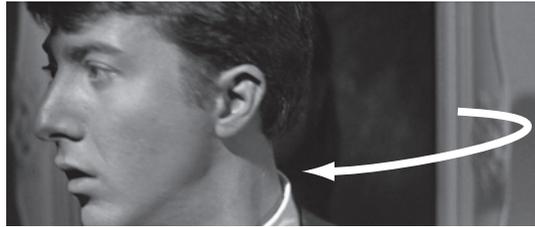
■ **Figure 21-20** The edits in this sequence from Reiner's *Misery* add tension and drama by making it seem that it takes forever for Paul (James Caan) to travel a few feet in his effort to avoid Annie (Kathy Bates).

(**Figure 21-21**). Benjamin's stupefaction at that moment—his shock, confusion, and panic—is brilliantly punctuated by duplicating the gesture and extending the moment of discovery with an overtly stylistic flourish (not to mention that it's funny, too). The continuation of the scene is also wonderfully edited. Benjamin doesn't want to, but he can't help looking at Mrs. Robinson's body, and his attracted-but-reluctant POV is reflected in little rapid close-up insert shots of various parts of her naked body, intercut with his furtive glances (**Figure 21-22**)—which brings us to our next editing consideration: timing, rhythm, and pace.

Timing, Rhythm, and Pace

Timing

Timing refers to the specific placement of a shot within the sequence, meaning the precise moment one cuts to a new shot for maximum impact. Good editors have a sixth sense for timing: it seems to be in their bones; the rest of us experiment—we try an edit here or there and then trim it until it's right. One good example of a sharp, perfectly timed edit is the first moment of death for Charlie Company in Terrence Malick's World War II film *The Thin Red Line* (1998) (edited by Saar Klein), which is edited with absolutely precise timing.



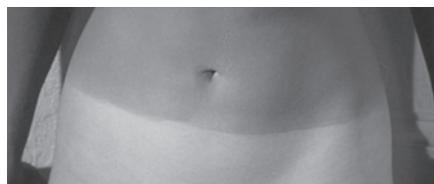
■ **Figure 21-21** In Nichols' *The Graduate*, the moment when Benjamin (Dustin Hoffman) sees Mrs. Robinson (Anne Bancroft) naked is punctuated by three quick shots of him turning his head, edited together.

At 45 minutes into *The Thin Red Line*, Charlie Company has already landed on Guadalcanal and the men have made their way to the front lines, where the Japanese are firmly dug in. Up to this point the company has seen only the aftermath of war during encounters with American soldiers returning from battle but they have suffered no casualties themselves. At the edge of the Japanese fortifications, a Second Lieutenant, on orders from the First Lieutenant, sends the first two soldiers out to press forward and scout. Slowly, carefully, they move toward the heavily armed Japanese bunkers while everyone watches (**Figure 21-23**). Although the audience can feel the apprehension, visually the journey doesn't seem so dangerous—the soldiers travel across a stunningly beautiful hill covered with long, brilliantly green grasses, gently swaying in a soft breeze. Suddenly, seemingly out of the blue—Bap! Bap!—two quick gunshots from the top of the hill, and both men drop. Before they even hit the ground, Malick cuts to the stunned Second Lieutenant and then quickly to the stunned First Lieutenant. They blink hard, staring in disbelief, trying to comprehend what just happened, in a flash—Bap! Bap!—just like that, two men dead. Is that possible? That swiftly, that easily, life is gone? We, too, like the First and Second Lieutenants, are stunned and disbelieving. Malick's strategy, not to linger on the deaths but to rapidly show the witnesses who are just as shocked as we are, compels us to ask the same questions they must be asking. The environment seemed so beautiful and quiet—how can death be so close? The precision of the editing, just a few quick cuts, constructs a huge existential moment from very little and dramatically understated material.

Verbal and visual timing are, of course, essential for comedy, too. A genuinely funny joke will elicit only a polite chuckle if the punch line isn't delivered with just the right timing—trust me on this one: I know! On the other hand, something decidedly silly can have people rolling on the floor in hysterical laughter, if the delivery is sharp. It's the same with editing a film that hopes to provoke laughter, and in comedy everything is secondary to making people laugh. The comic timing in Bobby and Peter Farrelly's 1998

comedy *There's Something about Mary* (edited by Christopher Greenbury) is flawless. One editing tactic the Farrelly Brothers frequently use is to allude to something off screen but not reveal it until the moment is just right.

Early in the film, when teenage Ted is getting ready to take his dream girl to the prom, he goes to the bathroom to relieve himself. As he does so, he glances out the window at a pair of cooing doves—the perfect image for how he feels, but when the doves fly away they reveal a half-naked Mary, with her mother, at her bedroom window getting dressed. They naturally assume Ted is a peeping tom, and in his haste to get out and explain himself, he zips up too quickly and, well, gets his “frank and beans” mangled in his zipper. A



■ **Figure 21-22** The rapid intercutting between Mrs. Robinson's naked body parts and Benjamin's stare in *The Graduate* mimic his inability to keep his eyes off her even though he doesn't want to look.

few scenes later, the bathroom is filled with Mary’s parents, a police officer, and a fireman, all staring at his zipper predicament. The cop decides to resolve the situation and approaches to unzip his fly to free him from the zipper’s teeth. He tells Ted it’ll be “just like taking off a Band-Aid” (Figure 21-24). Below the frame line, the cop takes hold of the zipper and counts “A-one, and a-two, and a-...” Just then, they cut to a close-up of a person we’ve never seen before—now outside. Huh? And the person screams, “We’ve got a bleeder!” The next quick cut is a wide shot. Poor Ted is on a stretcher, a towel covering his wound, and the entire neighborhood is watching as he’s rushed into a waiting ambulance by the EMTs. All of the audience’s anxiety, built up while anticipating the pain of the cop’s brutal action, is funneled through those two quick edits into the punch line of the joke. We feel the pain, understand the bloody aftermath, and laugh, all at the same time. At the conclusion of Ted’s tragic and traumatic prom night, as the ambulance takes him to the hospital, he starts to cry and the Farrellys cut to ... years later, a scene in which adult Ted is on a therapist’s couch. Again, a sharp edit efficiently and comically tells us that he’s still suffering the psychic wounds of that fateful night at Mary’s house.

Rhythm

Rhythm within a sequence refers to the duration of the shots relative to each other, and the patterns of emphasis, or pulses, these durations create. If you consider an edited shot as a pulse or a beat, like a musical beat, then you will be able to manipulate the duration of these image “beats” to create regular, irregular, or syncopated visual rhythms. For example, if you were to edit a sequence such that every shot was exactly 24 frames, then the sequence would have a constant rhythmic beat, as if it were cut to a metronome, and each image would have equal weight in the sequence. Cutting a sequence of shots that are all 48 frames long would obviously be slower and longer, but it would also have a very even rhythm. If, however, you were to cut your film in a pattern in which three shots had 12 frames and the fourth shot had 48 frames, and repeated this twice, you would get a visual rhythm in which there was a strong accent on the fourth and eighth shots, not unlike the opening of Beethoven’s Fifth Symphony (da, da, da, duummm/da, da, da, duummmm).

Obviously, finding a cutting rhythm is much more organic than arbitrarily imposing frame counts to edited shots. The visual cutting strategy of a sequence can find the drive for its rhythm in a number of places, especially action within the frame, camera movement, dialogue rhythms, or beats in the music sound track. The opening sequence in Fernando Meirelles and Kátia Lund’s film *City of God* (2002) (edited by Daniel Rezende) intercuts between two scenes with contrasting visual rhythms. The very first scene plunges the audience into the sounds, colors, people, food, music, and dangers of the favelas of Rio



■ **Figure 21-23** The rapid cutting, from the falling soldiers to their stunned commanding officers, reflects the fragility of life in a war situation in Malick’s *The Thin Red Line*.



■ **Figure 21-24** The careful timing of the edits in this scene from the Farrelly Brothers’ *There’s Something About Mary* creates a terrific punch line to a painfully funny situation.



■ **Figure 21-25** A clever POV sequence serves as a metaphor for the violence found in the favelas of Meirelles and Lund's *City of God*.

de Janeiro. A street party is in progress with food being prepared and music playing. The sequence is put together with familiar editing patterns. For example, there is a POV sequence involving a tied up chicken; the chicken looks (looking shot) and sees a knife cutting the throat of another chicken (POV shot), and when we cut back to the chicken (reaction shot) we see panic in his eyes (thank you, Mr. Kuleshov) (**Figure 21-25**). The chicken then tries to pull free of his bindings (cause and effect). Once the chicken is free, a chase sequence ensues, with gun-wielding kids trying to kill the frantic chicken in the alleys of the favela (**Figure 21-26**).

However, while the basic patterns are familiar, the editing (and camerawork) does not strictly adhere to the rules of continuity. Through rapid cutting, combined with dynamic visual discontinuity and percussive jump cuts, the editor creates a visual equivalent for the driving and syncopated Brazilian Batucada rhythms that play on the sound track. By varying the length of shots, which creates surprising accents throughout the scene, the cutting assiduously avoids a constant rhythm. Instead, the cuts create a complex syncopated visual rhythm that instantly holds the audience through its momentum and visual audacity. The propulsive energy of the scene would be destroyed by smooth, continuity style cuts, perfect matches on action, strict adherence to the 180° rule, and editing that was too metrically regular. When you watch this sequence, you can turn off the sound track and still dance to it!



■ **Figure 21-26** The jarring editing style and lapses in continuity augment the energetic introduction of the street gangs in *City of God*.

During the dynamically rhythmic chicken chase scene, the film cuts to Buscapé, the level-headed protagonist of the film, who is casually walking and talking with a friend (Figure 21-27). Buscapé has a calm, thoughtful, and sensible demeanor (and no gun). The editing abruptly stops and yields to a long, steady shot that reveals this shift in character energy. Within the first minutes of the movie, we “feel,” through the shift in editing rhythm, the contrast between Buscapé and the activity of the streets around him—which is one essential dimension of the conflict driving the film.



■ **Figure 21-27** Buscapé’s (Alexandre Rodrigues) introduction in *City of God* is marked by a shift in editing and cinematographic styles, immediately establishing him as a level-headed, decent character.

Pace

Pace (also called **tempo**) is, of course, related to rhythm, in that it is determined by the duration of shots next to other shots, but pace refers specifically to the rate of speed that a scene, or sequence of scenes, plays out. A **fast-paced** editing approach can suggest intensity, excitement, energy, or even confusion or chaos, depending on the narrative context. **Slowly paced** editing can lend a feeling of casualness, fluidity, calm, contemplation, or even torpor or stasis to a movie, again depending on the story.

The storyline of a film often suggests an overall pace, or tempo, and is an important consideration that can be incorporated right up in the scripting stage by carefully controlling the length of scenes on the page. Overall tempo is then carried through in the production phase by controlling the length of shots, number of shots, and camera movements, and then is finally realized in the editing room. However, very few films strictly maintain a single pace from beginning to end. Contrasting the pace of scenes is an important tool for creating narrative emphasis and a general sense for overall story shape.

Thomas McCarthy’s film *The Station Agent* (2003) (edited by Tom McArdle) is about Finbar McBride, a dwarf who inherits a pathetic little plot of land in New Jersey and simply wants to live his life in calm solitude doing what he loves the most, train watching (Figure 21-28 left). The pace of this film is broad, calm, and contemplative; Finbar is in no hurry, so neither is the editing pace. However, as Finbar becomes reluctantly involved in the dramatic personal lives of his neighbors, he is eventually forced to confront that which he sought to escape—his own loneliness. In one extraordinary scene (Figure 21-28 right), Finbar becomes drunk in a bar, and the suppressed anger and frustration he’s been holding suddenly erupts and this normally quiet and reserved man becomes publicly confrontational. To emphasize this profoundly disquieting moment, the editing pace accelerates and the length of each cut decreases.



■ **Figure 21-28** The leisurely pace of McCarthy’s *The Station Agent* is exemplified by this 30-second shot of the main characters watching a train roll along (left). But a change in the pace of the cutting effectively foreshadows Finbar’s (Peter Dinklage) outburst in this scene of emotional crisis.

Associative Editing

Associative edits are cuts that are designed to build additional meaning by juxtaposing two shots together with a stylized technique that encourages the audience to *think* about the connection. Broadly speaking, associative editing works by comparing or contrasting the content of the shots to create an association that is not contained in the individual shots. The connective content can be either the **formal/graphic** compositional elements of the frame (e.g., color, shape, and movement) or the **thematic/metaphoric** elements (based on actions and other visual detail), and these properties provide a link between shots that don't otherwise have an immediate, direct, or obvious narrative connection. We have already explored this phenomenon of creating an association between two juxtaposed images in its most basic form, with the examples from Kuleshov and Lucas (see pages 46–48). But there can be more overt and complex connections created through associative editing; these encourage the audience to think instead of merely responding emotionally, which is why this technique is also referred to as **intellectual editing**. Again, we saw a classic example of this technique in our discussion of *2001: A Space Odyssey*. In the cut shown in [Fig. 21-13](#), Kubrick used a strong **formal/graphic edit** (on shape and movement) to forge a metaphoric connection between a bone and an orbiting satellite.

In *Natural Born Killers* (1994), Oliver Stone and editors Brian Berdan and Hank Corwin use extremely fast, disjunctive, highly associative editing and wildly stylized camerawork to depict the vicious anarchy of Mickey and Mallory's killing sprees. In several episodes, Stone cuts in (or projects right onto the scene) images of horses, snakes, spiders, and rabbits that do not come from the world of the film but are inserted to create metaphoric visual links that force us to consider the murderous brutality of Mickey and Mallory in the context of predator and prey and the cruel laws of nature ([Figure 21-29](#)). Where does the ability to kill come from? Is it natural or is it a by-product of our particularly violent culture? These questions are posed relentlessly through associative editing. Are Mickey and Mallory natural born killers, as the title suggests? Or have they been shaped by a violent upbringing and a sick society? Stylized devices like this never allow the audience to become entirely taken in by the fictive world; we are consistently reminded that we are watching a movie, a construction, an artifice from which we are deriving a perverse, prurient pleasure through a narrative of mass murder and mayhem. Hey, that's entertainment, no? This self-reflectivity is nowhere more apparent than at the end of the film, when Stone creates a didactic



■ **Figure 21-29** The violent journey of Mickey (Woody Harrelson) and Mallory (Juliette Lewis) in Stone's *Natural Born Killers* is punctuated with documentary images from the natural world.



■ **Figure 21-30** Oliver Stone juxtaposes the fictional world of Mickey and Mallory with real news events to illustrate his central theme concerning the American public's insatiable appetite for violence as entertainment.

juxtaposition by cutting from the movie's final fictional events to true news events, such as the O.J. Simpson trial (**Figure 21-30**).

Intellectual editing is a product of early Soviet filmmakers and their rigorous writings on, and uses of, an editing theory that has been labeled "Soviet montage." Soviet montage eschewed the smooth, invisible Hollywood style of continuity editing, which historically had been primarily about facilitating the dramatic goals of the story, for a more intellectually engaging, overtly visible and political style. Associative editing, like many Soviet montage techniques, is meant to call attention to itself as a device. Consequently, the audience is encouraged to thoughtfully participate in the construction of the film's meaning. The early Soviet filmmakers, like Vertov, Eisenstein, and Pudovkin, who each developed their own theories of montage, had a profound influence on the art of editing in general and on specific filmmakers, including Welles, Hitchcock, Godard, Kubrick, Scorsese, and Coppola, to name only a few. At this point in cinema history, the editing theories and practices of Soviet montage, Hollywood editing, French New Wave styles, Hong Kong cinema, and the rest of the cumulative history of national and individual editing approaches have merged into one big, global aesthetic, cinema toolbox, available and accessible to any filmmaker, for any project, anywhere on the planet.

in practice

■ **EDITING AND DEVELOPING CHARACTER**

In his book *Making Movies* (1995), director Sidney Lumet says about editing, "To me there are two main elements to editing: juxtapositioning images and creating tempo." He then goes on to talk about how his careful control over editing tempo was used for narrative emphasis and characterization in his classic film *Long Day's Journey into Night* (1962) (**Figure-21-31**):

On Long Day's Journey into Night, I found that I could use editing tempos to reinforce character. I always shot Katherine Hepburn in long, sustained takes, so that in editing, the legato feel of her scenes would help us drift into her narcotized world. We would move with her, into her past and into her own journey into night. Jason Robard's character was edited

in exactly the opposite way. As the picture went on, I tried to cut his scenes in a staccato rhythm. I wanted him to feel erratic, disjointed, uncoordinated.

(From *Making Movies*, by S. Lumet, 1995)

Another good example of how editing rhythm aids in the development of character is in Jason Reitman's 2009 film *Up in the Air*. The central character, Ryan Bingham (George Clooney), spends much of his time flying from city to city. He's an experienced frequent flier; suitcases, airports, security gates, and bonus miles constitute a large part of his life. As Ryan himself puts it, "To know me is to fly with me; this is where I live." In an early sequence, in the introduction to Ryan's character, Reitman and editor Dana Glauberman unfurl a brief 1 minute and 15 second montage of Ryan packing his suitcase, arriving at



■ **Figure 21-31** In Lumet's *Long Day's Journey into Night*, the characterization of Mary (Katherine Hepburn) and Jamie (Jason Robards) is reinforced through editing tempo.

an airport, and going through security check. This sequence is cut together with quick, dynamic, elliptical edits showcasing Ryan's consummate skills in luggage packing and negotiating airport security protocol. His movements have the sophisticated timing, balance, precision, and master technique of a samurai. And just as there is nothing extraneous in Ryan's movements or method, the cutting is accurate,

efficient, and economical, in both the shot selection and duration. At the end of the montage, in no small part because of the editing style as well as shot content, we are in awe of his skill; when it comes to navigating a business trip, he's the best—the Michael Jordan of airport check-in (**Figure 21-32**) (see also the "Montage" box).

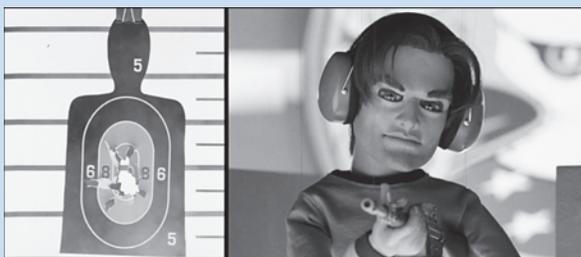


■ **Figure 21-32** In *Up in the Air* Ryan Bingham's expertise at packing and airport check-in is highlighted through sharp, highly dynamic editing.

■ MONTAGE

“Montage” is one of the more slippery terms in filmmaking. When speaking of (1) **Soviet montage**, the term refers to the various theories of the early Soviet filmmakers concerning a style of editing that was, by and large, a noncontinuity method that juxtaposed images to suggest ideas that are not obviously present in each individual shot. In French, (2) **montage** means “editing.” To edit a film is *faire le montage*. Often in English, you will also come across the term used simply as a synonym for editing in general. In the parlance of traditional American film, a (3) **montage sequence** refers to a sequence that greatly condenses time, space, or narrative activity through broad elliptical editing as a way of quickly getting from one point in the story to another. We’re all familiar with *Rocky*-type montages that collapse time and highlight only key moments in the long development of, say, a mediocre boxer training to become a prizefighter. We saw a similar elliptical montage in the example from *Up in the Air* (see Fig. 21-32). Trey Parker and Matt Stone playfully spoof this sort of montage sequence in the “Montage Song” sequence from their film *Team America: World Police* (2004) (Figure 21-33).

A great example of the temporal flexibility of editing can be seen in the brief “falling off the train” montage from Danny Boyle and Loveleen Tandan’s *Slumdog Millionaire* (2008) which was edited by Chris Dickens. This sequence begins with the brothers Jamal and Salim (each around 6–8 years old), who are traveling through India atop trains, trying to steal food. While Salim holds Jamal by the ankles, dangling him over the side of the train, Jamal grabs



■ **Figure 21-33** Parker and Stone parody a common cinematic device, the montage sequence, in *Team America: World Police*.

food through the train window. Unfortunately, they are caught and are both pulled off the moving train. A series of quick edits trace their plunge down the dusty embankment. When they finally hit the bottom and, dazed from the fall, sit upright, the brothers are now teenagers. This little montage, edited to feel like one continuous fall and tumble from the train, in fact is an elliptical device moving us years forward. This sequence also informs us that these boys have spent all this time riding and hustling on the trains of India, until now, in their teen years, when they begin a new hustle at the Taj Mahal (Figure 21-34).



■ **Figure 21-34** This montage from *Slumdog Millionaire* transforms young Salim (Azharuddin Mohammed Ismail) and young Jamal (Ayush Mahesh Khedekar) into teenage Salim (Ashutosh Lobo Gajiwala) and teenage Jamal (Tanay Chheda) during what appears to be one continuous fall down a train track embankment.

Emotion

We started this chapter by talking about cutting to tell a story, but a story without emotion is lifeless. Notice how in many of the examples we have discussed, the word “feel” is used. Many editors believe that the first consideration of an editing strategy, and indeed the motivation for individual edits, is emotion—how you want the audience to feel at any

given moment. Do you want them to laugh? Worry? Jump in their seat? Do you want them to feel an impending doom, or a sense of relief? Do you want them to feel what your protagonist is feeling? Emotion is aroused in the audience when they become participants in the drama. The editing principle for the Robinson fight sequence from *Raging Bull* (see [Fig. 21-10](#)) was not to be stylistic for its own sake, but to make the audience feel what it's like to be in a boxing ring, to feel the surreal malleability of time as your adrenaline surges, to feel the powerful blows from a prizefighter. The Farrelly Brothers also want us to feel pain in *There's Something about Mary* (see [Fig. 21-24](#))—the pain of catching your “frank and beans” in a zipper; but they also want to make us howl with laughter as we simultaneously grimace in pain; Rob Reiner, in *Misery* (see [Fig. 21-20](#)), wants us to feel anxiety that our hero will not make it to the room in time—and so on.

Never forget that we are telling a story to move people emotionally in very particular ways. So the next time you're watching a movie and have an emotional reaction, pull yourself out of the filmmaker's spell and try to figure out how they did that. Try to recall, cut for cut, how the filmmaker drew that emotion out of you. If you can do that, then you'll *really* be learning how to make movies.

So of course there are basic rules. But even today, people are struggling with new ways of telling stories through film, and they're still using the same old tools—establishing shots, medium shots, close-ups—but not necessarily with the same intent. And it's the juxtaposition of these shots in the editing process that is creating new emotions or, more precisely, a new way to communicate certain feelings to the audience.

Martin Scorsese (From *Moviemakers' Master Class*, by L. Tirard, 2002)

The Sound Design in Film

*We gestate in Sound, and are born into Sight
Cinema gestated in Sight, and was born into Sound*

Walter Murch (From the Forward to *Audio-Vision*, by M. Chion, 1994)

Sound is almost like a drug. It's so pure that when it goes in your ears, it instantly does something to you.

David Lynch (From "David Lynch's Musical Magic" by E. Morgan,
The Guardian, 2012)

Roughly, the first 33 years of film's early history—between the introduction of Edison's kinetoscope in 1894 and the commercial success of Warner Brothers' *The Jazz Singer* in 1927—established the "motion picture" as a fundamentally visual art form, with images telling the entire narrative. In those early decades, before the introduction of "talking pictures," the movies themselves were silent and sound was incorporated almost exclusively in the form of live musical accompaniment played during the screenings, long after the production of the motion picture. Even though it's been roughly 80 years since *The Jazz Singer* transformed film production into an art form with multiple layers of synchronized audio, filmmaking is all too often still considered (and taught) as a primarily visual storytelling form—with sound as a sort of addendum. However, as Walter Murch, Michel Chion, David Lynch, Randy Thom, and others have so eloquently expressed, the filmmaker's art has evolved to the point where the aural dimension of a movie is at least as important as, and sometimes even more dominant than, the picture for creating tone, mood, and meaning. For too many filmmakers, the audio component remains at one of two poles; for some it plays a purely supporting role as an auxiliary to the image, an accompaniment (often redundant) to the story being told through the visual action, and others shackle it to the hard labor of expository dialogue that explains the film story in the absence of truly expressive imagery. Because of its powerful dramatic potential, you should consider sound as a costar of your movie, capable of much more than expository drudgery—capable, in fact, of profound and nuanced narrative eloquence. The filmmaker who learns to harness the power of a film's aural realm and fully develops sound as an essential storytelling component that enhances, but does not duplicate, the visual dimension of a movie will have vastly more opportunity and territory for creative expression. This requires imagining and incorporating aural story elements from the earliest scriptwriting stages straight through to postproduction. It's unfortunate that all too often, filmmakers think about sound only after the shooting is done.

Sound is fifty percent of a film, at least. [...] It's the thing that can add so much emotion to a film. It's a thing that can add all the mood and create a larger world. It sets the tone and it moves things. Sound is a great "pull" into a different world. And it has to work with the picture – but without it you've lost half the film.

David Lynch (From *Soundscape*, by L. Sider, D. Freeman, and J. Sider (eds), 2003)

■ SOUND DESIGN OVERVIEW

The final form of a movie's total aural impression is called the film's **sound design**. A film's sound design consists of layering multiple tracks of sound, anywhere from two tracks to over a dozen. The creative manipulation, placement, layering, enhancing, composing,

juxtaposing, and mixing of these audio tracks is done in the postproduction stage. It is important to understand that in film production visual and aural components remain separate for as long as possible to allow for maximum creative manipulation, right up to the very end of the filmmaking process, when the movie (picture) and all sound tracks are locked together and prepared for distribution. For this reason, we gather and lay down the elements of the sound design, each separate and distinct from the others. For example, as we construct our movie in postproduction we may have three separate audio tracks for our sync sound dialogue, a fourth track for the music, a fifth track for sound effects, and a sixth track for ambient sound. Taken as a whole, all of these audio tracks and the way they are mixed together comprise the sound design (see **Fig. 15-1**).

Whether you are cutting to only a single music track or layering 15 tracks of audio, there is virtually no end to the contributions a well-crafted sound design can bring to a film. Sound can establish a tone or mood with unmatched nuance, and it can vividly establish the credibility and emotional impression of a location. Sound can contribute to establishing a character's point of view even to the point of reflecting their particular psychology. Sound is able to bring dramatic emphasis to actions or details inside or outside of the frame; in fact, sound can create an entire world off screen (how many times have we seen characters reacting to the sound of a terrible car crash just outside the frame's edge?). In short, sound is an essential cinematic storytelling component that deserves considerable attention throughout all phases of the film production process.

■ SOUND DESIGN I: SOUNDS, SYNC, AND SOURCE

In closely exploring or devising the sound design of a motion picture, we need to consider three closely related aspects of the movie's sonic world: (1) What kinds of sounds make up the sound design? (2) Is the sound synchronous (in sync) with the picture or not? (3) Where are those sounds emanating from, or where is the source?

Movie Sounds: Speech, Sound Effects, Ambience, and Music

The sound components of a film, the aural elements of the sound design, can pretty much be organized into four broad categories: **speech**, **sound effects**, **ambience**, and **music**. These sounds constitute the way a film aurally communicates to an audience, but not every scene within a film will have all three types of sound. For example, many scenes are edited to music without any dialogue or sound effects at all, while other scenes may have dialogue and ambience, but no music. Many short films tell their stories without the use of the human voice at all, either as dialogue or voice-over. One of the most famous examples is Roman Polanski's celebrated short, *Two Men and a Wardrobe* (1958), which is a complex social satire about two men who are ostracized from "civilized" society

because they carry a huge wardrobe around with them. This 14-minute short film, which garnered prizes all over the world, has no dialogue or voice-over whatsoever. The sound design consists only of a music track and a few sound effects (**Figure 22-1**). Not using dialogue isn't something that only occurs in short films; there are many feature films with extended periods in which there is no dialogue, for example: Luc Besson's post-apocalyptic *Le Dernier Combat* (1983), which has no dialogue at all; the opening 20 minutes of *There Will Be Blood* (2007); and the famous 30-minute heist scene in *Rififi* (1955); and, of course, the core story concept of Michel Hazanavicius' 2012 film *The Artist* requires that the film introduce sync dialogue only in the very last scene, and sound effects only in a few specific scenes toward the end (see box on page 519).



■ **Figure 22-1** A scene from Polanski's renowned short film *Two Men and a Wardrobe*, which includes no dialogue or voice-over.

It is also not uncommon to find narrative films, even feature films, that do not have any music at all. A good example is

the Romanian film *4 Months, 3 Weeks, 2 Days* (2007) by Cristian Mungiu. The power of this film comes from its strict adherence to realism, without emotional broadcasting or editorializing. The addition of music, even just once, would undercut the brutal honesty and integrity of its tone and therefore the audience's direct connection to the situation (Figure 22-2). Many filmmakers, especially those working in a more realist mode, like Abbas Kiarostami (*Taste of Cherry*) and the Dardenne Brothers (*Rosetta*, *Kid With a Bike*), assiduously avoid the overt infusion of emotion that music supplies.



■ **Figure 22-2** The powerful realism of Mungiu's *4 Months, 3 Weeks, 2 Days* would be subverted by the inclusion of a musical score.

Ambience (or background sounds) is perhaps the most ubiquitous sound in a conventional sound design. It's very rare that you'll find a scene in which there are no background noises (unless, of course, all natural sounds are replaced by a music track). The utter absence of ambience creates a true silence that is very noticeable and artificial to an audience which, unless justified by the narrative, can feel like a technical error—like the speakers got disconnected. As I mention at the beginning of Chapter 15, Stanley Kubrick uses total silence during the death of Dr. Poole in outer space because he's astutely aware that there can be no sound at all in outer space—so the deep silence is, in fact, motivated.

The general categories of speech, sound effects, ambience, and music can obviously be broken down into more detailed categories, but first let's look at the question of sync and source that also informs the more specific elements of a sound design.

Synchronous, Nonsynchronous, and Postsynchronous Audio

The second consideration for sound is whether the audio as it is realized in the sound design is **in sync** with the picture or not, in which case it is called **nonsync audio** (or **asynchronous sound**). Sync audio has a frame-accurate, direct correspondence with the image and appears to be generated from what we are watching, like a character speaking lines of dialogue or the sound that accompanies the image of a car starting up and driving off. Sync sound that is recorded on location and in sync with the image (for example, the car image and the sound of the car engine turning over) is called **direct sound**. As we explored in Chapter 15, if we're not happy with the quality of the sync sound (perhaps the camera framing didn't allow us to position our mics for optimum sound), we can always get another, better recording in the field, of a car starting and pulling away without the camera rolling, as **wild sound**. In the postproduction world, sound effects recorded on location are called **production sound effects**. This sound is recorded nonsync, but it will be aligned to appear in sync later in postproduction. But perhaps in building our sound design we don't like *either* car sound from the field recordings. Well, we can easily replace it with a "car starting and driving away" sound from a **prerecorded sound effects** library; such libraries are found on CDs or through online sound effect resources. In this case, the sound will also be aligned with the image in postproduction (i.e., just as the key is turned in the ignition). Both the PFX and prerecorded effects are called **postsynchronous** sound effects because their synchronous relationship to the picture is accomplished in postproduction rather than in the shooting.

Nonsync audio (either speech, sound effects, or music) is sound that has no corresponding image and so has no visible sync source. For example, just as the car drives off screen, we hear the sound of a car crash. Nonsync audio always carries with it the question: Where is this sound coming from? Because there is no visible source, nonsync sound is often used to create a sense for the area outside of the camera's field of view (as in the car crash example) or to layer an additional emotional tone over the image. In the climactic scene in the 2008 vampire film *Let the Right One In*, director Tomas Alfredson plunges the camera (and therefore the viewer) underwater with the central character Oskar as he is being drowned by a bully (Figure 22-3). A moment later, we hear wild screeching,



■ **Figure 22-3** Alfredson's *Let the Right One In* uses off-screen sound to provoke us to imagine the horrific carnage we're missing while the camera keeps us submerged underwater.

thuds, and screaming, indicating that terrible violence is being wrought just above the water, off screen. It is not until later, when we come out of the water, that we fully understand that Oskar was saved by his friend who unleashed horrific carnage while he and we were underwater.

Source

The question of the source of a sound has a profound interrelationship with all categories of sound. The film theorist Michel Chion makes the astute observation in his book, *Audio-Vision*, that in film, all images are contained within the frame. But sound, the aural

universe of the film, has no such “container,” no such strictly delineated limits. Not only are we free to layer as many sounds as we want on top of other sounds, but we can also have various rationales for where those sounds are ostensibly coming from. As we just mentioned, sounds can emanate from **on screen** (a source within the frame) or from **off screen** (a source outside the frame). In addition, sounds can have different relationships to the fictive world that the film has created. In film theory terms, the world of the film—consisting of the characters, actions, objects, locations, time, and story—is called the film's **diegesis**. A sound track can have sounds that seem to come from the world of the movie, called **diegetic sound**, and it can have **nondiegetic sounds**, which don't emanate from any source within the world of the film. These are supplementary sounds, like music, included by the filmmaker to add further emotional or narrative dimensions.

Examples of diegetic sound would be the dialogue spoken by a character, music playing on a radio that is visible in the scene, or the sound of a car crash that our characters respond to, whether it is on screen or not. All of these sounds come from the world of the movie and can be heard by the characters in the film. Nondiegetic sound, on the other hand, would include the voice of a narrator commenting on a scene we are watching, music that has no source in the world of the film (like the romantic orchestral music that swells when two characters kiss), or the sound of a car crash just as an infatuated boy says something stupid to the girl he's trying to win. There is no literal car crash in the world of the film, neither the boy nor the girl hears this sound, but the filmmaker is making a sound metaphor for the boy's crash-and-burn attempt to get the girl.

■ SOUND DESIGN GAMES I: HIGH ANXIETY

Off screen, on screen, diegetic, nondiegetic—these terms may sound theoretical, but their application is simple and evident in practically every film you see. Mel Brooks even found a way to play to the audience's expectations concerning diegetic and nondiegetic sounds for laughs. In his 1977 comedy *High Anxiety*, which is a hilarious spoof of Alfred Hitchcock thrillers, Dr. Richard H. Thorndyke is the new chief administrator for the prestigious “Psychoneurotic Institute for the Very, Very Nervous.” But Dr. Thorndyke quickly discovers that there are some *very* sinister goings-on at the hospital. On his first day, as he is being driven from the airport to the institute, his

chauffer Brophy announces that the sudden demise of the previous chief administrator was “highly suspicious!” True to the genre conventions, ominous orchestral music (nondiegetic music) punctuates this portentous revelation.

As soon as the music kicks in, Dr. Thorndyke and Brophy start looking around. The audience wonders: What are they looking for? And at that moment a bus carrying the entire Los Angeles Philharmonic passes their car, playing the very ominous orchestral music that we (and they) are hearing. In one moment, the music that we assumed was simply the musical score becomes diegetic music coming from just outside their car (**Figure 22-4**).



■ **Figure 22-4** Mel Brooks pokes fun at cinematic conventions by exposing the “true source” of the ominous music that underscores this scene from *High Anxiety*.



■ SOUND DESIGN GAMES II: THE ARTIST

Tracing the precipitous and heartbreaking fall from stardom of silent movie icon during Hollywood’s transition into “talkies,” the core premise of Michel Hazanavicius’ film *The Artist* (2011) revolves around the very concept of film sound. Valentin is not only a silent movie star, he quite literally lives in a world in which the sound universe is the same as in a silent film—silent. There is, of course, a musical score sound track, but this is a nondiegetic sound element also characteristic of the silent film. It’s the many ingenious games that Hazanavicius plays with cinematic sound that makes this film so much fun. Let’s look at three key scenes in the film that toy with the world of movie sound.

The sound games are introduced with the very first scene. The year is 1925 and we open on the premiere of Valentin’s newest blockbuster release where an audience in rapt attention watches the climactic ending. It’s a silent movie, of course, with an orchestra in the theater playing the score (diegetic sound and on-screen sound). Then we go backstage, behind the movie screen, where George, his co-star, and producer are waiting for the film to end, to take their bows. A sign backstage cleverly reads “Please be silent behind the screen.” As the film comes to a close, George and the producer hold their breath to hear the reaction of the crowd. At this moment, we certainly expect to leave the sound world of the projected silent movie and enter a naturalistic diegetic world of George, his co-star, and producer. Instead, though we see their jubilation, there is still no sound, total silence—not even ambient sounds. The scene cuts to the movie audience applauding wildly, but we don’t hear them either, and soon a new musical score kicks in, but this one is not being played by the orches-

tra in the film, it’s the score for *The Artist*, and we quickly realize that the aural world of the actual film *The Artist* is very much the same as that of the silent film premiere within the film, a silent movie sound world with musical accompaniment (Figure 22-5 top).

At the Act 1 turning point of *The Artist* (30 minutes into the film) George is invited to watch some rushes from a new, revolutionary studio project—a “talkie” motion picture (voice in sync with picture)! Because we are still in the aural world of the film (silent), we do not actually hear the “talkie,” but the producers and George react as if they do hear the synchronized words spoken as they watch—and their reactions are very different. While the producers clearly see it as the future of cinema, George laughs it off as a cheap gimmick. However, in the next scene, George is sitting in front of his dressing room mirror and when he places his water glass on the table—CLACK! What was that? He lifts the glass again and places it back on the table—CLACK! A sync sound in his silent movie world!? He tests this bizarre phenomenon by dropping a brush—PLONK! And a comb—PLINK! Soon his dog is BARKING and the telephone is RINGING!! He’s surrounded by sync sound and now we can hear it like he can. But when a stunned George tries to shout, “What the hell!?” nothing comes out—he’s still trapped in his silent world. George rushes outside where he (and we) hears the WIND and WOMEN LAUGHING and finally he watches a small feather as it falls gently to the ground with a huge BOOM! And all the while George’s panicked screams remain unheard ... then he wakes up. It was all a dream. But it’s obvious that George wasn’t able to brush off the introduction of sound quite so easily (Figure 22-5 center).



■ **Figure 22-5** In the opening scene of Hazanavicius' *The Artist*, George Valentin (Jean Dujardin) listens to applause that we cannot hear because we're watching a "silent" film (*top*). Later, the world of sync sound, which we can now hear, begins to haunt George's dreams (*center*). At the end, George is reconciled to the introduction of "talking pictures" and just like George, the film itself gives over to sync sound as well (*bottom*).

As *The Artist* progresses we witness how George's resistance to the introduction of "talkies" takes a toll on his professional and personal life. It is *film sound* itself that emerges as George's principle antagonist, sending his career, his marriage, and his fortunes into a tailspin, and rendering him, like silent cinema, totally obsolete. Soon an essential dramatic question emerges: Why *is* George resisting the transition into talking motion pictures? Why does it threaten him so much? The answer comes only in the very last sequence in the film, after George accepts Peppy's offer to work with her on a musical. The very first (non-dream sequence) sync sound to enter *The Artist's* silent film world is George and Peppy's TAP DANCING audition for the producer of Kino Studios. However, while we hear the tap shoes in sync, the producer's verbal exclamation "That's terrific!" remains unheard. It isn't until the next scene, the filming of their tap dance number on a studio set, that the full sync sound world slowly emerges. It begins with the TAPPING of the dance and then, at the end, we hear the couple's HEAVY BREATHING, and finally we hear the director call "CUT" and the producer exclaim, "PERFECT!" (**Figure 22-5 bottom**). Soon sound effects, dialogue, and background sounds all fill-in *The Artist's* new aural and cinematic reality. And it is here that the reasons for George's rejection of sound films becomes clear [*spoiler alert*]. When the producer asks, "Could you give me just one more?" George responds with his first and only sync sound line of dialogue, he replies "With pleasure," in a *very thick French accent*. As they prepare for another take, George, Peppy, and the producer are engulfed in all the sounds of the set, all the sounds of a sync sound movie world, and the film ends appropriately with the Assistant Director calling "Roll Sound! Roll Camera! Silence Please! And Action!"

■ SOUND DESIGN II: THE SOUND ELEMENTS IN DETAIL

Now let's look in more detail at those basic audio categories (speech, sound effects, ambience, and music), with the added aspects of sync and source. When we consider these other factors, we are able to break down the general categories even further and define all of the kinds of sounds we can employ in a sound design. Remember, not every film uses every kind of sound.

Speech

Sync Dialogue and Off-Screen Dialogue

Sync dialogue is dialogue that is recorded in sync with the picture during the production phase. The picture and sound from the shot are both used and sync is maintained during

editing. **Off-screen dialogue** is dialogue that comes from a person who is assumed to be in the time and space of the film (diegetic sound) but simply is not in the view of the camera. For example, in Orson Welles' *Touch of Evil* (1958), Susie Vargas (Janet Leigh) talks through the wall with a mysterious young woman who is in the adjacent motel room. The voice from next door warns her that boys are looking for a key to get into her room to drug her. Susie's dialogue is sync dialogue, while the woman talking through the wall is off-screen dialogue (because there is no visual reference in the frame, this is a non-sync sound element) (Figure 22-6). Keep in mind that these categories are not fixed in production. We often use sound that was recorded as sync sound, but in the edit we decide not to use the corresponding image. For example, say we shoot a scene of a girl getting dressed in the morning and include a shot of her mother at the foot of the stairs calling up to her, "Honey, hurry up. You're going to be late!" When we edit, we could easily toss out the mother's picture and simply place that dialogue under the image of the girl getting dressed, as if it's coming from off screen.

Voice-Over Narration

Voice-over narration (V.O.) is also nonsync sound and has no direct visual sync reference in the frame; however, it differs from off-screen sound in that it is understood by the audience that the voice cannot be heard by the people in the scene. This means that the voice-over is either not in the time and space of the film world (nondiegetic sound), as in the case of a narrator who is commenting on the events or narrating the story of the film, or it can be the unspoken thoughts of a character in the scene.

ADR

ADR is the acronym for **automatic dialogue replacement**, which is the rerecording of sync dialogue, in a studio, in cases where the production sound is not usable. ADR is also referred to as **looping** because the method of rerecording and syncing up the dialogue involves the actor standing in a studio in front of a microphone watching a loop of the scene whose dialogue needs replacing over and over again (Figure 22-7). The actor watching the scene also listens to the field recordings of their performance (called **guide tracks**) on headphones while trying to duplicate the words, timing, and emotional intensity. ADR can be used to replace poorly recorded audio, improve articulation or performance, or even "revoice" a character (meaning to replace one actor's voice with another's).

ADR can be an expensive and elaborate process, especially if you have to pay Tom Cruise to come back into a rented ADR studio to redo the dialogue for entire scenes. But on shorts and independent films, where field recordings are mostly used, ADR can simply mean replacing an unintelligible line or two here and there, while the talent watches the scene on a laptop computer in a sound-proof room.



■ **Figure 22-6** "Do you know what a mainliner is?" Welles' *Touch of Evil* incorporates both on-screen sync sound and off-screen nonsync sound in this one shot.



■ **Figure 22-7** In this scene from Haneke's *Code Unknown* (2000), he replicates a typical ADR session, where actors are brought back to rerecord their lines as they watch themselves on screen.

■ SPEECH IN FILMS

Dialogue

With very few exceptions, narrative films after the silent era have used some degree of sync dialogue. In some film genres, dialogue is *the* dominant storytelling element. The screwball comedy genre is known for its reliance on wall-to-wall, fast-paced, witty verbal repartee, as in the following conversation between two recently divorced newspaper reporters, from *His Girl Friday* (1940) by Howard Hawks (**Figure 22-8**):

Hildy: Walter!

Walter: What?

Hildy: The mayor's first wife, what was her name?

Walter: You mean the one with the wart on her ...?

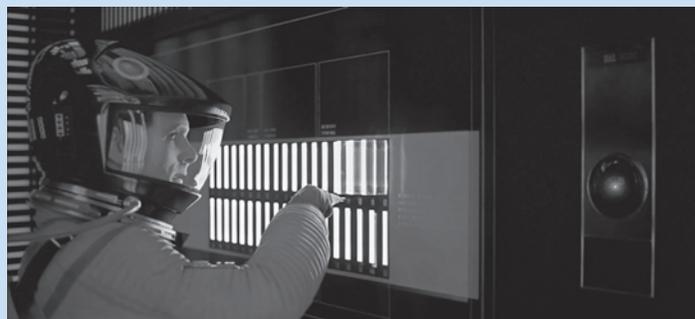
Hildy: Right.

Walter: Fanny!

Stanley Kubrick, on the other hand, used quite a different approach in *2001: A Space Odyssey* (1968), where his use of dialogue was extremely spare. In his article “*2001: A Space Odyssey Re-viewed*” (from the book, *The Making of 2001: A Space Odyssey*, edited by Stephanie Schwam, 2000), Alexander Walker claims that, “there are barely forty minutes of



■ **Figure 22-8** Fast and witty repartee is central to the screwball comedy genre as epitomized in Hawks' *His Girl Friday*, with Cary Grant and Rosalind Russell.



■ **Figure 22-9** Much of the sparse dialogue in Kubrick's *2001: A Space Odyssey* is given to HAL 9000 (voiced by Douglas Rain), allowing the audience to identify with it more than with the human protagonists.

dialogue in a 141 minute film.” By far, the most verbal character in this film is the computer HAL 9000, whose dialogue expresses much more emotion than do any of the human beings in the movie (**Figure 22-9**). In fact, while crewmember Poole dies a quick and silent death in space, Kubrick gives HAL 9000 a very talky and stirring melodramatic death scene. As crewmember Bowman is shutting HAL 9000 down by removing one artificial intelligence bank at a time, HAL at first protests, but then, weakened, it (he?) comes to terms with its (his?) impending death:

HAL: I'm afraid. I'm afraid, Dave. Dave, my mind is going. I can feel it. I can feel it. My mind is going. There is no question about it. I can feel it. I can feel it. I can feel it. I'm afraid. Good afternoon, gentlemen. I am a HAL 9000 computer. I became operational at the H.A.L. plant in Urbana, Illinois, on the 12th of January 1992. My instructor was Mr. Langley, and he taught me to sing a song. If you'd like to hear it I can sing it for you.

Bowman: Yes, I'd like to hear it, HAL. Sing it for me.

HAL: It's called “Daisy.”

[*HAL progressively slows down as he sings*]

Daisy, Daisy, give me your answer do. I'm half crazy all for the love of you. It won't be a stylish marriage, I can't afford a carriage ...

[*slows down further*]

But you'll look sweet ... upon the seat of a bicycle ... built ... for two....

Off-Screen Voice

Alfred Hitchcock uses the physical absence of a character as an essential element of mystery and suspense in his film *Psycho* (1960) (Figure 22-10). After the brutal stabbing of Marion, we hear the off-screen voice of Norman Bates shouting, “Mother! Oh God, mother! Blood! Blood!” By keeping Norman off screen we assume he’s addressing his mother and that she may have been the one who killed Marion, but we can’t be entirely sure. Randy Thom, in his article “Designing a Movie for Sound” (*FilmSound.org*, 1999), says “starving the eye will inevitably bring the ear, and therefore the imagination, into play.” This is exactly Hitchcock’s strategy: by suggesting the presence of Norman’s mother strictly through off-screen dialogue, he piques the audience’s curiosity (Where is she? What does she look like?) and a mystery forms in their minds.

Voice-Over

François Truffaut’s classic short film *Les Mistons* (1957) (Figure 22-11) uses a sound track with two primary elements: voice-over and music. There are also a few sound effects and postsynchronously dubbed dialogue, but it is the voice-over that dominates and recounts the story of a group of preadolescent boys who spy on, tease, and torment Bernadette and Gérard, a young couple in love. When Gérard



■ **Figure 22-10** Hitchcock’s use of off-screen dialogue expertly manipulates audience expectations in this scene from *Psycho*.



■ **Figure 22-11** Truffaut’s use of voice-over in *Les Mistons* adds an additional layer of emotional complexity and poignancy to this story of five mischievous boys.

leaves to go on a mountain-climbing expedition, the boys play a trick on Bernadette, sending her a postcard that suggests that Gérard is not being faithful while he is away, but after they mail it to her they learn from the newspapers that Gérard was killed in a mountaineering accident.

Voice-over as a storytelling element is frequently poorly used. It’s so easy to tell a story simply by slapping on a voice-over, but one must be sure that this technique contributes additional layers of meaning to the image rather than simply duplicating what we are seeing, or, worse, doing all of the storytelling while the images accomplish nothing. *Les Mistons* is a great example of well-used voice-over. The story is told from the point of view of one of the boys (we never know which), who is now a man. The young boys could not possibly understand at the time that they are experiencing a profound, tragic, and indelible life lesson as they struggle with their newly emerging and confusing desires—their first romantic crush on a woman. But it is the now grown man, reflecting on his childhood experiences in the voice-over, who reveals the emotional complexity of what would otherwise be seen simply as the irritating antics of a group of childish brats.

Sound Effects—Hard and Soft

Sound effects (FX) are specific sounds—like shattering glass, a dog bark, a gunshot, an explosion, creaky stairs, a doorbell, a clock ticking, a door slamming, exotic birdcalls, or a Huey helicopter fly-by—that are gathered as a nonsync sound and then inserted into the sound design in postproduction. Sound effects can come from wild sound recorded in the field (PFX) or can be found as a prerecorded sound effect from commercial sound effects libraries (on CDs or the internet), or they can be constructed from a collection of sounds, like mixing a PFX field recording of a car starting with a lion’s roar from a commercial FX library, to reflect a character’s anger as he starts the car and pulls away (Figure 22-12).

Apocalypse Now “This Is War” (The American Zoetrope SFX Collection)

Disc Number	Track Number	Duration	Description
AZ-01	01	0:21	Radio spot: 'Psychedelic Music Show'. Mono.
AZ-01	02	0:38	A-6 Intruder: power-up and takeoff. Stereo.
AZ-01	03	0:30	F-4 Phantom: takeoff medium-distant, 2 versions. Stereo
AZ-01	04	1:42	F-4 Phantom: taxi, idle and takeoff. Stereo.
AZ-01	05	0:41	F-4 Phantom: idle, power-up and takeoff. Stereo.
AZ-01	06	0:43	F-4 Phantom: in, by and afterburner distant. Stereo
AZ-01	07	0:06	Fighter jet: hot fly-by, close-up. Stereo
AZ-01	07	0:08	Fighter jet: fly-by. Medium close-up. Stereo
AZ-01	07	0:12	Fighter jet: fly-by distant overhead. Stereo
AZ-01	07	0:08	Fighter jet: fly-by medium-distant. Stereo
AZ-01	08	1:10	C-130 Hercules: taxi by, medium close-up. Stereo
AZ-01	09	1:11	AH-1 Cobra: hover overhead, medium-distant. Mono
AZ-01	10	0:39	AH-1 Cobra: fly-by while firing 2.75' rockets. Mono
AZ-01	11	0:46	Ch-46 Chinook: idle on ground, medium close-up. Stereo
AZ-01	12	1:01	CH-46 Chinook: takeoff and hover. Stereo

■ **Figure 22-12** This excerpt from the extensive list of sound effects used in Coppola's *Apocalypse Now* (1979) illustrates how precise sound effects must be in order to be convincing, including specific model, action, and distance perspective. The sound designer was Walter Murch.

Sound effects break down into two basic categories depending on how they are used: hard effects and soft effects. **Hard effects** are positioned in the sound track to synchronize with a corresponding image (postsynchronous sound). In other words, they have a visible source in the frame. For example, we see a man get into his car, slam the door close, and start the engine. We can find good sound effects for the car door slam and the engine starting, and cut them to the picture so that they appear to emanate in perfect sync with the action. **Soft effects** do not sync to a source that is visible on the screen. Soft effects are usually off-screen sounds. For example, let's say we have a scene in which a man and a woman are arguing and the man storms out of the house—but we stay on the woman as she hears the car door slam, the car start up and drive away. Now the car door and engine are soft effects.

Understanding the power of sound effects is critical for cinematic storytellers. Sound effects add dimensionality to the visible world of the film and act as a bridge to the larger, off-screen world outside the frame. Sound effects can even suggest the existence of things, actions, and people that are not actually there (see *Far From the Madding Crowd* on pages 526–527). Because of their rich story contributions, it's extremely important to record, create, or find the sound effect that will have the particular impact you need, and this is a task that requires great attention to detail. One doesn't just say, “Hey, I need a dog barking.” That's way too general. To get just the right one, each sound effect needs to be considered from a number of different angles. You need to have a specific sense for the size and kind of dog (the “yap” of a Yorkie or the lazy “woof-woof” of a hound dog), the kind of bark (playful, serious, or rabid), and the dramatic context for the bark (is the film a drama or comedy; is the barking realistic or expressionistic?), and so on.

Foley Effects

Foley effects, named after Universal Picture sound department head Jack Foley, differ from hard effects in that they are created and recorded in synchronization with the edited film. A foley session involves watching a scene in a soundproof room, with whatever objects or surfaces you need to create the right noise, and creating and recording the sounds as you watch the film. The recording is done onto a digital sound recorder and input into the NLE system to be aligned with the scene. The intention of a foley effect is always to create a sound in sync with the picture. Just like ADR, a foley session can be an extremely elaborate and expensive event, requiring professional **foley artists** and a



■ **Figure 22-13** Professional foley rooms are sound studios designed to record postsynchronous sound effects while the foley artist watches the scene projected. As you can see here, they are outfitted with a wide array of objects that can make a variety of noises.

special **foley room** equipped with, among other things, different floor surfaces (gravel, concrete, wood, carpet, etc.), in order to create the right “walking sounds” (Figure 22-13). But for shorts and independent films, a foley session can simply mean watching your footage on a laptop computer in a soundproof room and re-creating a sound effect or two onto a digital recorder, then putting it back into the NLE and making the necessary frame adjustments to slide it into sync.

in practice

■ **USING SOUND EFFECTS IN FILM**

When Real Is Not Real Enough

Anyone who has seen a fight in real life knows that a real punch doesn’t sound like much—it sounds quite a bit like a slap, only a little more solid. It certainly doesn’t sound as bad as it *feels*. A real punch sound is decidedly undramatic, which is why many “punch” sound effects are constructed out of layers of other sounds. But when constructing a sound effect, like a punch, you need to consider the visual and dramatic context for the effect. The sound of a bare-fisted punch would be different than one with a boxing glove; a punch to the jaw should sound different than a punch in the gut. Also, the sound of a punch seen in a long shot would have less vivid presence than would a punch in a close-up shot. Additionally, a punch in a comedy film should sound very different than the same punch in a hard-hitting drama. A student of mine once created a punch sound effect for his “found footage” editing exercise. His film included one quick shot of a knockout punch from a boxing match. For this shot he blended the sound of a baseball bat hitting the soft cushion of a sofa, for the low “thud,” and the sound of crushing a small head of lettuce, for the high “crunch” of damaged nose cartilage, and his own fist hitting his wet palm, for the “slap” of leather on flesh. The effect was pretty darn good, if a little bit too visceral for his exercise. The “knockout punch” effect stole the show.

In the world of sound design, it’s universally recognized that supervising sound effects editor Frank Warner created some of the greatest “punch” sounds in the history of movies for Scorsese’s *Raging Bull* (1980). Warner created punches that did more than simply sound realistic; they acutely reflected the subjective *feel* of receiving blows from a prizefighter. Not only do the boxers get punched, but everyone in the audience *feels* each uppercut right on their own jaw. How did Warner construct these sound effects? So far, he hasn’t shared with anyone this particular sound effect recipe, and he has since destroyed the original multi-track tapes. Although there are rumors that melons and tomatoes were involved, no one really knows exactly how he created those punches. It has remained a secret even from Martin Scorsese himself, who admits that he indeed asked, but wasn’t told (Figure 22-14).



■ **Figure 22-14** Among the most famous and mythologized sound effects in film history are Frank Warner’s “punch” sounds in Scorsese’s *Raging Bull*.

When Real Is Too Real

Sometimes with sound effects, less is more. A former student of mine in an intermediate production class made a simple, high-energy comedy chase scene, in which a high school kid on a skateboard is being chased by his mother, who turns out to be the superior athlete. She ultimately catches the kid and forces him to finish his breakfast. The end. At one point, as the mother chases her son, the boy bumps into an old lady carrying groceries, knocking her onto her fanny (the mother later hurdles right over the woman as she picks up her oranges). The old lady was played by a sophomore dance major (wearing loads of makeup) and she was miked with a supercardioid to get good sync sound. The stuntwoman did a great job of getting knocked backward, sprawling, onto the sidewalk. But when the student showed his synced dailies in class, rather than laugh, the students groaned with sympathetic pain. The sounds were too good, too real, too close. We could hear flesh and bone hitting the hard concrete and we felt this poor old woman's pain; it was anything but funny. Clearly, the student filmmaker needed a different "fall" sound effect. He removed the sync sound and found a funny "yelp and fall" sound effect on a sound effects CD that had a large selection of "cartoon" sound effects. The new "fall" sound included a soft "splat" and comical "boioioing," clearly not realism. When he showed the edited film, the old lady's fall was now a genuinely comic pratfall (Figure 22-15).

Simple Foley

I once edited a scene that had no dialogue and involved a man standing in a bathtub, up to his ankles in water, bathing (Figure 22-16). After his bath he steps out of the tub and leaves the bathroom. The scene was shot MOS (without sound) so I needed to create all of the sounds in foley. After the scene was cut, I simply brought the footage on my laptop into a music practice room (a sound-proof space) along with a plastic tub of water and a



■ **Figure 22-15** To keep us laughing, the slapping, poking, punching, and falling sounds in the *Three Stooges* are given a comedic rather than a visceral tone. Mo is no Jake LaMotta. From White's *Nutty but Nice* (1940).

microphone hooked up to a digital recorder. I positioned the mic above the water. When the man stepped into the water I plunged my hands in to make the right "splush-splush" sound, and when he moved around, I swirled my hands to create the "sloshing" of water on legs. When he stepped out of the tub, I quickly removed both arms from the water to make the right "splash-splash" noise, and when his feet hit the floor, I patted my wet hands on the linoleum to make the "pit-pat" sound of wet flesh on a hard surface. After downloading the sound files into my NLE, I first placed them on the SFX track roughly with the picture, slid them around until they were in sync with the actions, tweaked the levels, added a bit of location ambience, and voilà!, the entire scene had perfectly convincing sound to accompany the image.

Evoking Physical Detail

At a climactic moment in Thomas Vinterberg's 2015 film *Far From the Madding Crowd*, one of Bathsheba Everdeen's dogged but unsuccessful suitors, William Boldwood (Michael Sheen), shoots Bathsheba's



■ **Figure 22-16** Simple foley effects were used to create all the bath water sounds in K. Hurbis-Cherrier's short film *Ode to a Bar of Soap* (1998).

cruel husband Sgt. Francis Troy when he shows up at Boldwood's party. The crime of passion is witnessed by everyone at the party and he will certainly be arrested for murder. The next scene is a very simple one-shot of Boldwood being thrown in jail for his crime. The scene includes Boldwood being led to his dank, dark jail cell and the heavy prison door slamming shut and locking behind him with a resounding finality that implies that he will surely never emerge from his incarceration. However, it's revealing to examine closely what we understood from the scene versus the actual visual information on the screen. The only things we *see* are a wooden bench, the shadows of jail bars falling across a craggy wall, Boldwood entering the frame and sitting on the bench, and the shadow of a "door" closing, leaving Boldwood in near darkness. Character, bench, wall, shadows, that's it; that is all we see (Figure 22-17). We do not, in fact, see a door, prison bars, keys, or guards. While the visuals don't give us much, it's the sound effects we *hear* that paint the complete picture. The harsh



■ **Figure 22-17** In this scene from *Far From the Madding Crowd* all we really see is a wall and some shadows, it's the sound design that specifically evokes a prison cell.

metallic clang of the jail cell door opening, the rattle of hefty keys, Boldwood's footsteps on a hard, gritty stone floor (also unseen), the wooden bench creaking under his weight, followed by the grinding iron-on-iron screech as the door swings shut, slamming hard and heavy, leaving Boldwood in utter isolation. All of these off-screen sounds create a clear impression of a jail cell and jail guards without the need for visual verification.

Ambient Sound, Room Tone, and Walla

Ambient sound (also called **background sound**) is the general aural environment in which a scene takes place—the background noises and other acoustic properties of a location. Ambient sound can come from the field recordings at the actual locations or can be taken from commercial sound effects libraries, which can offer hundreds of different ambient environments (“rainforest with birds,” “city streets/rush hour,” “small restaurant,” “children’s playground,” and so on). Ambient sound in a final sound design can be a combination of the ambience which is already part of the sync field recordings augmented by added sounds to create the precise aural space for the scene. It is not uncommon to use multiple ambient tracks in a single scene to get the atmosphere just right.

It's important to note that “silence” in film, as well as in real life, does not mean “utterly no sound.” During “silent” passages, we should be able to hear the ambient sound of the environment, the naturally occurring background noises. What this means is that there is never (almost never) a time when a sound track has no audio track. At the very least, it will contain very quiet ambient sound that only feels like silence.

Room tone (RT) is a very specific category of ambient sound that is recorded by the sound recordists in the field. Room tone generally refers to the sound of an interior space where a dialogue scene is taking place. The very last recording at any location where there was sync dialogue will be a room tone track. This involves the sound recordist recording one minute of room tone before anything on set changes (lights, crew, sets, etc.) (see page 399). Sound designers use room tone to help fill gaps or smooth edits and transitions when cutting dialogue scenes. We discuss this technique in some detail on page 552.

Walla is the term used for ambient sound that involves the general, unintelligible chatter of a group of people. You can have, for example, the walla of a theater audience before the curtain goes up, or of a cocktail party, or an art gallery opening. Walla is a great resource for a low-budget filmmaker, because it is often used under a scene to give the impression that there are many more people in the location (off screen) than there actually were in production. For example, a medium close-up of two people sitting in a restaurant may have been shot in an empty restaurant during off hours, but by putting “crowded restaurant

walla” under the scene, it will feel like the place is full. Like ambient sound, you can record this yourself as wild sound or you can get it from a sound effects library.

As with everything else in film, ambient sound has a practical use and a creative application. Practically speaking, the ambient track is used to smooth out any ambient shifts that would be apparent when cutting from one shot to another in the same scene. For example, in a scene in which we cut between two people sitting at a sidewalk cafe, one facing the traffic and another facing away, there might be a noticeable discrepancy between the traffic noise we hear in their respective sound recordings. Often, this ambience shift (the amount of traffic picked up by the mic) can be too abrupt for continuity’s sake when cutting from one shot to the other. Although we can’t get rid of the traffic noise from one character’s audio, we could add a little traffic ambience on another track, under the character who has less, in order to even them out.

The creative dimension of ambient sound is not to be underestimated. Finding just the right ambient sound for a scene can, with any degree of subtlety, establish an environment that adds additional narrative information or an emotional tone. Ambience is also often used to create a subjective sound space, meaning that the sound environment the audience hears is a reflection of what a specific character is feeling.

■ PRACTICAL AMBIENCE AND WALLA

Andrew Lund’s *Snapshot* (2006) is a low-budget short film that revolves around the kidnapping of the wildly popular photographer Marcello (Henry Darrow), who has enjoyed a lucrative career taking candid photos of people on the street (Figure 22-18). His kidnapper is Nathan, the disgruntled subject of one of his photos who believes that Marcello ruined his life when he published the fateful photograph showing Nathan at a highly compromised moment. In order to establish the popularity of the photographer, the film opens with an elaborate and well-attended museum retrospective of the photographer’s work. But Lund did not have the time or money to wrangle a large, well-heeled crowd of extras to populate the museum opening. So he and his editor/sound designer, Dave Monahan, created the crowd through sound. In the



■ **Figure 22-18** Clever use of ambience and walla, along with tight framing, in his short film *Snapshot* allowed Lund to convincingly conjure a crowded museum without having a real crowd.

museum scene Lund kept his framing fairly tight and carefully selected several ambience and walla tracks to sonically create the excited buzz and murmurs of a large crowd—but just off screen! Once in a while Lund would have an extra pass in front of the lens, implying that people are milling about, but we never see more than a few people. The effect is totally convincing; the audience gets a clear sense of a huge turnout for Marcello’s big museum retrospective.

■ DRAMATIC TONE AND AMBIENT SOUND

Ramin Bahrani’s *Chop Shop* (2007) revolves around the struggles of Alejandro, a 10-year-old boy who works at an auto repair shop in a very rough neighborhood to support himself and his teenaged sister. Late in the film, after Ale discovers that his sister is selling sexual favors for money, he decides to catch her in the act and confront her. Twice, Ale walks through the barren, decrepit neighborhood, to a remote parking area where she meets the men (Figure 22-19). The first time she is not there, the second time she is. For many reasons, this is a highly perilous act for Ale and this is subtly underscored and amplified by the ambient track during his journey through the neighborhood. Without undercutting the realist tone of the movie, Bahrani and sound effects designer and editor Abigail Savage worked with sounds that would be perfectly plausible for the location to evoke a sense of threat and anxiety. The first time Ale goes to the parking lot, the normal ambience of the nearby highway is layered over with the unsettling sounds of sirens, crashing metal, and a barking dog in the



■ **Figure 22-19** Bahrani and special effects designer Abigail Savage carefully controlled the ambient sounds in the 2007 film *Chop Shop* to create dramatic emphasis within a naturalistic design.

distance, increasing Ale's (and our) anxiety level. The second time Ale goes to confront his sister (this time he finds her), Bahrani and Savage utilized an even subtler, yet more unnerving ambient effect. They manipulated the ubiquitous buzzing of the sodium vapor security lamps that are characteristic of the environment. At the beginning of Ale's journey, the buzzing sound track was slowed down 50% so that its pitch was lower than normal. Then, down each new street, getting closer and closer to his sister, the buzzing sound track was sped up, raising its pitch, with each edit. The effect creates an edgy, intensification of emotional tension which is practically imperceptible on a conscious level. Consequently the film's realist tone is never broken.

Music

Music is a vitally important component of the cinematic universe. In fact, music accompanied film screenings long before dialogue and sound effects were introduced. By including music a filmmaker can, subtly or overtly, add emotional tone, context, and even thematic nuance to the story. It can connect your narrative and characters to a specific era, location, community, or sub-culture. Music can define character, it can establish rhythms and tempi for the flow of scenes, it can introduce irony or humor. Music is so powerful, that its selection and application must be carefully considered or you run the risk of your music working against your film instead of in coordination with all the other cinematic elements.

Source Music

Source music is the name for any music that has a visible source in the scene—for example, a song playing from a jukebox in the corner of a bar, the guitar that a character is playing, or the orchestral music of the Los Angeles Philharmonic in a bus driving down the highway (see **Fig. 22-4**). Source music is always diegetic music, but it is not always direct sound (recorded in sync). Many times source music is postsynchronous sound, either gathered from prerecorded music (the jukebox playing in the bar) or recorded in postproduction (the orchestral music on the bus) and synced up in the editing. The guitar music, however, could easily be recorded on location as sync sound or handled as postsynchronous sound (**Figure 22-20**).

The Score

The **musical score** (or **background music**) is non-sync and nondiegetic music that generally accompanies action or dialogue to underscore the events of a scene with a tone, a mood, or musical commentary. Most people understand how scary music can underscore frightening scenes, how lush and sweeping violins can infuse passion in a romantic moment, and how a jaunty score can encourage laughs for a funny scene. This use is so common that audiences barely notice score music, but they feel it deeply. Score music is often composed specifically for the film. In this case, the edited film is given to a composer who, in close consultation with the director, composes music timed to the actions, rhythms, and durations of specific scenes. Sometimes, the performance and recording



■ **Figure 22-20** The music emanating from Radio Raheem's (Bill Nunn) boom box in Lee's *Do the Right Thing* (1989) is a prime example of source music, even though it was dubbed in later.



■ **Figure 22-21** On major motion pictures an entire orchestra plays and records score music while the conductor watches the scene on a monitor for timing. Pictured is a scoring session for the *Lord of the Rings* trilogy.

Scarlett’s love for the land. Motifs can also be associated with a character and repeated whenever that character appears in the film or when you wish to evoke them. A character motif always contains something of the spirit of the character—for example, accompanying the shark in *Jaws* (1975) is the frighteningly efficient “duum-dum, duum-dum, duum-dum,” which gathers momentum and malevolence the closer the shark gets. Once the association is made, all Spielberg needs to do is play the motif and everyone in the theater thinks, “Aaaak, shark!” even if we’re only looking at blue water. In either case, the music is aligned with the scenes in editing. You can also use prerecorded music from CDs for your background music, like a jazz tune or a baroque suite from a CD. Using

prerecorded music, however, means that you’ll be cutting your picture to a musical track that is fixed. This is a major difference between these two types of background music. With one, the editing rhythm and tempi of the picture determine the music, and with the other, the music determines the rhythms and pace of the editing. Also, the length of prerecorded music is fixed, and getting into or out of a piece can be tricky—especially if you want the score to be somewhat understated.



■ **Figure 22-22** Shigeru Umebayashi’s bittersweet theme for Wong’s *In the Mood for Love* perfectly encapsulates the film’s slower pace and poignant tone and heartbreaking story, and is frequently repeated, particularly during slow motion sequences.



■ **Figure 22-23** John Williams’ majestic score for the *Star Wars* films is designed to augment the emotional tone of the action, as seen in the triumphant final destruction of the second Death Star in Lucas’ *Star Wars: Episode VI—Return of the Jedi*.

of scored music are done while the performers watch the scenes projected to ensure perfect timing, not unlike ADR or foley sound effects (**Figure 22-21**). Other times, the composer will record a number of **musical motifs**, smaller musical phrases, which can be easily combined, elongated, and rearranged in the editing process to fit the temporal dimensions of the sequences.

Motifs can have a close association with an emotion, a psychological state, or an event such that the repetition of that musical phrase will evoke that feeling or event. For *Gone With the Wind* (1939), Max Steiner created one of the most famous motifs in film history, called “Tara’s Theme”—a grand, sweeping melody that conjured the glory of the plantation and

Scarlett’s love for the land. Motifs can also be associated with a character and repeated whenever that character appears in the film or when you wish to evoke them. A character motif always contains something of the spirit of the character—for example, accompanying the shark in *Jaws* (1975) is the frighteningly efficient “duum-dum, duum-dum, duum-dum,” which gathers momentum and malevolence the closer the shark gets. Once the association is made, all Spielberg needs to do is play the motif and everyone in the theater thinks, “Aaaak, shark!” even if we’re only looking at blue water. In either case, the music is aligned with the scenes in editing. You can also use prerecorded music from CDs for your background music, like a jazz tune or a baroque suite from a CD. Using prerecorded music, however, means that you’ll be cutting your picture to a musical track that is fixed. This is a major difference between these two types of background music. With one, the editing rhythm and tempi of the picture determine the music, and with the other, the music determines the rhythms and pace of the editing. Also, the length of prerecorded music is fixed, and getting into or out of a piece can be tricky—especially if you want the score to be somewhat understated.

Film music has been around for the entire history of cinema and is in itself a complex art form. It’s beyond the scope of this book to elaborate in complete detail the uses of music in films, but a few concepts might be helpful. Obviously, the **tempo** and **rhythm** of music can infuse a scene with fast and explosive energy, as in the opening of *City of God* (see page 507), or with slow sensual fluidity, as in the case of Wong Kar-Wai’s *In the Mood for Love* (2000) (**Figure 22-22**).

We are also all familiar with music that provides an **emotional tone** or **mood** in a scene. No one can resist feeling the exhilaration of victory in *Star Wars: Episode VI—Return of the Jedi* (1983) when the Rebel Alliance destroys the Death Star (**Figure 22-23**) and restores justice and order to the galaxy—especially when the heroism is underscored with John Williams’ exuberant and energetic orchestral score. Incidentally, throughout the *Star Wars* series, Williams also created individual musical motifs for Darth Vader, Princess Leia, Luke Skywalker, and other major characters.

■ FOREGROUNDING MUSIC TO ADD EXTRA LAYERS

Audiences are so familiar with the traditional role of music supporting the emotions of a scene that this music can fade in and fade out again without them being consciously aware of it. But music, like sound effects, can do much more than simply reinforce the existing mood, tone, or rhythm of a scene. Music can supply an extra, and sometimes surprising, layer of emotions or even commentary, and in these cases, the music is noticeable. In the famous “ear scene” in Quentin Tarantino’s 1992 film *Reservoir Dogs*, an upbeat pop song (“Stuck in the Middle with You” by Stealers Wheel) plays on the radio as the cold-blooded killer, Mr. Blonde, tortures a captured police officer by slicing off his ear (Figure 22-24). The audience absolutely notices this music because



■ **Figure 22-24** The pop music that plays on the radio as Mr. Blonde (Michael Madsen) cruelly taunts a captured police officer creates a highly disturbing tonal dissonance in this scene from Tarantino’s *Reservoir Dogs*.

the peppiness of the song completely plays against the horror we’re witnessing on the screen, and this ironic juxtaposition only accentuates the cruelty of the moment. Another example of the overt use of music comes from Sean Penn’s 2007 film *Into the Wild*. In addition to a traditional score, the director frequently interjects complete ballads sung by Eddie Vedder into the film. In these sequences, the narrative progress slows down, while the songs infuse a sense of the fatal innocence and social valor of a true folk hero into the actions of the central character Chris McCandless, an idealistic young man who wants to live free of material possessions and closer to nature. These sequences, which are cut to the rhythms of the songs, invoke the romanticism of a rambling man, a traveling seeker, a “supertramp” (Figure 22-25).



■ **Figure 22-25** Penn’s *Into the Wild* incorporates ballads sung by Eddie Vedder to provide a heroic subtext to the actions of the main character Chris McCandless (Emile Hirsch).

Finding Film Music

Film music generally comes from three places: a composer, a prerecorded music library, or commercial recordings.

Working with a composer involves finding a musical composer who can compose and record music specifically for your film. Like all creative team members, you will need to scour sample reels and audition composers to find the person whose musical sensibilities are the right fit for your film. Also like your other creative collaborators, you will either need to find a composer who is looking for experience and is willing to work for free or you must find money in your budget to pay them. Obviously, adding a composer to the team requires extra time to accommodate the additional collaborative creation process, but it can ultimately be very rewarding because it is the surest path to getting exactly the tone and mood you are seeking for your sound track, and if you are working on an exclusive rights basis, it also assures that your film music will remain uniquely yours.

Online music libraries allow you to select complete musical compositions or brief musical motifs that can be used multiple times. This type of prerecorded music is called **canned music**. There are many **royalty free** music libraries out there that charge very small download fees (or are even free), but the music tracks on these sites are usually numbingly generic and colorless. Alternatively, there are websites that sell music from genuine composers with easy licensing agreements already in place. Some of these sites,

like **musicbed.com** and **marmoset.com**, offer tracks from many musical genres that are really quite good and charge a sliding fee depending on the use (commercial versus independent) and on the budget of the film. However, all of these sites involve non-exclusive use so don't be surprised if your sound track is identical to another film at the festival!

Using a prerecorded music track from a commercial recording, whether it's a pop song from last year, a folk song recorded in the 1950s, or a classical symphony from the 18th century, can be very powerful because these tracks, their composers, or the performers are often widely known and can infuse your film with a resonance beyond the narrative context of the film. Martin Scorsese and Quentin Tarantino are two directors who make extensive use of commercial music in their films to do more than simply add an emotional underpinning to a scene; their use of popular songs are quite overt and often evokes a time period and a specific culture, and very often introduces a deeply ironic tone (see box on previous page).

■ CLEARING MUSIC RIGHTS

If you want to use a piece of preexisting music in your film, you'll need to "clear the rights" before you can go into exhibition and distribution. Getting copyright clearance requires a number of steps. Sometimes the process is painless, especially for students who do not expect to make any money from the exhibition of their project, but more often than not, the process can be prohibitively difficult and expensive. Remember, it's not so easy to gain legal access to commercially produced music, so you'll need to start this process in preproduction if possible.¹

Copyright clearance means that you have been given, or have purchased, the non-exclusive rights to use specific music in your film. The rights you will obtain from the publisher are called **synchronization rights (sync rights)**, which is basically permission to use the composition in your film for a fee. The second type of license is a **master use license**, controlled by the record label, that grants the right to include a specific recording of the composition in your film if that's your plan.

1. Ascertain and contact the people (or entities) who hold the rights.

For sync rights to a song, the best places to start your investigation are ASCAP, BMI, and SESAC. These are performance rights societies, to which most professional songwriters

and publishers belong. Each society has a website for easy online research of publisher/copyright owner contact information for songs, plus phone support.

The master use license is controlled by the record label that released the specific recording of a song that you may want to use. A song will have one publisher you need to clear the sync rights with, but there may be multiple recordings of that song that you could clear through the corresponding record labels. You can also research rights information for commercially released recordings on sites such as amazon.com, as well as CD jackets and booklet credits. Usually, independently released artists, whom you can approach directly, will be self-published and will control both sync and master use rights.

2. State the content and context.

Once you have contacted the rights holder, you need to state specifically (a) what you want, (b) how much of it you want, (c) in what context it will be used, and (d) how the music will be credited. As you can understand, people who create or control artistic works are very careful about how the works are used. A performer who wrote a lovely ballad may not want his song used in and associated with a slasher film bloodbath.

3. Negotiate a price.

If the rights holders are okay with your use of the music, then you negotiate the price. What's important to the rights holder here is how much money the filmmaker stands to

¹ This section has been adapted from "2016 Music Rights Primer for Independent Filmmakers" by David Powell, themusicbridge.com

make from the film. So you need to be honest about what sort of distribution your film is expected to get. If your movie is a short made for a class and you hope to show the movie only at a few film festivals, then what you're asking for is called "festival rights." The cost of festival rights is often manageable. Occasionally, my students are given permission to use commercial music in their films for nothing.

If you have any intention of getting your film into festivals (which is a public screening), then you must take the time to acquire the necessary festival clearance. However, the more rights you can clear up front (i.e., theatrical, television, web streaming, VOD, etc.) the better. You never know. It's not uncommon for low-budget, independent films to become surprise festival hits, ones that attract commercial distributors. One of the first questions an interested distributor will ask is, "Do you have the rights to all of the music?" If you don't, then they very well may back away. Why? A music rights holder is more likely to give an independent filmmaker a cheap price for rights *before* it has a distribution company attached, because they think the film is small, but if you attempt to buy additional music rights after your

festival success (i.e., it has commercial value), then the earning potential of the movie skyrockets, as does the price for the music. The price for clearance can easily become more than a distributor wants to pay and so they pass, even though they love the movie. This is such a sad story and so common, but so crushing for the filmmaker that I dare not name examples, though I could.

I certainly cannot cover this topic in nearly enough detail, but it is necessary for you to be alerted to the fact that you cannot simply grab music from your CD collection to use in a film you plan to distribute to festivals or broadcast on TV. In the Recommended Readings appendix at the back of the book, and the Web Resources tab on the companion website, you will find some resources that can help you negotiate this complex terrain.

Obtaining clearance is always a time-consuming process that requires patience, research, and persistence. Filmmakers on tight schedules, like students, are usually better off finding musicians to write original music for their films. There are many benefits to this: namely, you can acquire perfectly matched, custom-made music *and* collaborate with more creative people along the way.

Common Music Pitfalls

Music, when used correctly, can be a profoundly expressive option in the filmmaker's toolbox of storytelling elements. The use of music to enhance a motion picture's impact can seem so easy, and yet there are a number of pitfalls to be wary of. A poorly employed musical score can bury what would otherwise be a fine film. Most problems with poorly used music come from "too much." Music is like a strong cooking spice—just because a little bit is good does not mean that more is better.

1. *Use music only where it is necessary.* **Wall-to-wall music** is the phenomenon of the excessive and indiscriminate use of music from the beginning to the end of a film. Music that relentlessly "cues emotions" from the audience can be exhausting and counterproductive because it ultimately impedes authentic audience involvement.
2. *Don't try to evoke an emotion that is not in the film.* It doesn't help to throw music under a scene simply because the scene isn't working. If a suspenseful scene does not create suspense in the actions, adding suspenseful music will not necessarily help. It will simply become an unsuspenseful scene with mismatched music.
3. *Too loud!* Often in student films the music is mixed in so loudly that it dominates anything else in the scene. In especially bad cases, loud music makes dialogue unintelligible. This is a sound mixing issue.
4. *Watch out for mismatched tempi.* Rhythm and tempo come from many places: the cutting pace, the actions in the frame, the camerawork, and the dialogue. Be careful that your music fits well with the tempo you've established in the picture editing. This doesn't necessarily mean to duplicate the rhythms beat for beat, because music can often serve as a rhythmic counterpoint.

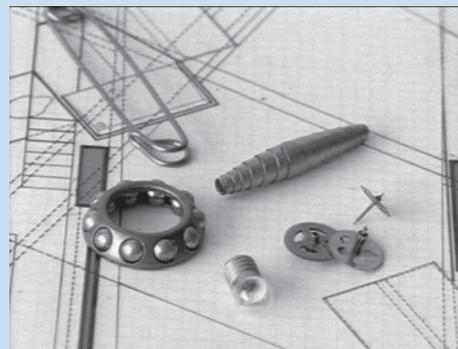
5. *Be careful with lyrics I.* Lyrics can be difficult to manage, especially in dialogue scenes. Lyrics tend to fight with dialogue for attention, even if you're using low-level source music, like a radio softly playing in the background. The more compelling the lyrics, the more they'll scream "listen to me!"
6. *Be careful with lyrics II.* A related problem is inappropriate lyrics. I've seen many films where students will use a piece of music because they love the beats or the melody, but they're so familiar with the song that they've stopped really listening to the words. Remember: the words are expressing something. They will invariably add a layer of meaning to your film. Make sure it's something you want to include.
6. *Emotional associations are not absolute.* While music is especially useful for conjuring emotions, the relationship between the particular music and the individual listener can be highly subjective. This is especially a problem when using popular music. You may decide to use a song in a love scene because it was on the radio two summers ago when you fell madly in love, so that piece of music resonates, for you, with all of those feelings. But this may not be a universal feeling about that song; in fact, there are no universal feelings about any song. When you use a very popular song, people bring their feelings about that song (and that band or that musical genre) with them into your movie instead of gleaning the emotional context from within the world of your movie.

in practice

■ SIMPLE SCORE MUSIC

Keep in mind that you certainly do not need the Los Angeles Philharmonic and a professional recording studio to score a film. One of my own short films, *Ode to Things* (1998) (7 minutes), was scored by Byron Estep, a very talented musician playing only a guitar, and the music was recorded in a small soundproof recording room Byron built in his apartment. *Ode to Things* is an adaptation of a poem by Pablo Neruda; it follows a day in the life of a married couple, detailing the myriad "things" they use over the course of that day: keys, pencils, napkins, shoelaces, spoons, sunglasses, and so on. Byron and I sat in his apartment and watched the film a few times, discussing the overall feeling I wanted to evoke in the film, which was affection. The film, I told him, was an affectionate and appreciative look at those simple objects that help us live our daily lives but that we scarcely even notice. It was a paean to common objects. I also pointed out to him the place

where the film/poem shifts from a literal discussion of "things" into a more metaphysical mode. I indicated to him that there needed to be a marked shift in the tone of the music right at that point, telling him where the music needed to dig a little deeper. As we watched and talked he played me a few riffs on the guitar and together we found the musical mood and themes we were looking for. Then Byron moved to his soundproof room, opened a mic, and, as he watched the film one more time, expertly improvised on those themes, modulating into a minor key and slowing the tempo just a hair when the film shifted into its metaphysical mode; then he resolved back to the bright major key just as the final images faded to black. He nailed it in one go! I took that track, which was recorded on DAT, and downloaded it into the Avid, laid it into my sound track, and adjusted a few frames, and voilà, my scored sound track was done. All in all it took one great musician and about four hours (Figure 22-26).



■ **Figure 22-26** The lovely original score music for Hurbis-Cherrier's short *Ode to Things* was conceived, written, performed, and recorded by Byron Estep—in his apartment!

■ SOUND DESIGN STRATEGIES

Sound may be the most powerful tool in the filmmaker's arsenal in terms of its ability to seduce. That's because "sound," as the great sound editor Alan Splet once said, "is a heart thing." We, the audience, interpret sound with our emotions, not our intellect.

Randy Thom (sound designer, *Wild at Heart*, *Forrest Gump*, *Ratatouille*) (From "Designing a Movie for Sound," *FilmSound.org*, 1999)

In film production we have a great degree of control over the actual sounds used in the sound design and we are able to create a sound environment that can be anything from highly objective, using a direct sound, documentary approach, to highly subjective, reflecting the emotional or psychological state of a character. A sound design can provide a tone of irony or hyperbole, or even create fantastic or intellectual associations between sound and image. Moreover, one can combine any number of approaches in a single film. The possibilities are endless. The question to ask yourself is: What are you trying to say with this film and how can sound help you accomplish that?

From Realism to Stylized Approaches

The continuum from **realism** in sound to a **stylized** sound design, as with cinematography, cannot be broken down into strict categories. The differences between approaches can be subtle and practices can overlap. Films that overall employ a realistic sound design often use stylization to elevate certain dramatic moments.

Realism obviously can be achieved through **direct sound**, which is the use of sounds recorded at the actual location (usually in sync). This "realism" is a documentary type of realism, but depending on microphone placement it can be more or less convincing. Realism is also achievable through the careful and judicious addition of other nondirect sounds, which are motivated by the scale of a shot (close-ups requiring "closer" sounds and long shots requiring remote sounds), by the dramatic magnitude of the actions, or by character psychology. For example, the sound of a gun firing in an extreme long shot is expected to sound lower and farther away than a gun going off in a close-up. However, the direct sound of a man firing a gun in a long shot might be "realistic," but will also, in all likelihood, be thinner than what most movie audiences expect from a gunshot in a fictional narrative film. If the narrative context calls for a big and violent sound, then adding a closer, darker gunshot sound effect will be necessary and not necessarily unrealistic. Using a sound that enriches the image and adds an expressive or emotional feel to the action from which it emanates is referred to (originally by the sound theorist Michel Chion) as **added value sound**. This "hyper-real" sound effect doesn't in and of itself create a stylized sound approach. Although it is an artifice, it in fact gives a stronger impression of realism by reinforcing the emotional energy of the dramatic moment. Remember, "sound is a heart thing." However, if we should add a sound effect of a lion's roar inside the gunshot to augment the menace and power of the gun, we would then be pulling away from realism into stylization.

A simple example of this can be seen in Akira Kurosawa's *Dreams* (1990) (Figure 22-27). In "The Tunnel" segment, an officer walks along a small mountain road, returning home from a battle in which his entire platoon has been annihilated. As he enters a tunnel, he is confronted by a rabid dog, which bares its teeth and growls at him. Through a layered sound design, each bark and growl of the dog includes real vicious dog barks with what sounds like gunshots and cannon fire. The sound effect not only increases the ferociousness of the dog, but through it we understand that this is not a "real" dog, it's a hound from hell, a

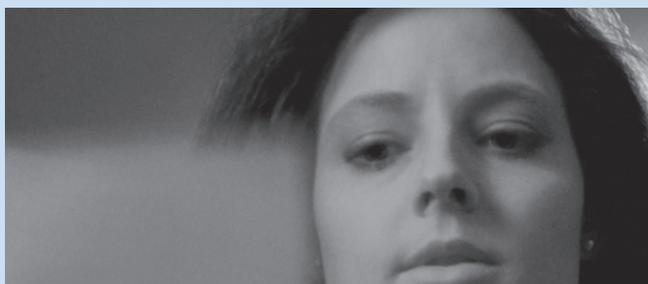


■ **Figure 22-27** The barking of this dog in Kurosawa's *Dreams* is manipulated to sound much more aggressive than in real life. Film theorist Michel Chion calls this type of sound manipulation "added value sound."

dog from the hell of war. In keeping with the otherworldliness of this particular “dream” (or nightmare, in this case), Kurosawa employs an otherworldly, stylized sound approach.

■ THE SOUND OF STRICT REALISM

The Dardenne Brothers' 1996 film *La Promesse* is an excellent example of a realist film that uses a direct sound approach almost exclusively to express its tragic story in an utterly honest and immediate way. The Dardenne Brothers' aesthetic approach to this film, as with all of their other films, is a fairly strict *vérité* documentary style: handheld camera,



■ **Figure 22-28** Realistic and stylized sound design. In *La Promesse* the Dardenne Brothers maintain audio that matches the documentary style of the cinematography (*top*). *The Wrestler* maintains a realist tone for most of the film, but includes two moments of subjective sound design (*center*). In Demme's *The Silence of the Lambs*, sound designer Skip Lievsay often interjects stylized, subjective sounds when the dramatic tension is elevated (*bottom*).

real locations, natural light, and almost exclusively direct audio recorded by the microphone in the field. An example of the effectiveness of the Dardenne Brothers' uncompromising approach occurs early in the film, when the main character, Igor, a 15-year-old boy, is running through a building under construction, warning all of the illegal immigrant workers to flee because inspectors are on their way. As he climbs a staircase, Igor hears Amidou, an illegal immigrant from Africa, fall several floors from the scaffolding. Igor races down the stairs; when he reaches Amidou, Igor sees that he is badly hurt. Just before the man dies, he asks the boy to take care of his wife and the boy promises that he will. It's a central and highly dramatic moment in the film—but the audio remains absolutely realistic and without any embellishment. What the boy hears in the stairwell is the very faint and simple clank of a scaffolding pipe breaking loose. It's easy to miss, and we certainly don't know what has happened until the boy reaches Amidou outside. During the dialogue between them, not one additional sound is used to pull pathos from the moment. There is no sad music, no added value sound effects, no special ambience to enrobe these characters at this moment in which everything is suddenly and dramatically changed. The track consists of whatever was picked up on the boom mic in the field. The strict use of nothing but direct sound leads the audience to feel that this is not a constructed fictional film, that this did indeed truly happen. In this unembellished moment we feel as if we are kneeling right next to Amidou and Igor (**Figure 22-28 top**).

■ REALISM WITH ELEVATED MOMENTS

Darren Aronofsky's film *The Wrestler* (2008) follows the bitter end of an aging professional wrestler's career as he struggles to find a new life after a devastating heart attack. *The Wrestler* can be described as having a realistic style, both visually and aurally. Indeed many people have noted its “documentary-like” look and feel. True to form, the ambient sound throughout the film faithfully reflects the locations of each scene. But there are two notable deviations, which add nondiegetic sounds in an attempt to get us inside the main character's perspective. The first exception takes place when Randy “The Ram” has his heart attack following a particularly brutal

wrestling match. As Randy doubles over in pain, the ambience of the locker room is replaced by a high-pitched whine and echoes of voices, which draw us into what Randy is experiencing during this brush with death. The second instance, later in the film, is an even greater stylistic departure from realism. Randy has secured a new job working the deli counter at a supermarket. As he walks through the hallways, stockrooms, and loading areas in the back of the supermarket on his way to the deli counter, the ambience of the supermarket slowly fades out and is replaced by the sound of a cheering crowd. These are the cheers Randy would have heard in his wrestling prime, when he was star, making his way through the sports arena tunnels from the locker room to the ring. Placed here, the cheers are a commentary by the filmmaker, reminding us of who Randy once was and showing us what he's become. It's a brief moment in the film, but it's heartbreaking because it reinforces the fact that wrestling is still this man's life, his entire identity; but now, as he pushes through the plastic curtains, he is not entering the ring to fight in the main event, he is entering a deli counter to sling potato salad (Figure 22-28 center).

■ STORY AND A STYLIZED DESIGN

Jonathan Demme's *The Silence of the Lambs* (1991) is a classic example of a film, shot in a highly dramatic style, which uses added value sounds (ambience and sound effects) in a more or less "realistic" way throughout most of the film, but then selectively elevates other, exceptionally dramatic moments by incorporating overtly stylistic flourishes to the sound design. For example, early in the film, just as the lead character, Clarice Starling, is about to meet the serial killer, Hannibal Lecter, for the first time, the chief administrator of the institution, Dr. Chilton, shows

Clarice a photograph of one of Hannibal's victims. We do not see the photograph she is looking at, only her reaction, but the sound track leaves no doubt as to the gruesomeness of the image and the savagery of Lecter's actions. On the dialogue track Chilton talks about the attack on a nurse, "When she leaned over him he did *this* to her . . . they managed to save an eye, reset her jaw more or less" and his voice is recorded oppressively close, too close for comfort, like he's right at our ear. The ambience track suddenly becomes thick with a portentous low bass rumble and a sound effects track additionally layers the diabolical groans and malevolent breathing of a madman. Although Clarice is trying to remain professional and confident, the sound track infuses the scene with fear. This is not objective fear, it is *her* fear, escalating like a spiking pulse rate, and we share her dread that when she sees Hannibal, she will be seeing the face of evil. A few moments later, as Clarice enters the secure cell block where Hannibal is imprisoned, the automatic prison bars close behind her with a decisive, resounding, and exaggerated *clang*, giving her and us the feeling that she is well and good locked in with a madman who eats people's faces. Then, the moment she begins her tentative progress toward Hannibal's cell, the music track slips in. A slow, low-pitched dirge, a frightening musical scale, descends lower and lower the closer she gets to "Hannibal the Cannibal," who, once he sees her, greets her with a surprisingly courteous "Good Morning." All of these sounds (ambience, sound effects, and music) are not merely hyper-real, they are downright expressionistic. The sound design not only amplifies the terror that the young FBI agent is feeling at meeting her first serial killer face to face, but it communicates her emotional point of view so directly that we feel what she is feeling as well (Figure 22-28 bottom).

■ SOUND DESIGN IN THE VOICE & VISION ONLINE FILMS



The five *Voice & Vision* online example films provide an excellent study in sound design. One reason these films were chosen was for the variety of approaches they take to sound. It's instructive to consider and compare how their different approaches to sound design correlate with their particular stories. Two of these films use no dialogue whatsoever, one is primarily voice-over, two others are essentially dialogue driven. Two films use no music, another uses source music, and three others

incorporate score music. Be sure to check them all out on the *Voice & Vision* companion website.

The Black Hole

There is no dialogue in this brief, action-driven film, so without the need for sync sound, *The Black Hole* could be shot entirely MOS. There is no music in this film either. All the narrative and emotional sound work is achieved through a well conceived ambient track and sound effects (all added in postproduction). This is a very efficient way to work. In terms of hard sound effects, listen to the otherworldly hum in the

shots from the underside of the hole (as if that POV were from another dimension) and the dark electrical buzz when the character puts a finger or hand into the hole. Listen carefully at the moment when he gets the idea to plunder the safe—he's eating the candy bar and takes a big, greedy bite out of it; the heightened, wet sound of his smacking lips underscores his avarice. It's subtle and sharp. More overt is the climax of the film, which is intensified by the escalation of the black hole buzzing sound and his heavy breathing as he plunders the safe. Also, listen closely to the ambient track. At first it seems like an ordinary office environment, with the rhythmic beeping of a photocopier making multiple copies, but the filmmakers never let up on that beeping sound. Throughout the film, that beeping takes on various overtones depending on the actions of the main character and in the end (it seems to me), the beeping mocks him; life goes on as usual, the task he's supposed to be performing—photocopying papers—continues without him.

Plastic Bag

The ambience and sounds effects in this film are more or less realistic. The sounds of the plastic bag, wind, water, beach, bulldozers, seagulls, bugs, etc. are all what we'd expect. There is notably one stylized moment when the plastic bag is “born” early on in the film, when it take its “first breath,” and the ambient sound of the supermarket becomes clear. This little aural moment seems to imply that before the bag is opened and put to use, it was in a state of silent, pre-consciousness. Clearly the dominant sound track in this film is the voice-over track (spoken by Werner Herzog). As I mentioned before, voice-over works best when you do not use it to tell the entire story or duplicate what we see on screen; instead it should add another layer to our understanding of the story. Turn off the sound and you will still get the very basic story: A plastic bag from the supermarket goes home with a woman who uses it for other tasks. After she uses it to clean up a dog's mess, the bag is discarded and winds up in the landfill. It is then blown around by the winds through a landscape that is utterly devoid of human life, and it winds up in the ocean with a lot of other plastic bags. But include the voice-over and you'll see all the new layers it adds to this simple journey. Primarily, the voice infuses the bag with human consciousness and motivation. Not only does the bag refer to its “skin,” “hand,” and “mind,” but it also speaks of desires, fear, hope, beauty, joy, madness, despair, and needing a purpose in the world. The bag is more than a sentient being—it's a sensitive soul. This “humanity”

means that it also perceives its condition of loneliness, purposelessness, and immortality as a human would—as a terrible tragedy. Also critical to *Plastic Bag* is the score (by Kjartan Sveinsson of *Sigur Ros*). Though quite subtle, the music underscores the various emotional shades in the film, and it also helps to change narrative direction. Listen carefully to when the music comes up and when it falls out again and when it changes (slightly) in tone. The first time music enters is fully six minutes into the film, when the bag learns to “navigate the winds” and decides to look for its maker. Watch this film and take note of when the music enters and drops out, and you'll see how Bahrani uses the score to skillfully delineate the narrative beats and emotional progression of the journey.

Waking Dreams

Turn off the sound in this film and you won't get it at all. *Waking Dreams* is a heavily dialogue-driven film and relies on location sync sound. Character, motivation, and the central existential question play out in the verbal interactions between the office temp Becky and the executive Mr. Saroyan. As I mention on pages 40–41, Daschbach handles the dialogue extremely well. His characters do not tell us the story or their feelings in words; rather the dialogue is part of dramatizing their reactions to this rather bizarre encounter. There is clearly some added ambient sound of the office environment (off-screen typing, phones ringing, etc.) to provide authenticity to the location, and for most of the film Daschbach stays with a highly realistic sound design. There is not much in the way of music or sound effects in the film except as transition devices (i.e., the airplane and Caribbean steel pan drums to efficiently indicate that time has passed and Mr. Saroyan took his vacation, and a few notes played backward to suture scenes together). However, in the last scene, piano score music is laid over the street ambience to add a new emotional layer to Mr. Saroyan's indecisiveness at this critical moment, which elevates this final scene into a genuinely existential dilemma.

This is It

Despite the stylized form of the frenetic narrative, Alexander Engel's film *This is It* remains principally in the realm of realism. The dominant audio track in the film is straight up sync dialogue and there is no music until the end credits; however, it's in the sound effects where things get interesting. A close listen reveals a subtle, yet very precise design that supports the film's realism while occasionally including some humorous stylizations.

Most of the sound effects in *This Is It* are naturalistic hard effects. For example, the *squeaky faucet* (“Hey, did you shower last?”), the *buzzing razor* (“Did you use my clippers?”), and the *aluminum crinkle* (“Do we recycle?”) were recorded as wild PFX tracks on location and synced to the actions in postproduction. The ambient track of *rain falling* that is used under the exterior scene “Did we close the windows?” came from a sound effects library and was inserted in post to convince the viewer that it’s raining even though that shot was taken on a sunny day with all the other exterior shots. Another sound effect that came from a sound effects library was the critically important *bing-bong doorbell* sound. As Engel tells it, “The actual apartment doorbell was this buzzer and it just didn’t sound right. I wanted one of those old fashioned two-tone doorbells. It had to have just the right *ding* and *dong*. Used at the right moment it adds humor.” One of those moments is in the sequence where Kip is reading Jules’ email; Jules: “Are you reading my email?” Kip: “Are you cheating on Marla?” and Jules’ reaction shot shows him opening his mouth speechlessly just as we hear the *bing-bong doorbell*. The timing of this sound effect turns an otherwise realistic doorbell sound into an overtly humorous directorial flourish. And the same effect cue also serves as a diegetic sound bridge to the next scene, Marla coming over to talk with Kip “Doesn’t he love me anymore?” All of these examples reflect diegetic sounds, however there are also a few moments in the film where Engel seamlessly inserts nondiegetic sounds. For example, the *jet airplane* noise used as a time ellipse transition device implying that Kip has left and returned from his travels to find Jules’ sister asleep on the sofa, “Is it cool if my sister stays with us?” and the subsequent *gas range pilot clicking* when he sees his dead plant. Similar to the *doorbell*, this latter sound is also used as a sound bridge and changes from nondiegetic to diegetic as it takes us into the next scene where the sister is frying up an egg and asking (way too late), “Do you want the last egg?” Another example of a nondiegetic sound effect is the emphatic *water drip* noise that punctuates the climactic moment when

Kip and Marla finally connect romantically, “Doesn’t this need water?” Echoing David Lynch, Engel says “for me sound is so important, the soundscape is half of the movie. I knew that this film was going to have quick beats – one second shots, quick actions, quick cuts – but the beats, the rhythm of the film, can also be created by the sounds you use. There are moments where I wanted sounds to create the beats.”

When I Was Young

Strict realism is the general sound design approach for this film. It would be inappropriate to be too polished or hyperbolic with a film that has a quasi-documentary feel and might contradict the emotional tone of this story of a woman who feels she’s fallen into a life of compromise. In addition to the sync sound, music plays an important role in this film. In keeping with the realist tone, the music is not underscore music but in-scene source music from her radio or played by musicians or whistled by another character. Take note of how Lu uses music as a sound bridge to get us from present day Philadelphia to her memories of the American boy she knew in China.

Vive le 14 Juillet

With no sync dialogue, this film was shot entirely MOS with a small crew. The playful music track (composed of source and prerecorded underscore music) not only identifies this as a distinctively French film (set during Bastille Day after all) but it also carries important narrative functions. Songs like Serge Gainsbourg’s “Sea, Sex, and Sun” put an extra edge on the wayward girlfriend’s flirtatiousness, the military band music at the parade serves to contrast this mild guy with the military brawn around him, and the return to the tender accordion music at the end implies that he has re-won her heart and they are in love again. All the ambience and source sounds were recorded as wild PFX sound (the tank) or were prerecorded sound effects (morning birds) and were mixed with a slightly exaggerated presence, more like cartoon noises than strict realism. Again, this is perfectly consistent with the playful tone of the whole film.



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Cutting Sound and Working with Multiple Tracks

One of the things that I try to hold on to is some sort of creative constraint. For example, one of those creative constraints might be: “I’m going to only give myself eight channels to edit” . . . and if I can’t make something interesting in that eight channels, I am going to get rid of something and replace it with something else until I get something that is, in fact, interesting. And the reason why that’s an important way to work is that it helps you focus on what the music and the sound is truly about. Because if you can’t figure out the essence of “what it’s about” within a creative constraint of a minimum amount of channels then you’re probably doing something wrong.

Ren Klyce (sound designer, *Gone Girl*, *The Social Network*, *Fight Club*)
(From DVD extras, *Panic Room*, 2002)

WORKING WITH MULTIPLE TRACKS

In the previous chapter we defined a film’s **sound design** as the complete aural impression of a movie created through the layering of multiple tracks of sound, and we concentrated on defining the various sound elements and discussing their creative application. In this chapter we will look closely at the more practical aspects of building the sound design, specifically how to work with multiple tracks within a nonlinear editing timeline. The most basic principle of multiple tracks is that it allows us to layer sounds that occur simultaneously in the film, and control the relative prominence and characteristics of each sound layer—for example, a scene in which score music plays under dialogue while we also hear police sirens approaching off screen. This situation would involve at least three tracks of audio running simultaneously (Figure 23-1).

There are four fundamental tasks in audio postproduction: *finding*, *positioning*, *enhancing*, and *mixing*. The first task, **finding** the best lines of dialogue, perfect sound effects, and appropriate music, we have already covered in detail in the previous chapter. The second task, **positioning**, means to locate the precise placement for each sound element in your sound design, meaning the right dramatic moment (horizontally along the timeline) and the best track for individual equalizing and creative sound manipulation (vertically along the layered tracks). The third task, **enhancing**, involves tweaking, fixing, improving, and



■ **Figure 23-1** The timeline for this project has eight tracks of audio—one stereo pair and six mono tracks. NLE systems can layer upward of 99 tracks of audio.

enriching every sound element so that they all function within a coordinated, multi-layered sound design that works toward the same expressive goal as the writing, directing, cinematography, and editing—telling your story in the style you choose. The last task, **mixing**, includes fixing the perfect interplay and relative dynamic levels of each sound element to all the others in the final version of the sound track and bringing them all together into a mix track that is ready for presentation.

On an ultra-low-budget or student film, you will probably do your own sound editing, enhancing, and mixing in your NLE program—which is a great way to learn the value of good sound and the dynamics of a truly expressive sound design. However, as your budgets increase and you're able to hire specialists who come with tools and experience, you will likely “prep” your sound elements in your NLE system and then deliver your project to a specialized **Sound Editor** and **Rerecording Mixer** (or **Dubbing Mixer** in Europe). Or, you yourself may become the postproduction sound specialist. In any case, whatever the scenario, as a filmmaker you will begin in your NLE by building your audio tracks.

Building Your Essential Audio Tracks

Even though popular NLE systems allow us to create more than 100 audio tracks, most films use only a small fraction of this capacity. True, the sound design for *Apocalypse Now* (1979) included more than 75 audio tracks, but short films and low-budget productions can easily be made with anywhere from 3 to 12 tracks of audio. The construction of your sound design follows various stages; starting with the most important audio (essential to understanding the story) and ending with the supplementary sounds (those that add tone, mood, or other sonic dimensions to the film).

We begin to build our tracks from the moment we start to put shots together in the first assembly and first rough cut. If you're cutting a narrative that is dialogue based, then picture and dialogue editing will happen simultaneously. If your film has no dialogue and is driven primarily by a music track, then start with that. As you edit your early rough cuts, you will find it necessary to start adding other sound track layers that also play a vital role in the progress of the story or the rhythms of the cuts and are therefore necessary for picture editing. In other words, start with the most essential audio for each particular scene.

The typical progression for the gradual buildup of audio tracks for a narrative film with sync sound dialogue goes something like this:

1. *Dialogue (narration)*. The first assembly and first rough cut include picture and production dialogue editing. If your film uses voice-over narration, this too will be an early part of the rough cut. These involving only a few tracks of audio.
2. *Essential music*. An additional track is then added for sequences that are intended to be edited to music (for example, montage or action sequences cut to prerecorded music).
3. *Essential sound effects*. Subsequent rough cuts add a sound effect track for important hard sound effects, especially those that are central to the story and to which characters in a scene respond.

Refining Your Sound Design

Once you have arrived at picture lock, with the image and essential audio tracks in their fixed places, you then turn your attention to the supplementary sounds—those sounds that provide extra layers of mood, tone, and narrative information. This is where much of the creative sound design work begins.

The first step in this process is called **spotting for sound** (or just **spotting**). Spotting is the process of sitting down and closely watching the picture-locked movie to identify, scene by scene, the placement and character of any additional sound effects, ambience tracks, or music that are needed. A spotting session for sound effects and ambience will be done with the editor (or **SFX editor**). Thorough notes are made on a **spotting sheet** (a.k.a. **cue**

Date: 10/03 Page 1

POST AUDIO CUE SHEET

TITLE: FearFall DIRECTOR M. Hurbis-Cherrier SND DESIGNER: B. Seery

RERECORD MIXER: B. Seery COMPOSER: _____ FOLEY: _____

MUSIC SFX / AMB FOLEY ADR / VO OTHER

Cue #	T.C. IN	T.C. OUT	Description
1	00:01:58:23	00:02:33:10	Birds Chirping. Cheery (SND #202)
2	02:08:06	02:26:16	V.O. Female Radio Ann. (Filtered)
3	02:41:01	02:55:13	V.O. Male Radio Ann. (Filtered)
4	02:56:21	: : :	Door knock - light
5	03:25:11	03:27:02	Dog Bark (distant)
6	03:54:11	04:10:21	Car Alarm (distant)
7	04:14:22	04:19:25	Birds Chirping (SND #204)
8	04:19:25	: : :	"Chunk!" Wooden Post in ground
9	04:20:18	04:31:16	2 Notebook Keyboards typing - fast
10	04:20:12	04:31:16	Coffee Pot Percolating - low
11	04:31:16	04:37:23	"Hammering" Wooden Post into ground
12	04:37:23	04:39:03	2 Notebook Keyboards typing & Stop
13	04:37:23	04:44:12	Coffee Pot Percolating - intense
14	04:44:12	04:46:22	Office Ambience: phones, typing

■ **Figure 23-2** The first page of the sound effects spotting sheet for *FearFall* (2000). After picture lock, all missing sound effects are listed in the order they occur in the program with their approximate timecode in- and out-points.



You can download a blank spotting sheet from the book's website.

sheet) which details the location (scene, shot, and timecode reference) of each sound effect and music start and end points (sync and nonsync). A separate spotting session will be done with a **composer** or **music editor** to create a **music cue sheet**. Both spotting sheets and music cue sheets include notes on the tone, mood, or other contribution that each sound or music cue is supposed to provide in the film (**Figure 23-2**). Do you want to add an off-screen siren under a tense confrontation? What sort of siren? How far off? On what line exactly does it come in and how long can we hear it before it fades away? When music enters a scene, what mood does it introduce into the moment? How do the tempo and rhythms interact with the picture editing? Spotting is not simply a logistical/technical procedure, especially when working with a composer or sound designer, this process can be a highly collaborative creative process, one where a filmmaker can make further discoveries about the dramatic possibilities embedded in each scene.

After picture lock and SFX/Music spotting, the buildup of further audio tracks proceeds something like this:

1. **Add all hard sound effects.** Once the film has been thoroughly spotted, all of the sound effects must be created (or found) and placed in the appropriate audio track. This usually involves adding a few more tracks if several effects overlap. This is where you replace all scratch sound effects as well.
2. **Room tone tracks.** An additional track is added for production room tone when it is needed to smooth over location transitions, dialogue edits, and dialogue gaps. Remember: with extremely rare exceptions, there should be no place in your sound design where there is utterly no sound. Silence almost always means adding quiet room tone. A complete absence of sound will feel to a viewer like a technical malfunction.
3. **Ambient tracks.** More tracks can be added if you need additional ambient sounds to add a mood or sense of location for a certain scene (like adding the ambient

sound of off-screen waves on the beach to indicate that a scene takes place in a beachfront home).

4. *Score music and background source music.* Finally, after the composer has created the score (specifically to the locked picture edit) and/or you've located any background source music used in the film, you'll need to add still more tracks to accommodate these elements.

By now you should be getting a good idea how a film like *Apocalypse Now* ended up with close to 75 tracks of audio! However, remember that most short and simple films can easily get by with four to eight audio tracks.

■ WHAT ARE SCRATCH TRACKS?

Scratch tracks (also called **temp tracks**) are audio clips (either music, voice-over, or sound effects) that are slugged in temporarily during the editing process when the actual audio still need to be composed, recorded, or located. Rather than hold up the picture

cutting, we insert scratch tracks that have a similar character (rhythm, feel, duration) to the sound we will ultimately use. Scratch tracks are often used in editing the rough cuts to establish basic placement and timing and are replaced when the actual sound is finished and ready to cut in.

Tweaking Sound and Using Workspaces

During the editing stage you will probably need to adjust the audio levels of your tracks somewhat to give yourself an idea for the perspective and balance of the various tracks in relation to the others. This is especially important if you plan to screen rough cuts to get feedback along the way. All NLE systems offer some sort of easily accessible level control right in the timeline. To access this, you must select the timeline setting that shows the **clip audio level overlay** and **waveforms** within each track (**Figure 23-3**). The line that you see drawn through each clip is the system's default level. Using your mouse, you can simply grab the audio overlay and manually raise or lower it to raise or lower the entire clip level. You can adjust tracks globally, by selecting the entire track, or adjust individual clips. Naturally, you'll be keeping a close watch on your level meters to maintain



■ **Figure 23-3** All NLE systems offer level control functions right in the timeline. In this PP timeline, the audio waveforms (a) and clip level overlay (b) are visible, and as the pointer adjusts the audio level overlay, the volume level for the clip is revealed (2.89dB). The audio level meters allow you to monitor your adjustments (c).



■ **Figure 23-4** Adding an audio transition, like this audio dissolve, is as easy as dragging the effect into the timeline and then adjusting the characteristics and duration, like this simple 30-frame cross-fade from one clip to another (PP).

consistency. When it’s important to the story, you can also add simple transitions like sound fades and cross-fades into your sequence as well (**Figure 23-4**).

Indeed, there are more precise methods for adjusting audio levels and introducing transition effects, which we explore later, but you need to be careful. It’s very easy to waste many hours tweaking the volume or cross-fade parameters for this shot, that shot, and the other. Don’t take too much time fine-tuning details that will only be undone and redone later. The editing stage is not the place to get the sound absolutely perfect. Finessing the track level dynamics, creating complex transition effects, and enhancing the sound through equalization and audio filters are done in the final stage of the sound design process—sound mixing (see page 554).

Also remember that most NLE systems offer different workspaces for different tasks (page 470). Obviously, as you build your essential tracks during the rough cut stages, you will likely be in the “picture editing” workspace (or “source/record editing” workspace in Avid parlance). However, when it comes time to refine your sound design after picture lock, you should switch to the “audio editing” workspace which makes detailed audio work much easier (see **Fig. 23-6**).

Sound Track Labels by Type

For the sake of consistency through the various postproduction sound stages, each category of sound has a standard ID abbreviation to be used when labeling clips, folders, and audio tracks during the edit. If you have multiple tracks of any one audio type, you simply number them, e.g., DIA 1, DIA 2, DIA 3, and so on.

Dialogue: DIA	Prerecorded Sound Effects: SFX	Ambience: AMB (or BG for Background)
Dialogue Replacement: ADR	Production Sound Effects: PFX	Room Tone: RT
Voice-Over (Narration): VO	Foley Effects: FFX	Music: MX
Scratch Tracks: add “S-” to the sound type (e.g., scratch music: S-MX, scratch narration: S-VO)		

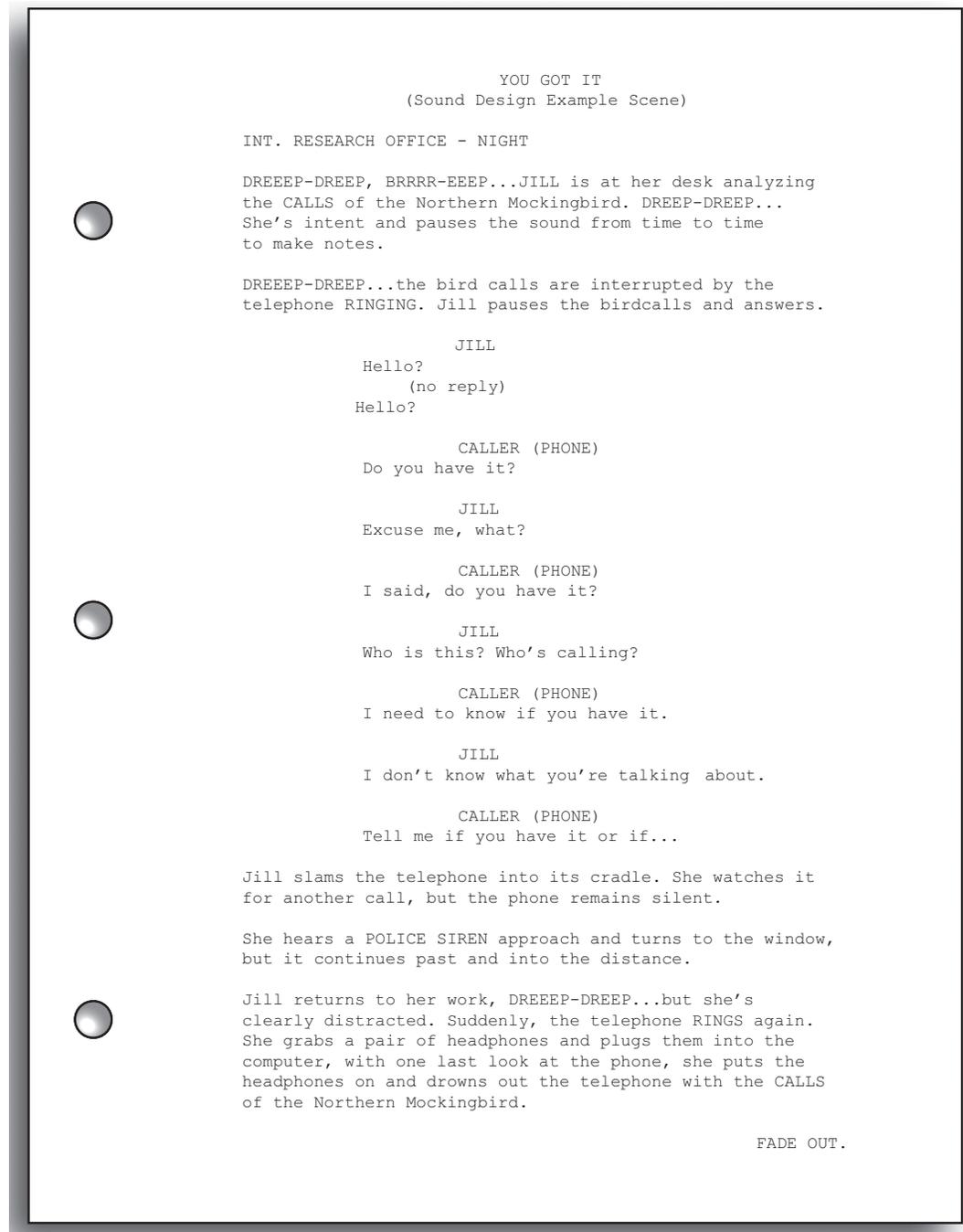
■ **BASIC SOUND DESIGN: ANALYSIS OF A SIMPLE SCENE**

Let’s analyze the sound design of a simple scene, that has a few stylistic flourishes, and explore the functions and uses of each type of sound in a basic, multi-layered soundtrack.

Synopsis: In *You Got It* scene 28, the celebrated ornithologist Dr. Jill Hauber is doing research late into the night when she receives a disturbing phone call concerning a mysterious package which has recently come into her possession. The scene is pivotal because it reveals to her that the package may contain something illicit and that she is being watched—but she doesn't know by whom.

 **Figure 23-5** is the screenplay page for *You Got It* scene 28 and **Figure 23-6** shows the audio track layout for the edited scene at the picture lock stage (before the sound mix). The actual scene can be streamed on the *Voice & Vision* companion website so that you can listen to the sound design as you read the following pages.

■ **Figure 23-5** A screenplay page from the short film *You Got It* scene 28. This scene requires simple, yet precise sound layering. See the finished scene on the *Voice & Vision* companion website.





■ **Figure 23-6** The eight audio tracks for *You Got It* scene 28. The track IDs are along the left edge of the timeline (from top to bottom): DIA 1-Jill's sync dialogue; DIA 2-Caller's voice; RT-production room tone; SFX 1-Bird calls; SFX 2-Phone ringing and more bird calls; SFX 3-Police siren; MX-score music; AMB-Light traffic ambience.

Dialogue Tracks

There are two tracks for dialogue in *You Got It* scene 28: **DIA 1** contains Jill's dialogue recorded on location, and **DIA 2** contains the Caller's voice on the telephone, which was recorded in a studio during postproduction. This interaction could have been edited on a single track, but the idea behind splitting the dialogue onto two tracks is that you have greater flexibility to equalize each track separately. To **equalize (EQ)** basically means adjusting the various frequencies and characteristics of a sound to achieve a specific quality (see "The Sound Mix" section later in the chapter).

The most common use of EQing dialogue occurs with dialogue exchanges that are recorded in the same location, but with different shots (i.e., master shot and reverse angles). In this case, a slight difference in ambient sound from one shot to another (like an air conditioner kicking on for only one angle) or even a simple shift in microphone angle and proximity can make the edits between lines of dialogue too obvious for continuity's sake, so splitting the dialogue allows you to easily EQ one or both tracks so that they match better.

In the case of *You Got It* scene 28, the Caller's voice was recorded normally in post, but then needed to be EQed to sound like it was coming through the handset speaker, so the entire DIA 2 track was selected and equalized by greatly suppressing the low frequencies, leaving mid-range, and boosting the high frequencies to create that tinny, filtered phone voice quality (**Figure 23-7**).

If the sound quality of your dialogue matches perfectly and you have no overlaps, then you don't necessarily need to split tracks for a rough cut. Any smoothing out can be accomplished with quick cross-fades (four frames or so) between dialogue edits to smooth out the cut point (**Figure 23-8**).



■ **Figure 23-7** By applying the EQ filter to a specific clip (a), you can attenuate specific frequencies in the sound spectrum (b), as with this example of a recorded voice EQed to sound like it's coming through a telephone handset.



■ **Figure 23-8** The arrows point to the four frame cross-fades that are commonly used to smooth over sound edits when cutting dialogue on a single track. This is only done when the audio quality of the different clips are nearly identical, like these two characters who were recorded in the same space and with the same microphone.

You'll also notice that there are three spaces in DIA 1 that roughly equal the three lines of phone voice in DIA 2. During the shooting of the scene, the director actually read the Caller's lines out loud to aid Jill's performance. Then, during the edit, the director's off-screen voice was removed (hence the gaps) and replaced with the Caller's voice, recorded days later.

Room Tone Track

The third track in the sound design is **RT** or **room tone**. The room tone you recorded during production at the location (see page 399) is downloaded into the computer and saved as a sound clip with the other editing elements for the scene. Room tone is used primarily to fill in "silent" gaps between lines of dialogue. Remember that silence in film, as in real life, does not mean the total absence of sound. Background noises in the environment are always present. In this way, room tone can give an editor great flexibility to cut lines, extend pauses, and manipulate the pace of a scene.

Room tone is also used to create a seamless aural environment for dialogue recorded in post and inserted into the scene. In the case of the example film, the Caller's dialogue was recorded in a sound booth days later, so placing a clip of room tone under each line was necessary to maintain ambient sound continuity from Jill's lines to the Caller's lines (**Figure 23-9**).



■ **Figure 23-9** On the room tone track for *You Got It* scene 28, clean room tone was cut in to fill the gaps in the Jill’s sync audio where the director called out performance cues (arrows) and to add location ambience under the Caller’s voice (brackets).

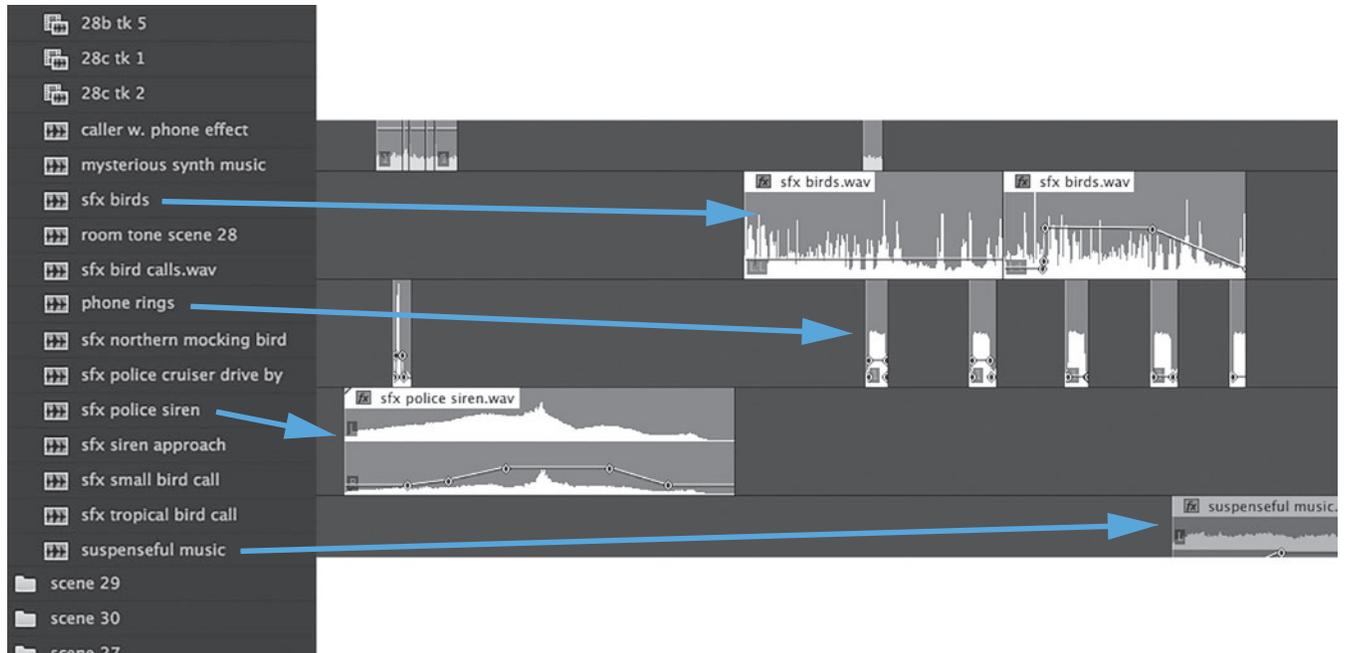
But you’ll notice that there are three other room tone clips on the track covering over areas where there is no dialogue. Those areas are where the telephone rings and the police siren passes by outside her window. The phone ringing and siren sound effects are from a SFX library and were added during the edit, so to get a convincing and correctly timed performance, the director “verbally cued” the actor at precisely the moment when those noises occur; meaning that during the take, the director called out, “Telephone rings . . .” and later “A police siren is approaching . . . it’s getting closer . . . it passes and fades away . . .” and finally, “The phone rings again . . .” The sound recordist, of course, picked up all of this, so these bits in the original sync take were cut out and replaced with nice, clean room tone on the RT track. This illustrates another use of room tone: replacing any parts of the existing ambience that contain noises the recordist picked up, but that you’d rather not have in the sound design. For example, if a motorcycle roars past in what is otherwise a perfect take, you just need to replace the motorcycle section with the clean room tone you recorded at the location. Related to this are the picture edits, like cutaway shots, that are shot MOS and therefore need ambience under them to fill in the “silent” gaps (see **Fig. 23-8**).

So, the four basic uses for room tone are: (1) smooth out ambience continuity from one shot to another, (2) fill in audio gaps or add pauses in dialogue allowing for dialogue cuts and rhythm flexibility, (3) fill ambient sound gaps where MOS shots or SFXs have been inserted into the timeline, and (4) replace areas in the sync track that contain unwanted noise. This is why it’s critical for the sound recordist to record at least one minute of clean room tone at every location before you break down the set.

Sound Effects Track

There are three sound effects tracks in *You Got It* scene 28: **SFX 1** consists of the bird calls ostensibly coming from Jill’s computer speakers. **SFX 2** contains all the telephone ring tones and pick-up/hang-up handset noises (which were insufficiently audible in the sync recording), as well as a few more bird calls at the beginning to create some extra texture. Finally, **SFX 3** has the police siren effect. All of these sound effects are prerecorded hard effects that were downloaded from an online sound effects library and, just like room tone, they were logged, named, and saved along with the sync takes and other editing elements for each scene. In this case, three different “police siren drive-bys” of varying lengths and quality were downloaded and tried out in the scene before the right one was found and multiple bird call SFX were tested and used in the sound design (**Figure 23-10**).

As I mentioned in the room tone section, each sound effect was “cued” by the director during the shooting to assure a careful alignment with Jill’s actions, eye movements, and focus—especially during the passing siren section. These verbal cues, picked up in the sync recording, were removed and replaced by the actual sound effect (and clean room tone as well).



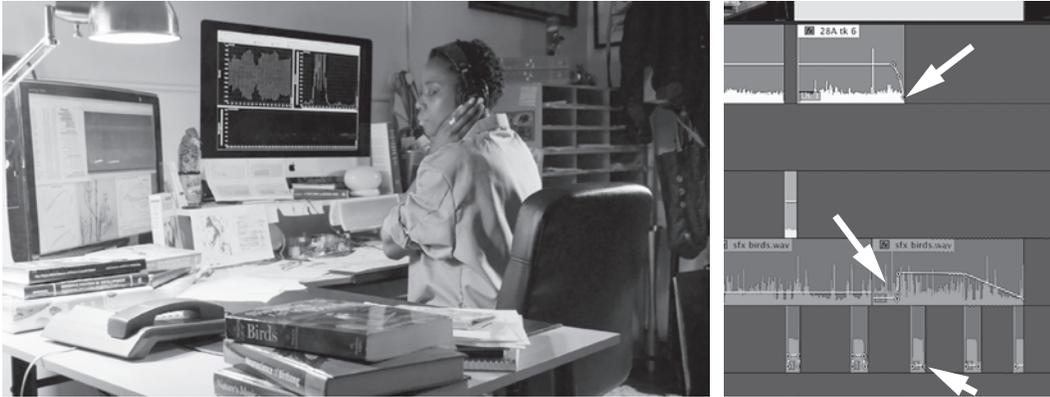
■ **Figure 23-10** Detail of the three sound effects tracks from *You Got It* scene 28 (right). All audio assets for a particular scene should be saved in the same scene folder as the video files (left).

Inserting hard effects can be tricky as they can sound artificially tacked on top of a scene. It's important to EQ them and carefully adjust sound levels so that they feel natural and integrated into the aural environment. This is clearly illustrated by the audio level manipulation for the police car drive-by, and the plunge in the bird call levels when she plugs in her headphones (with only a hint remaining as if the bird calls are leaking out of her headphones). You'll also notice that while most of the sound effects are mono tracks, the police siren on SFX 3 is a stereo track with a left and right channel. This allowed the sound to be routed differently to a left and right speaker adding texture. In the case of the police siren, the stereo pair allows the siren sound to literally move from the left speaker to the right speaker, thus replicating the Doppler effect of a police cruiser racing by on the street outside (which also follows her focus in the moment). The effect of shifting sound emphasis from one speaker to another is called **panning**.

On a technical note, it's important that your sound effects be as clean as possible, without too much ambience behind the noise you want. Also, cut the effect as tightly as possible, without clipping off any of the sound. When adding additional tracks, you want to avoid piling ambience on ambience each time to cut in a different sound effect. This is why good sound effects libraries are useful: the sounds are generally quite clean. If you record your own sound effects, try to find as quiet a location as possible and close-mic the recording. You can always create sound perspective later in the mix.

Beyond Utility: The Idea Behind the Design

Beyond simply reinforcing the verisimilitude of the location and actions, listen carefully—*You Got It* scene 28 actually does something very clever with the sound effects. Narratively speaking, this scene represents a psychological shift in our character by introducing a creeping paranoia, so to reflect this, the sound design itself shifts. It begins by presenting the sounds in Jill's environment from an objective perspective, the sounds natural to a viewer's perspective, all the way to the point when she plugs the headphones in and the bird call sounds drop in volume as if they are coming from the headphones. However, the moment she places the headphones over her ears, the room ambience drops out and the sound design shifts to a *subjective perspective*—we only hear what Jill hears (as if we too have placed the headphones over our ears); amplified birdcalls from the headphones and the *very faint* ringing of the telephone that she can't quite block out (could those persistent rings be coming from her mind?) (Figure 23-11).



■ **Figure 23-11** When Jill puts her headphones on the scene shifts from objective to subjective sound design; accomplished through careful volume manipulation. This places us inside Jill’s aural POV.

in practice

■ SOUND FX LIBRARIES

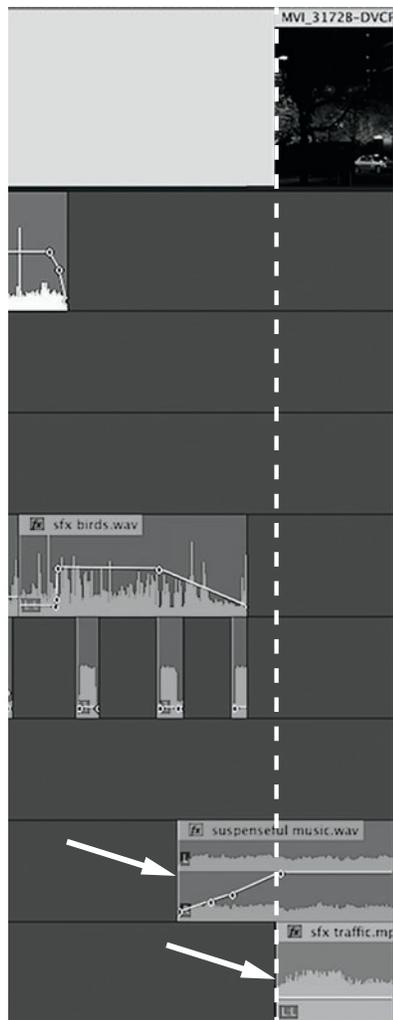
Sound effects collections come either on CDs or can be found through numerous sites on the internet, where you pay per sound effect download (there are a few free sites as well). Popular royalty free CD libraries include Hollywood Edge and Digifffects, and popular online SFX sites include Sound Dogs, Pro Sound Effects, Soundeffects+, and Free Sounds. Sound Ideas is a useful website where you can purchase individual sounds or entire CD libraries. A good sound effects collection can provide you with sounds you could only dream of recording on your own: dozens of factory noises, hundreds of airplane and helicopter fly-bys, and more dog barks and cat meows than you can imagine. If you need the sound of a 1965 Mustang starting up and pulling away, you’ll find it. If you want the wheels to screech, they’ve got that too (**Figure 23-12**).

But beware, not all commercial effects libraries are created equal and some are mostly garbage. Wading through the bad stuff to find the sounds you can

actually use can take a lot of research time. Also be aware that sound effects libraries come from different countries and can, for many effects, sound different. The difference between American and European police sirens is an obvious example, but interestingly, even though you cannot make out any words, walla also contains national characteristics. When I was an undergraduate (before there was such a thing as online sound FX libraries), my department had only one sound FX resource, which was produced by the BBC. In one of my first sync sound films I had a scene in a restaurant and tried to use the “restaurant walla” from this collection. The effect was not exactly what I was after. While my actors were clearly from the American Midwest, the restaurant patrons in the background were right out of Notting Hill. And forget about using a “car starting up” sound: our choices were a Mini-Cooper, a Jaguar, an Austin-Healey, and a Rolls Royce. Sure, they’ve got motors, but they also had a British accent.

Siren, Police	Siren: English Police Siren Constant.	0:41	#european edition #vehicle #sirens #foreign	Sound Effects	\$2.99	
Siren, Police	Police Siren, Waller Type, Medium Distant By.	0:22	#the edge edition volume 1 #vehicle #sirens #horns sirens	Sound Effects	\$2.99	
Siren, Police	Police Siren, Coming & Going	0:11	#the edge edition volume 1 #vehicle #sirens #horns sirens	Sound Effects	\$2.99	
Siren, Police	Police Siren, Coming & Going (Slower)	0:11	#the edge edition volume 1 #vehicle #sirens #horns sirens	Sound Effects	\$2.99	
Siren, Police	Police Siren, Coming & Going	0:13	#the edge edition volume 1 #vehicle #sirens #horns sirens	Sound Effects	\$2.99	
Traffic, Medium	Ambience: Medium City Traffic with Police Siren And Multiple Car Bys.	2:10	#the edge edition volume 2 #traffic #ext #various	Sound Effects	\$4.99	
Auto, Police, Siren	Police Siren: Various Types From Idle Car.	0:37	#the edge edition volume 2 #vehicle #sirens #hi lo	Sound Effects	\$2.99	
Auto, Police, Siren	Police Siren: In Tunnel with Various Types.	0:34	#the edge edition volume 2 #vehicle #sirens #hi lo	Sound Effects	\$2.99	

■ **Figure 23-12** An enormous repository of prerecorded hard effects and ambient sounds can be found through commercial sound effect libraries on CDs or on the internet for downloading individual sounds, like these from stockmusic.com.



■ **Figure 23-13** At the end of *You Got It* scene 28, you'll hear score music used as a sound bridge from the interior scene to a hospital establishing shot, as well as traffic ambience used to bring us aurally to the new exterior location. Sound bridges are a common device used to create emotional or narrative links, and momentum, from one scene to the next.

Ambience Track

Ambience is related to room tone, which is a kind of ambience also. However, in sound cutting terms, **ambience** (also called **backgrounds**) is a background effects track that creates a specific sense of space and location. Many films work quite well with just the production ambience recorded in the field, but ambience can be manipulated, as we saw in the previous chapter, to add another layer of narrative meaning or emotional tone. Adding separate ambience allows us to shoot our scenes in as quiet a location as possible, and concentrate on getting the best possible sonic recording of the dialogue, knowing that we can create a specific sonic background context for the location and the scene in the sound editing. For example, take a scene of a couple inside a small motel room. If you add an ambient track of gentle waves lapping on a shore (off screen), the location becomes a seaside motel. Add an ambient track of highway traffic (off screen) and it's instantly a roadside motel.

For *You Got It* scene 28, the room tone of the location was appropriate to the scene and worked just fine. However, the incoming scene (scene #29) is an exterior shot of a research center with a steady flow of traffic off screen and visible in the foreground. The establishing shot of the building, a hospital in fact, was filmed for a documentary project years before, but never used. It was cleverly re-purposed in *You Got It* to establish the exterior research center location. A simple “light traffic” ambience track (taken from a SFX CD collection) was added underneath to complete the authenticity of the shot (on AMB, the seventh sound track) because the original audio was not acceptable. If you listen closely, you'll notice that the editor perfectly timed the visual of a passing car with the sound of a passing car in the ambient track (**Figure 23-13**).

Music Track

Given the complexity of the SFX tracks, there is not much music underscoring *You Got It* scene 28; however, motivated by a significant narrative and emotional shift to the “dark side” near the end of this scene, ominous score music is introduced at the very end which serves to bring the new sense of foreboding from scene 28 into scene 29 (soundtrack 6, MX). This technique is called a **sound bridge** and it is designed to link adjacent scenes with a common emotional context through music or other sounds (see **Fig. 23-13**).

■ THE SOUND BRIDGE

Sound bridges are a very common sound editing technique involving any sound that overlaps from one scene into another. Sound bridges can involve a sound from one scene continuing into the following scene or, vice versa, the sound from the incoming scene beginning early, at the tail end of the preceding scene. Sound bridges create a strong and smooth connection between scenes by carrying over the emotional content of one scene into the other. Musical sound bridges are the most common, but sound effects and dialogue can also be used as sound

bridges. Like any other technique that creates strong associations, sound bridges can be extremely powerful and adaptable in their specific application.

■ MUSIC SOUND BRIDGE

The story of Bernard Rose's *Immortal Beloved* (1994) (**Figure 23-14**) revolves around the mystery of Ludwig van Beethoven's famous love letter to his unnamed “immortal beloved.” The ending sequence of the film includes a sound bridge constructed around Beethoven's most famous and influential composition, the mighty Ninth Symphony. The

sequence begins with an investigator talking to one of Beethoven's presumed mistresses, while the last movement of the Ninth Symphony underscores the scene (as nondiegetic music). The music continues as we cut to a concert hall, which shows an orchestra playing the symphony (the music is now diegetic). When Beethoven comes onto the stage, the sound is drastically muted and muffled to reflect his near total deafness (now it is subjective sound). The full aural dimension of the music returns as the film cuts to a flashback of Beethoven as a child, tormented by his father. The Ninth Symphony in this sequence serves as a sound bridge for three scenes that take place in three different eras and locations. In addition, the music transforms into three different sound modes: nondiegetic score music, diegetic source music, and subjective sound.

■ DIALOGUE SOUND BRIDGE

Fritz Lang's *M* (1931) contains perhaps one of cinema's earliest sound bridges and it remains one of the most eloquent and moving moments on film. After we see the little girl Elsie lured away by a man who has bought her a balloon, Lang cuts to her mother, who anxiously waits for her child to come home. The mother goes to her window, opens it wide, and calls for her little girl, "Elsie!" "Elsie!" (Figure 23-15). The sound of her voice bridges the next few edits, which take us out of the apartment, to the staircase, and to an attic, places where the little girl should be and that are still in earshot of the mother's continuing cries of "Elsie!" Elsie! But suddenly the calling stops and Lang presents us with three stunning shots in silence. Elsie's empty place at the family table, the little girl's toy ball rolling out of a thicket of brush, and the balloon, tangled in the wires of an electrical pole. The meaning couldn't be clearer: Elsie is another victim of the child killer.



■ **Figure 23-14** Rose's *Immortal Beloved* uses the music from the premiere of Beethoven's Ninth Symphony to bridge several scenes in one of the last sequences of the film.



■ **Figure 23-15** Although made only a few years after the introduction of sync sound in film, Lang's *M* experimented with sophisticated techniques, such as using an extended dialogue sound bridge over multiple shots that move us through empty space.

■ THE SOUND MIX

For most student, short, and ultra-low-budget films that are edited and finished on an NLE system, it's hard to strictly delineate the editing and sound cutting phase from the sound mixing stage. To be sure, as you work with your rough cuts and build your sound design, you will be doing some rough sound mixing along the way, especially if you screen test your rough cuts for feedback. But at some point, after picture lock and after you've more or less gathered all of the actual sounds you will use for your sound design and placed them more or less where they need to be, you must turn your attention exclusively to perfecting the way your movie sounds.

The **sound mix** is the process of polishing and finalizing the various audio tracks in your sound design and creating a single **mixtrack**, which is the mono or stereo sound track that is then married to your images and accompanies your film into distribution and exhibition. The ultimate goal of a sound mix is to create a harmonious sonic environment for your film, harmonious meaning that the completed sound design is both believable and appropriate for the conceptual and aesthetic aims of your motion picture. In this respect, the sound mix should not be viewed as merely a polishing process; rather there are substantial creative decisions to be made here.

The Sound Mixing Steps

The sound mix process involves five steps, generally in this order: (1) final sound selection and placement, (2) audio sweetening, (3) creating audio transitions, (4) audio level balancing, and (5) the mix down. Let's look at them one at a time.

Step 1: Final Sound Selection, Placement, and Splitting Tracks

As we discussed previously, the rough cut editing process involves a somewhat expeditious use of sound in order to get the film to a picture locked phase. This means using some sounds that will end up in the final film (like dialogue, production sound effects, or prerecorded music) and inserting scratch tracks as placeholders until you find or record the perfect sound (like sound effects, voice-over, or score music). But the final sound mix is the moment of truth: you must select, or record, all final sounds that make up your sound design and precisely place these sounds into your timeline, replacing all scratch tracks.

Preparing for your sound mix also involves **splitting tracks**. Often, it is easier to begin editing with most of the dialogue on two to four tracks and all of your ambience and sound effects on two or three additional tracks so you don't have to keep expanding the timeline vertically to see all your audio elements at the same time. But, as you prepare for the sound mix you will want to spread your audio out onto more tracks. The goal is to keep all the audio for each character, sound effect, and ambience, for every scene, on discrete tracks (or set of two tracks if you have stereo sync tracks with the picture). The principle is to make it simpler to isolate the audio for each character, sound effect, or ambience clip for a given section of the film, which in turn makes it easier to control volume and apply equalization (EQ) and effects across a range of similar audio clips.

There may also be times when you may want to **checkerboard** the dialogue audio for each character. This means alternating the clips of their audio over two (or four) tracks. So, for example, if you have chosen tracks 1–2 for Character A's dialogue, you would place the first audio clip on track 1, the second on track 2, and the third on track 1. This is called "checkerboarding" because it results in the alternating pattern found on a checkerboard. The reason for checkerboarding is that it allows you to make more complex transitions in areas where you may want to eliminate or rearrange lines of dialogue, or create or delete pauses in recorded dialogue.

Step 2: Audio Sweetening

Audio sweetening simply means making your audio sound better. Sweetening includes a variety of audio signal processing tools that can be employed to accomplish three goals:

to generally enhance the quality of the audio, to repair poor audio, and to create audio effects. Every individual audio clip, across each audio track (i.e., dialogue, sound effects, ambience), is evaluated and adjusted as necessary, one track at a time. And this is why we split audio tracks; when similar audio only (i.e., a single character's dialogue) is contained on a track, it allows the mixer to apply audio adjustments and settings to the whole track instead of having to evaluate and sweeten every edited clip individually.

Audio Filters

At the heart of audio sweetening is the application of **audio filters**. Audio filters are audio signal processors that digitally alter the audio data, and therefore the characteristics of your sound, in some way. Each audio filter manipulates the spectrum in a unique way to produce a specific effect. It is certainly not possible to explore in this chapter the capabilities of every processing tool found in most NLE systems, but a few basics should get you started. The effect and function of a specific audio filter generally falls into one of three categories: (1) equalization, (2) reverb/echo, and (3) compression/expansion.

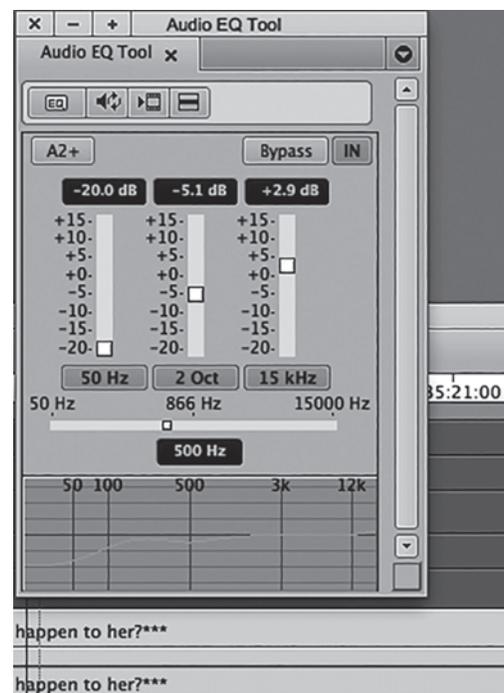
Filters for Frequency Equalization and Noise Reduction

Equalization, or **EQ**, means the manual manipulation of the various frequencies in your signal. Generally, we divide the frequency spectrum of an audio signal into three **frequency bands**: low frequencies, which are the deep, bass quality (around 25Hz to 250Hz); mid-range frequencies, which are the most perceptible range for the human ear and includes the human voice (250Hz to 4kHz); and high frequencies, which include the bright, treble quality of the sound (4kHz to 20kHz). Most NLE systems offer a filter called a **three-band equalizer**, which allows you to manipulate these three broad areas of the sound spectrum more or less independently (Figure 23-16, and see Fig. 23-7).

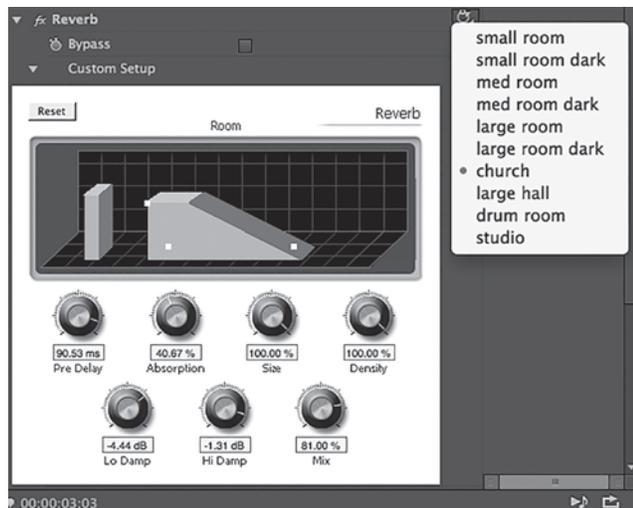
So when might we use an EQ filter? Let's say you have a romantic scene (shot in fairly tight close-ups) of a couple talking and clearly falling in love. In this situation, you may want to boost the low end of your audio just a bit, to "warm up" the audio, make it sound close, resonant, and intimate. Or let's say you shot a scene with a microphone that accentuated the high, treble end of the audio and, to your ear, it sounds too "crispy." You can use the EQ filter to bring down the high frequencies. Heavily suppressing both high frequencies and low frequencies, leaving only the mid-range, will make voices sound like they're coming through the telephone or over a PA system—as was done to create the "telephone voice" in the sound design example scene on page 547.

Primarily, however, EQ is used to fix audio that includes some sort of unwanted noise. For example, often a microphone will pick up the hum of a nearby refrigerator, or the low rumble of an HVAC, or the buzz of fluorescent lights overhead. Many of these unwanted noises can be reduced by isolating their frequencies and removing them from your track, or lessening them.

One of my students shot a scene that took place around a computer, and when he listened carefully to the recording he discovered an extremely high-pitched whine coming from the computer monitor. This sound was fairly easy to eliminate through EQing. In this case, the frequency of the offending noise was way higher than any other sounds, especially the voices in the scene, so there was no discernible change to the quality of the voices. However, if you need to EQ out a frequency that is found in other areas of the recorded sound spectrum, then the EQing will remove that frequency throughout the recording and will alter sounds you want to alter, as well as those you don't want changed. Also keep in mind, as a general rule, you can fairly successfully remove (or accentuate) frequencies that are in the recording, but you cannot add frequencies that are not in the audio



■ **Figure 23-16** The Audio EQ Tool in Avid's Media Composer.



■ **Figure 23-17** Do you want your audio to sound like it's reverberating in a large hall, or a Church? In Premiere Pro, you can choose from a range of acoustic effects when you apply the reverb filter.

in the first place. The removal of high- and low-frequency noise is so common in sound mixing that you'll find numerous **filter presets** for **high-end** and **low-end roll-off filters** designed exactly for these problems.

Filters for Reverb and Echo

Reverb and **echo** effects change the audio signal to make it sound as if it were recorded in an acoustically live space, where sound reverberates off hard surfaces. Echo and reverb are similar in that they both involve the reflection and return of sound after a slight delay, but the return delay for reverb is fast, like putting your source in a small tiled bathroom or concrete stairwell, and the return delay for an echo is much longer, like a Gothic cathedral or a large canyon.

Most NLE systems offer several preset filters (small hall, large hall, tunnel, etc.) (**Figure 23-17**) or you can control the loudness and delay of the return manually. Reverb and echo can sound great, but be careful not to use

too much or to use it without narrative and visual justification. Inappropriate reverb can sound cheesy and too much will make otherwise clear sound, especially dialogue, murky and unintelligible. Also remember that *reverb filters do not remove reverberation—they can only add it!*

So when do we use these filters? Let's say you have a scene in which a man is being chased up a concrete stairwell by an unseen dog. You want that dog to be barking and growling (off screen) as the man makes a desperate dash up the stairs to the rooftop doors. If you found your barking sound effect from a sound effects library, it's likely that the "mean dog barking" will have been recorded as closely and as flat as possible. All you need to do to make it sound as if that dog is only one landing below him in the stairwell is to add the appropriate amount of reverb to the "barking" clips.

Clearly, audio equalizing can be used for more than fixing poorly recorded sound or invisibly adding verisimilitude to a scene—EQing can be used in more overt and creative ways. Denis Villeneuve's 2016 film *Arrival* contains a good example. In the scene where Louise (Amy Adams) is brought into direct contact with the aliens, when she enters their ship alone, she is physically engulfed in a strange atmosphere; we perceive it as an ether that seems simultaneously liquid and arid (liquid gas comes to mind). The images support this with lots of dry-ice type mist, overexposed slow motion shots, and CGI effects that make Louise's hair move as if she were underwater. The sound design also conjures the arid-liquid qualities of the alien atmosphere with an ambience that sounds equally like breezes and waves, and deep rumbling sound effects that evoke whale songs, Tuuva throat singers and synthesized cellos for the aliens' "voices." But most suggestive of the otherworldly atmosphere is the EQing of Louise's voice and breathing which are tweaked to sound brittle, flat, and thin, yet very close—perhaps even remaining inside the chamber of the skull. The EQing gives the effect of hearing your own voice and breath with your ears completely plugged—or the way you hear your voice underwater. Add to this that her dialogue is ever so slightly out of sync with the slo-mo footage, as if sound and light travel through this medium at different rates, and the arid-liquid sensation becomes vivid every time she speaks (**Figure 23-18**)

Filters for Amplitude Compression or Expansion

Compression and **expansion filters** work on the amplitude of a sound signal or, more accurately, on the dynamic range (see page 366) of a given recording. As we already know, the result of audio that peaks above 0dB on a peak meter is distortion. In digital audio this means the loss of data and noticeable crackling in the sound. A compression

filter detects when a sound will peak above 0dB and it will suppress the sound to keep it within range without affecting the average audio levels of the track.

This is very different than simply lowering the overall (or average) audio level to keep loud sounds from peaking above 0dB, which would also lower everything on that track. Here's an example: Let's say you've shot a scene in which a married couple is talking while the husband washes the dishes. The sound recordist did their job well and kept the sound from peaking above 0dB in the field recordings, but now that you're mixing your sound, you want to be able to hear the dialogue clearly, and so you've set the audio levels for the dialogue track fairly high. But now you discover that every time the husband bumps a plate in the sink or in the dish drainer, the audio spikes above 0dB and crackles. If you simply lower the average track level overall so that this doesn't happen, you'll be lowering the dialogue as well. The solution here is a compression filter, which will suppress only the audio that threatens to peak above 0dB, leaving the rest at the level established in the timeline.

While compression filters lower loud, peaking sounds, **expansion filters** lower the amplitude of extremely low-level sounds in order to drop them below the level of audibility. Let's say you finally go into your sound mix, with super high-quality speakers, and suddenly notice that during the shooting of a tight, close-up monologue, the microphone picked up the ticking of the boom operator's watch. It's very faint but, by revealing the presence of a crewperson, the fictive world you're trying to create is shattered. An expansion filter will drop this very quiet noise even lower, hopefully out of the range of hearing, without affecting the rest of the audio on the track. Expansion filters can also be used to minimize the room tone in a dialogue recording, allowing you to more successfully replace it with another ambient track without worrying about compounding ambience over a noticeably different presence. With both compression and expansion, you can manually set the **threshold level** (Figure 23-19), which is the amplitude level above which (compression) or below which (expansion) the sound must be in order to be affected by the filter.

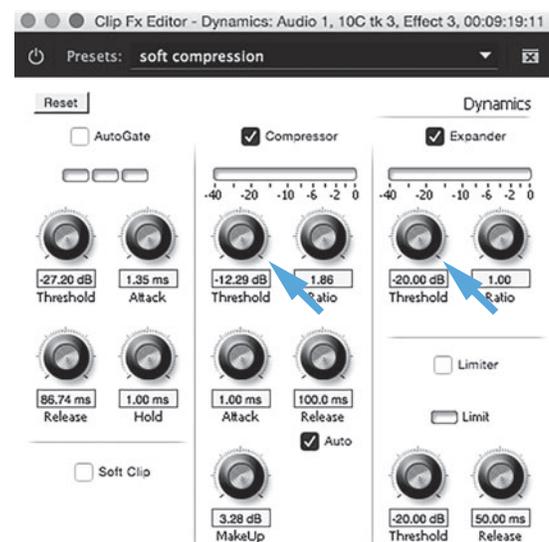
This little section has only scratched the surface of the audio effects available in your NLE for audio sweetening. Beyond these basics you'll find myriad EQ pre-sets for echoes, reverbs, distortions, phasers, deEssers, deClickers, dePoppers, deHummers, delays, pitch shifters, noise reducers and on and on—or you can set custom parameters for any audio effect you desire. Enjoy the journey!

Step 3: Creating Audio Transitions

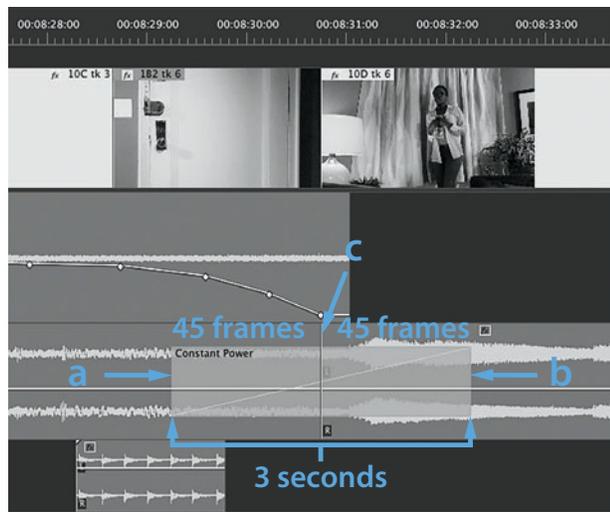
Most of the creative audio editing choices, like split edits for dialogue, sound bridges, and ambient track layering, are accomplished during the picture and sound editing stage. During the sound mixing phase, what concerns us most is the smooth transition from sound to sound across an entire track. This includes the use of room tone to fill in gaps of “silence” on the sound track and to even out the ambience quality of two pieces of audio that are supposed to sound continuous. However, most audio edits that are straight cuts, especially in dialogue editing, also require a little extra attention. A straight cut between two audio clips not only magnifies small ambient shifts, but the inconsistent



■ **Figure 23-18** Villeneuve's *Arrival* uses creative sound design and EQing to create the effect of the otherworldly atmosphere that surrounds Louise when she enters the alien's actual environment for the first time.



■ **Figure 23-19** The manual threshold level adjustments for the compressor audio filter (*left arrow*) and the expander audio filter (*right arrow*) in Premiere Pro.



■ **Figure 23-20** You can determine the length of audio cross-fades to suit the requirements of the effect. Pictured is a 3-second cross-fade from a “light rainfall” ambience track that plays under the final scene to the gradual introduction of the end credit music. To accommodate the cross-fade, the incoming audio clip requires 45 additional clean frames (1.5 seconds) before the cut point (a) and the outgoing audio clip needs an additional 45 frames (b) beyond the cut point (c). These extra frames are called handles.

waveforms of the two directly abutted audio clips will also result in an audible “pop” or “click” right at the edit point. To correct this, sound editors routinely add a very quick, four- to six-frame **cross-fade** right at the edit point between two connected sound clips (like of **Fig. 23-8**) and two- to four-frame **fades** (in and out) at the beginning and end of sound clips that are on separate tracks and therefore not directly joined to another audio clip.

Obviously, like an image dissolve, you can create long cross-fades of many seconds to, for example, slowly introduce some background music. But longer cross-fades (from 12–48 frames) are also useful for smoothing over an edit between two dialogue clips or scenes that have very different sound qualities, like moving from an interior to an exterior location.

When you cross-fade between two clips, the audio of the first clip is extended beyond the cut point by half the duration of the cross-fade to accommodate the full fade-out, and the incoming shot is extended at the head by half the cross-fade duration to accommodate the fade-in. This is called a **center on cross-fade**. For example, if you decide that a cut point needs a 30-frame cross-fade to smooth out an ambience discrepancy, then the first shot will end 15 frames after the cut point before it completely fades

out, and the second clip will begin 15 frames before the edit point to accommodate the fade-in. These extra frames on either side of the cut point are called **handles**, and you must be sure that your handles are clean—meaning, there are no unwanted sounds, like the tail end of some dialogue that you wanted to cut out, within those extra frames (**Figure 23-20**).

Step 4: Audio Level Balancing

Once all of the tracks sound good on their own, and all of the edit points are clean and smooth, it’s time to think about adjusting the overall volume balance between the clips in each track and between the various tracks in relation to the others. This stage is critical not only for the intelligibility of your sound (for example, important dialogue shouldn’t be drowned out by music that is too loud), but it also is critical for the general believability of the world of your film. An ambience track that is too loud can make a scene ring false; dialogue levels that are all over the map can make the editing painfully obvious; music that is too low will cause the audience to turn around and scream “louder!” at the poor projectionist. If all tracks have equal volume levels, then all you’ll get is a sonic stew. The dynamics of track levels helps you to create emphasis and direct the ear and the eye to what is most important at a particular moment.

The Reference Track and Establishing Average Level Range

When establishing audio levels we start with the most important tracks first and then adjust all other tracks relative to this central reference. For example, if your film is primarily dialogue-driven, then you’ll set levels for the dialogue track first and then later adjust the effects, music, and ambience tracks relative to the dialogue. For a music-driven project with an occasional special effect tossed in here and there, you’ll set levels for the music track first and adjust the other tracks according to that reference. In either case, the first, and most important, track we mix is called our **reference track**.

Just as with field recording, we use a peak meter as our primary reference tool as we adjust levels. Yes, we monitor with the headphones as well (discussed later), but the peak meter helps us maintain consistency *across time*, meaning from clip to clip, from start to finish, across your timeline. The first track that we adjust, our reference track, establishes

our **average audio level range**, known as **headroom**, which is the dB range between the reference track's average peak and the absolute peak limit of any possible sound (commonly set at -6dB to safely avoid distortion) (Figure 23-21).

Let's say we're adjusting dialogue as our reference track. Just as with field recording (see page 389), the peak level for normally spoken dialogue falls around -20dB , and the loudest peaks in your sound mix should never exceed -6dB (to give you a comfortable margin before the ultimate limit of 0dB). The area, between -20 and -6dB , therefore becomes our average audio range. Now you can adjust the levels of each and every clip, across the dialogue tracks, relative to this reference. A whisper should obviously dip below -20dB , loud voices will register around -16dB , and a scream will clearly be even louder, but should not peak above -6dB . If prerecorded music is your most important track (say you're making a music video), then you'd simply find the loudest peak in the track and adjust the levels so that it falls on -6dB . The rest will fall into place below that top headroom point.

As you adjust your clip levels for the reference track across time, you should use the peak meter to maintain consistency from clip to clip to clip. For example, if character A's average voice in the first scene held around -20dB , then in the last scene it should also be at the same level. By comparing the levels of the two clips, you can easily see if your mix levels have drifted over time.

Adjusting the Other Tracks

Once you have established the levels of your reference track, you can then adjust the other tracks (sound effects, ambience, music) relative to this one. Keep in mind that "reference track" does not mean that this is always the loudest track in the movie. There are many times, for example, when music levels will be set well under dialogue levels and then later fade up to become the most prominent track in the sound design. Also, some sound effects, like explosions, should clearly be mixed louder than average dialogue; other sounds can be mixed hotter than dialogue to intentionally drown out the speakers for dramatic value.

A good example of a music track taking over in story prominence and volume level can be seen in the famous "Albert Hall" sequence in Alfred Hitchcock's *The Man Who Knew Too Much* (1956) (Figure 23-22). In this film an average American couple finds themselves unwittingly tangled in a plot to assassinate a prime minister; to keep them quiet, the plotters kidnap their son. Looking for their son, the couple finally converges on one of the kidnappers as he is about to carry out the assassination during an orchestral concert at the Royal Albert Hall. The killer's plan is to shoot the diplomat when the music reaches its climax, with a crash of cymbals, to cover the sound of the shot. The sequence dramatically intercuts the police and parents searching for the killer, while the killer takes aim at the diplomat and the audience simply enjoys the orchestral music. Although the rest of the film is primarily dialogue driven, in this sequence the music itself becomes the driving force of the narrative as we get closer and closer, measure by measure, to the assassination. Additionally, the music completely drowns out all dialogue exchanges, essentially creating a sequence that harkens back to the silent era.



■ **Figure 23-21** The Premiere Pro mixing tool allows you to adjust and meter the levels for each track independently. You should first establish your headroom by adjusting your dominant audio track peaks (here dialogue track #1), and then adjust the others to that reference.



■ **Figure 23-22** The famous Albert Hall sequence from Hitchcock's *The Man Who Knew Too Much*. The diegetic orchestral sound track drowns out all other sounds in the scene and playfully recalls the silent era films of Hitchcock's early career.

Matching Sound Perspective to the Image and Dramatic Context

Keep in mind that the visual composition of the shot will have an important effect on where you place your audio levels. The sound of a man talking in a close-up should obviously be somewhat louder than the same dialogue shot in a long shot. For this reason it's important not only to *listen* to your sound mix but also to *watch* and consider the images you're trying to match the sound to. Dramatic content also has a profound effect on levels, especially when working with **subjective sound**, in which you are trying to represent the POV and selective aural perception of a character. Humans have the ability to either “tune out” or concentrate on sounds, for example we can focus on and isolate someone talking to us from across a crowded room and in effect filter out competing voices; you can use your audio level mixing to duplicate this effect.

Bob Fosse's *All That Jazz* (1979) (**Figure 23-23**) tells the story of hard-living and hard-working Joe Gideon, a musical theater director on Broadway who is putting up a show while his life and health fall apart. During the first reading of the play, with the entire cast and principal crew of the production gathered around him, Gideon has a mild heart attack. At this moment, Fosse completely mutes all sounds, except for those that Gideon himself makes, which are amplified. Although we see everything going on around him, we cannot hear the obvious sounds, like lines being read or the uproarious laughter of the people gathered in the room. Instead we hear his fingernails scratching on a metal pipe, the rustle as he removes yet another cigarette from its box, his pencil snapping, and his spent cigarette landing on the floor. The effect is one of extreme character subjectivity in which we are enclosed completely and deeply in Gideon's perspective and consciousness.

NLE Systems and Audio Levels

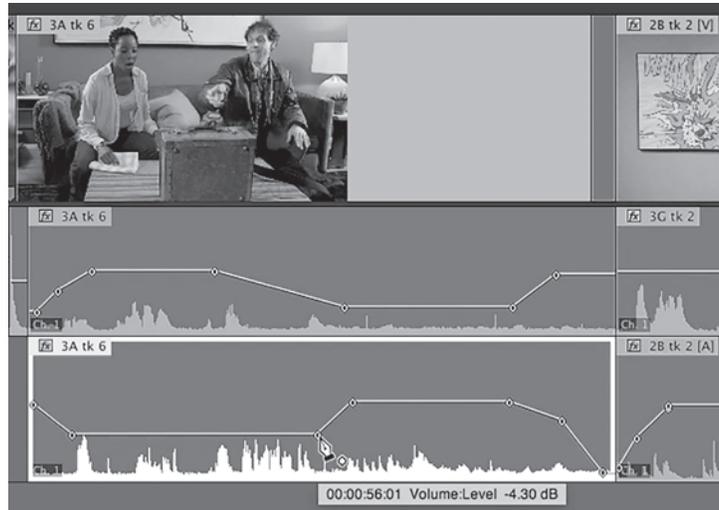
As with most other functions in NLE systems, there are a number of ways to adjust the audio levels of clips and tracks. The most controlled and accurate method for adjusting audio levels is a combination of using the timeline, the viewer, and of course, the



■ **Figure 23-23** In Fosse's *All That Jazz*, sound design is manipulated to reflect Joe Gideon's (Roy Scheider) subjective experience as he endures a mild heart attack.

audio level meter. As we already discussed on page 544, most NLE systems make it extremely easy to change the audio levels of a clip or entire track right in the timeline. However, NLE systems offer level adjustment tools that give you much more precision than simply grabbing the level overlay for an entire clip.

If you have a clip that requires multiple dynamic level adjustments (for example, music in which the volume dips and then rises again), you can create **key frames** by using the NLE's **pen tool** which places key frame points along the timeline. Audio levels between key frames can be adjusted independently (Figure 23-24). You can create as many key frames as you need, allowing for enormous flexibility for fine-tuning audio levels within a single clip. Also, remember, that when working with audio, work in the “Audio Edit” workspace and expand the width of the audio tracks in the timeline to get a more detailed view of the waveform.



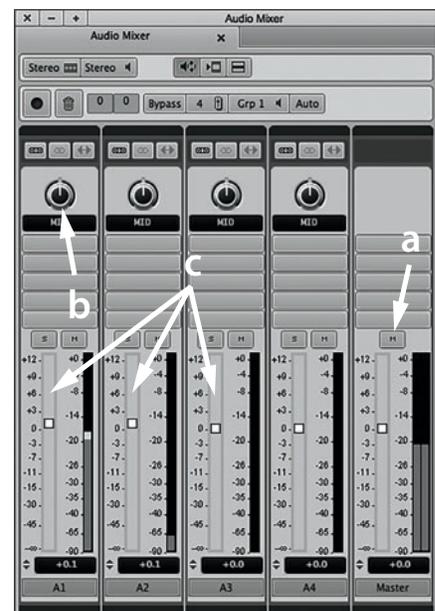
■ **Figure 23-24** The pen tool allows you to create multiple level adjustments within a single clip. Notice the box showing the changing dB levels as the overlay is adjusted (PP).

Obviously this discussion only scratches the surface of the capabilities and procedures for adjusting levels in an NLE system. You should look over the manual for your particular system carefully to fully understand how to achieve the audio balance you are after.

Step 5: The Mix Down

Finally, with all of the tracks sounding their best and mixed to the perfect balance relative to the other tracks, you are ready to **mix down** and output your multiple tracks to create a master **mix track**. Your NLE program's mix tool is used for this purpose (Figure 23-25). When you open the mix tool, you will see one audio gain slider for every audio track in the program, and as you play through your sound design, the gain sliders will move, corresponding to the level adjustments you made in each clip. At the top of each level slider is a **pan slider**. Generally, you will be outputting your audio as a **two-channel stereo mix**. The pan sliders allow you to select which channel each audio track should be directed to. If you want both channels of audio to be the same, for a **mono mix**, then all of the pan sliders remain in their central position.

A third option for a mix down is **surround sound**, which is becoming more common and is required for Digital Cinema Packages. But this is usually handled in a more professional mixing environment (see “Surround Sound” box later).



■ **Figure 23-25** Avid's audio mixer mixes all your audio tracks down to two master output stereo channels (a). With the panning slider (b), you can send each track to either one or both stereo channels. Each track also has its own fader (c) for independent level adjustment.

■ ADVANCED SOUND MIXING PROGRAMS

The audio sweetening and sound mixing capabilities found in most NLE systems are truly remarkable, but to a professional sound mixer they offer only basic functions. As your films get more complex and your sound track needs become more demanding, you may find yourself needing to use more advanced, stand-alone, sound mixing programs. Remember, Avid and Premiere Pro are picture editing programs, and professional sound mixers would never use these to mix sound; instead, they use a **digital audio workstation (DAW)**. There are numerous DAWs on the market, but many are exclusively for mixing music. Currently, the two most common DAW programs for independent filmmakers are **Adobe Audition** (which interfaces seamlessly with Premiere Pro) and **Pro Tools**

■ MORE SOUND MIXING TIPS

The Mix Environment

Sound mixing should be done in an environment that most accurately represents a high-quality exhibition space. In a professional mixing facility, the **rerecording mixer** (also called a **sound-mix engineer**) handles the hardware and the mixing tasks while the director and editor watch the film projected on a fairly large screen and listen to the sound mix on high-quality reference speakers. The whole mixing suite is also sound baffled to minimize reverberation. Most students in introductory or intermediate production courses, however, mix right on their NLE system—which is certainly fine—but it is recommended to mix in a space that is quiet and to use good speakers. Be aware of what the mixing environment itself sounds like; traffic noise, reverberant surfaces, and the HVAC can all blend with what's coming out of your speakers. Mixing with headphones is also a viable alternative,

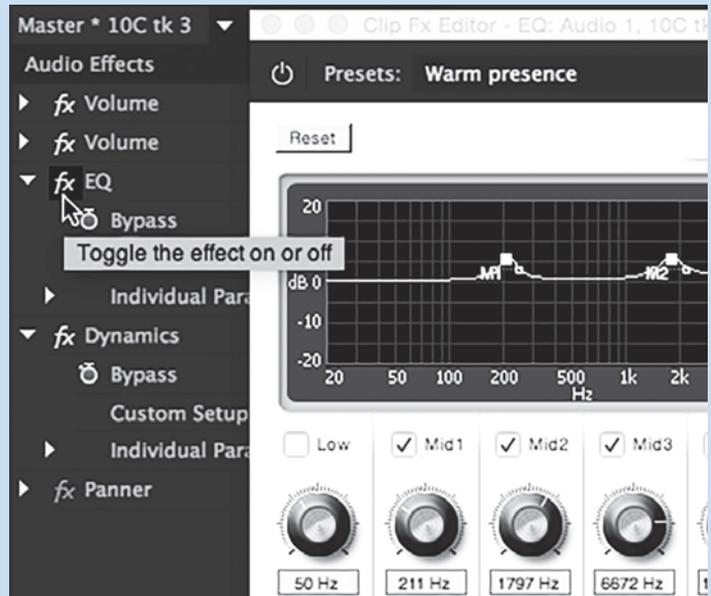
but again, make sure the headphones are of very high quality and are isolation-type headphones, meaning that they have foam that surrounds your ears to keep external noises from leaking in. Poor-quality headphones, especially those that do not press firmly against your ear, can give you a less than accurate impression of your sound track. Also, if you do mix with headphones, be sure to check your sound on a good set of speakers from time to time to get a more accurate impression of how the audience will hear it.

Audio Monitor Reference

When setting audio levels during the sound mix, it is essential that you keep the output level to your speakers, or headphones, absolutely consistent. Audio levels are relative, so if your headphone level is low one day, you might raise the levels of your clips higher than you need, and if the headphone levels are higher another day, then you may be tempted to set clip levels lower than on the previous day. So set the output volume to a comfortable level and leave it alone for the duration of the sound mix. This includes the computer audio output volume settings and the monitor out on an external mixer, if you're using one.

Audio Filter Toggle for Reference

The human ear is a very adaptable and intricate mechanism that subconsciously equalizes, attenu-



■ **Figure 23-26** All NLE's will enable you to easily toggle an audio filter effect on and off, allowing you to refresh your ear and compare the effect to your original audio for reference (PP).

ates, filters, and selectively perceives the sounds in the world around us in order to reduce what we perceive to be the essentials. For example, sitting around a table talking with our friends, it's automatic that we no longer perceive the hum of the air conditioner or the sound of traffic outside the window. For this reason, all filter effects have the ability to toggle instantly on and off. To really hear what effect an audio filter is having on your sound, you need to compare it regularly to the reference of the original track. Without toggling back to your reference, your ear can get lost as you apply effect after effect, straying further from the parameters of acceptable audio manipulation (**Figure 23-26**).

Summary

Clean dialogue edits and consistent levels are essential for the maintenance of continuity in dialogue-driven films. Here is a summary of techniques we use to keep an edited sequence feeling like it's unfolding seamlessly and continuously:

1. Stay in sync.
2. Use split audio edits.
3. Maintain consistent room tone.
4. Use cross-fades for hard cuts.
5. Never let audio peak above 0dB.
6. Establish an average audio level range and maintain consistent and appropriate levels from clip to clip and scene to scene across time.



■ **Figure 23-27** DAWs are substantially more precise and powerful for audio work than NLEs. Pictured is the Pro Tools 9.0 desktop.

(which interfaces seamlessly with Avid). Both programs are designed to mix both music and film sound tracks and contain many more features and capabilities compared to NLE picture editing programs (**Figure 23-27**). Both mixing programs offer dozens more (and much more powerful) audio filters for special effects and “audio fixing.” They have several more precise equalizers and many more transition effects. Their ability to make subframe edits and stretch audio without changing pitch allows for highly precise sound edits and ADR syncing.

These programs are also designed to import both your edited video (for visual reference) as well as all of the sound tracks and adjustments you’ve made along the way. Adobe Audition is designed to let you move seamlessly from Premiere Pro and back again without any format conversions. Pro Tools, on the other hand, requires that all sound files be converted into the **open media framework (OMF)** file format. Realizing that most sound mixing professionals use Pro Tools, almost all NLE systems have an option for exporting all audio clips and timeline information in the OMF format making it relatively easy to migrate. You can even set the conversion to export each clip with handles (page 558).

Why Go Pro?

Certainly, as you are starting out, the benefits of mixing your own sound tracks on your first, fairly simple films are enormous. Mixing your own sound gives you an intimate and nuanced understanding of the power of layered audio tracks. Creating an intricate sound design, placing a sound effect with perfect timing, adjusting the audio balance to create

■ SURROUND SOUND

Surround sound is an audio presentation strategy that involves mastering to multiple channels of audio that are then strategically delivered to multiple speakers positioned in front, behind, and to the sides of the viewer to create a three-dimensional aural environment. Assigning specific tracks to specific speakers is called **sound channel mapping**. Surround sound is an increasingly common alternative to mono or stereo mixing, especially considering the popularity of sophisticated home viewing setups. Surround sound is also the required sound mix for Digital Cinema Packages (DCP) (see page 579) and may be required for other delivery situations.

There are different types of surround sound strategies depending on the specific display context (e.g., commercial theatrical release, broadcast, VR, and so on), however the most common approach for digital cinema and television is **surround sound 5.1**, which involves six audio channels mapped to six speakers: three front, two back, and a sub-woofer for low frequencies (**Figure 23-28**).

If you anticipate creating a surround sound mix track, you will likely be working with a professional sound editor/rerecording mixer who specializes in creating 3D soundscapes, because the technicalities are fairly complex.



■ **Figure 23-28** Surround sound 5.1 is an alternative to mono or stereo mixing and is required for DCPs. It involves mapping six audio channels to six speakers for playback. Pictured is a typical surround sound 5.1 speaker setup: three front, two back, and a sub-woofer.

dramatic emphasis, changing the mood by inserting a different ambient track, and literally seeing the way a music track can weave its way throughout a film and therefore in and out of a viewer's consciousness are all invaluable lessons that will inevitably have an impact on the way you look at movies and how sound is used in your future projects. To actually lay your hands on the stuff and make it happen, quite simply, will make you a better filmmaker; it may even convince you that you'd like to be a sound designer like Walter Murch, Ben Burtt, Randy Thom, or Ren Klyce.

But at some point you may find that your ideas and sound requirements have become more complex than your abilities. It's then time to turn to those people who absolutely adore postproduction sound, those who have dedicated their careers to it and have a talent for it, those people who know exactly what every one of those audio filters and third-party plug-ins in a Pro Tools system actually does—those people are called **professional postproduction sound mixers**.

I remember the first film for which I had a professional digital mix on a Pro Tools system (before that, my mixes were done on 16mm magnetic stock, which is a different experience entirely). I dutifully brought in my video and all of my audio and sound track data in

OMF format to the postproduction mixer, Bill, having carefully arranged and “fixed” my tracks. I had a very small budget and needed the mix session to proceed as quickly as possible, so, to save time, I had done meticulous level balancing, inserted quick cross-fade dissolves for every cut, and applied a few simple filters. I thought that by doing that, all Bill would have to do is tweak things here or there, replace a few special effects, and I could go home. When Bill loaded my sound design into his Pro Tools system he indeed told me to go home and we would start the next day. When I returned I found that overnight he had undone everything I had done, with the exception of the basic sound cutting and placement. All of the lovely audio smoothing and finessing I had labored over for more than a week was gone. Bill had removed all audio filters and transitions, undone all level settings, and checkerboarded all dialogue onto multiple tracks. I went from 6 tracks to over 20 in less than 10 hours! Then Bill got down to work.

Yes, he had a high-end mixing program with audio processors, scopes, and equalizers I had never even heard of, but more important he had experience and a sensibility for the world of sound that I simply couldn't match. He not only made everything sound much better with his more accurate and powerful mixing tools and his vast selection of sound effects and ambient tracks, but he heard problems in the tracks that I couldn't hear until after he fixed them. Most important, he made creative suggestions, especially for sound bridges between scenes, which quite frankly improved the movie. And that's why we go to a professional, in any area of filmmaking; experience, talent, and technical experience will enhance the expressive impact of your movie.

When you decide to start using professional sound mixers, it is important to consult with them before you start shooting your film. They will tell you the details of the mixing system they use and how it interfaces with your particular editing system. They will tell you what resources they have, what they need, and in what format they prefer the audio data and video delivered. It is especially important to consult with them ahead of time if you have problematic sound that will need significant fixing in the mix. Some things can be fixed; others, like too much reverb in a recording, are nearly impossible to correct.

Keep in mind that the options are not limited to DIY or going with a professional sound mixer charging \$200 an hour or more. Just as with acting, cinematography, directing, writing, and any other filmmaking task, there are people who have a talent for sound design and mixing, who are good, but not yet professionals. This person might be your classmate or it might be you! These people need to establish themselves in the field and gain experience, and the only way to do that is to work and practice and show what they've got—so they are looking to mix your movie, and you are looking for a postproduction mixer. Sounds like a perfect match.



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Once you have a picture-locked film and a mixed sound track, it may seem like the big creative choices are over. Yet there are still important aesthetic decisions to be made before exporting your project and sending it out into the world. And that last step, distribution, is ultimately what we do all of this for in the first place—so people can see our movie.

The determining factors in choosing your finishing workflow include your budget and where your film is going to be seen. Student films that may show in a couple of regional festivals, and perhaps on YouTube or Vimeo, will have a different workflow than films destined for international festivals, broadcast, or theatrical presentation.

■ COLOR CORRECTION VERSUS COLOR GRADING

The terms color correction and color grading are often used interchangeably, but there is a difference: the three goals of **color correction** are basic:

1. **Correct** or fix any obvious brightness and color shortcomings in your clips, including wayward color temperatures and inexact exposures.
2. **Match** luminance (brightness and contrast) and chrominance values (color tint and saturation) for visual consistency across shots within a scene, and scene to scene for the entire film.
3. **“Make it legal.”** Ensure that your film complies with delivery requirements, meaning that your technical video specs conform to the standards of your distribution platform—like broadcast or web streaming.

Color grading refers to the creative application of postproduction color grading tools to create a specialized mood and visual style for your film—commonly known as creating **looks**. Color grading can comprise very simple and subtle enhancements to basic scene tonalities to create the appropriate “look” or mood, or grading can radically alter the original footage in terms of luminance range, contrast, color, texture, and so on. As such, color grading includes *and* goes beyond the parameters of color correction.

Historically, color grading was done in an expensive color grading session by a trained **colorist** using specialized software in a postproduction facility. This service was (is) billed by the hour. However, the recent explosion of color tools built into your average editing system means that sophisticated color correction and color grading can be accomplished using your NLE. Many students and low-budget filmmakers do their own color correction—and a bit of color grading as well. Why not? In this chapter, we will mostly focus on the common color correction adjustments you might expect to do on your own in your NLE system—and some basic color grading processes too. If your film is shot in a fairly naturalistic style and you’ve maintained solid control over your cinematography, and therefore require nothing too complex from the color grading process, you can do much of this work right in your NLE on your own, or better, with a fellow student whose creative path is leaning toward a career as a postproduction image specialist. However, if your color grading requirements are complex, like trying to create fantastical environments with a D-Cinema workflow (extended dynamic range, custom LUTs, and visual effects) you will probably want to work with a professional colorist. In any case, let’s look at what you can learn and do.



■ **Figure 24-1** The Basic Correction level in Premiere Pro's Lumetri Color panel. With slider controls for color temperatures, exposure correction, contrast, and highlights and shadow adjustment, this “basic” level is already a powerful color correction tool. See the color insert.

■ BASIC COLOR CORRECTION IN YOUR NLE

The standard **color correction tools** incorporated into many NLE systems are, in fact, very powerful; it takes some time and patience to learn them, but once you've got the basics down you can put a truly professional and individualized polish on the look of your motion picture (**Figure 24-1**). That said, it's clearly beyond the scope of this chapter to get into too much detail, so you should check out your NLE manual, the online tutorials, and specialized reference books for additional information and techniques as your color correction requirements become more complex.

Adjusting Luminance Values

Video luminance is essentially the black-and-white values of the video image. Sometimes you will also see luminance referred to as **gray scale values**. The

adjustable elements of luminance are **brightness** (a.k.a. **exposure**) which refers to the overall lightness or darkness of your image and **contrast** which refers to the range of dark and light values—from pure white to pure black—within the shot. As you make adjustments to the luminance values of your image, you'll need some sort of instrument to evaluate your original image and monitor your changes. The principle scope used to measure and monitor luminance levels in postproduction, as with production, is the **waveform monitor**—and every NLE system is able to open a waveform window while you color correct. As we already discussed in Chapter 12 (see “Black, White, and Middle Gray: A Waveform Monitor Introduction” on page 281), the waveform scope provides a graphical representation of the brightness levels across the image. The brightness scale is measured

in **IRE** units along the y-axis, with 100 IRE representing pure white and 0 IRE representing black, and 50 IRE representing middle gray (see **Fig. 12-13**).

Clearly, there is an aesthetic dimension to tweaking your contrast and brightness which are critical components affecting the look of your images. For example, if your brights are too low and darks too light, your image will look gray and murky. Consider these two images of Coney Island's Dreamland in 1905 (**Figure 24-2**). Notice how the waveform for the original, flatter image (*top*) is compressed toward the middle IRE range. With the white lights peaking at 90 IRE (a) and dark shadows measuring above 20 IRE (b), the original does not take advantage of the full range of the gray scale values. Compare this to the corrected image (*bottom*) which makes greater use of the contrast range. More specifically, the white lights now peak at 100 IRE (a) and blacks are now at 0 IRE (b). The corrected image shows how even just



■ **Figure 24-2** Two images from of Coney Island's Dreamland in 1905. The contract range of each image is indicated by the vertical bar on the right of the waveform graticule (*arrows*). The original image (*top*) does not take full advantage of the full range of gray scale values. The corrected image (*bottom*) shows how a little bit of brightness and contrast tweaking can create a richer and more visually dynamic image.

a little bit of brightness and contrast tweaking can create a much richer and more visually dynamic image.

On the practical side, delivering a program for broadcast requires that you pay close attention to your brightness levels as there are technical standards set by engineers that need to be adhered to. For example, white levels that exceed 100 IRE and black levels that dip below 0 IRE are not only devoid of image detail, but they are considered “illegal” values because they can disrupt proper scanning functions. Luminance requirements for various platforms differ, so be sure to check the specifications for your particular situation before you begin postproduction.

Adjusting Chrominance Values

Video chrominance (chroma) refers to the color portion of your image. The adjustable color elements essentially break down into two broad categories: **Hue** (a.k.a. **tint**) refers to the color values of your image—in other words, the balance of red, blue, or green in your image; and **saturation** refers to the intensity of the colors. An image with rich, vibrant color is considered highly saturated, while a washed-out image is less saturated. An image that has no color saturation is black and white. Very often, your first reference for hue and saturation adjustments is character skin tone. Beyond that, chroma tweaks, even subtle ones, can go a long way to helping you create an effective look or mood for your film (**Figure 24-3**).

The primary tool for monitoring and adjusting color is the **vectorscope** (**Figure 24-4 top**). The vectorscope measures both balance and saturation of video chrominance, meaning the colors in the image. The vectorscope graticule shows six small boxes that correspond to the three primary colors (red, green, blue) and their complementary colors (cyan, magenta, yellow). The vectorscope maps these colors in exactly the same place that you’d find them on a color wheel (see **Fig. 24-8**). In fact, the vectorscope plots the colors in your actual image on a graphical representation of the color wheel. Just as with a color wheel, the placement of a color around the circle represents its hue and the distance from the center that each color signal reaches indicates its saturation (or intensity if you prefer). And those little boxes, called **targets**, represent the maximum legal broadcast limit for color intensity, which is 75% saturation.

The vectorscope graticule also contains a dedicated **skin tone line**, on which all human skin tones should fall if they are to look normal (**Figure 24-4 bottom**). Huh? How does a single color line represent all skin tones? Because all skin tones have essentially the same flesh pigment, which aligns with the skin tone line, regardless of race. Therefore, the difference in perceived skin color (black, brown, white, etc.) is not a matter of hue adjustment, rather it is determined by saturation and brightness, which are tweaked after placing flesh tones along this line. These variables make the necessary difference when tweaking for accurate skin tone shades. Of course, this assumes that you have properly white balanced video to begin with.

The Color Workspace and Tools

Currently all of the popular NLE systems offer a specialized **color workspace** option that not only gives you quick access to the program’s extensive color grading tools, but also to the necessary array of scopes to monitor your work. While it’s possible to do color adjustments in the edit workspace, it’s far preferable that you perform all final color correction and grading in the dedicated color workspace.

Premiere Pro has recently integrated the **Lumetri color panel** into its program which organizes various color tools into discrete sections—with each section offering increasingly powerful complex tools for image tweaking and effects. **Fig. 24-1** shows the first Lumetri

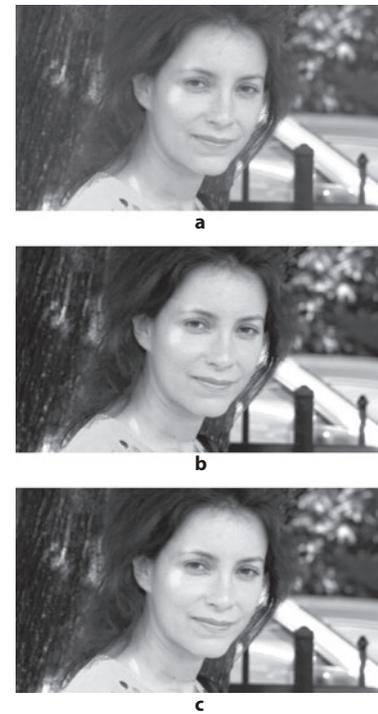
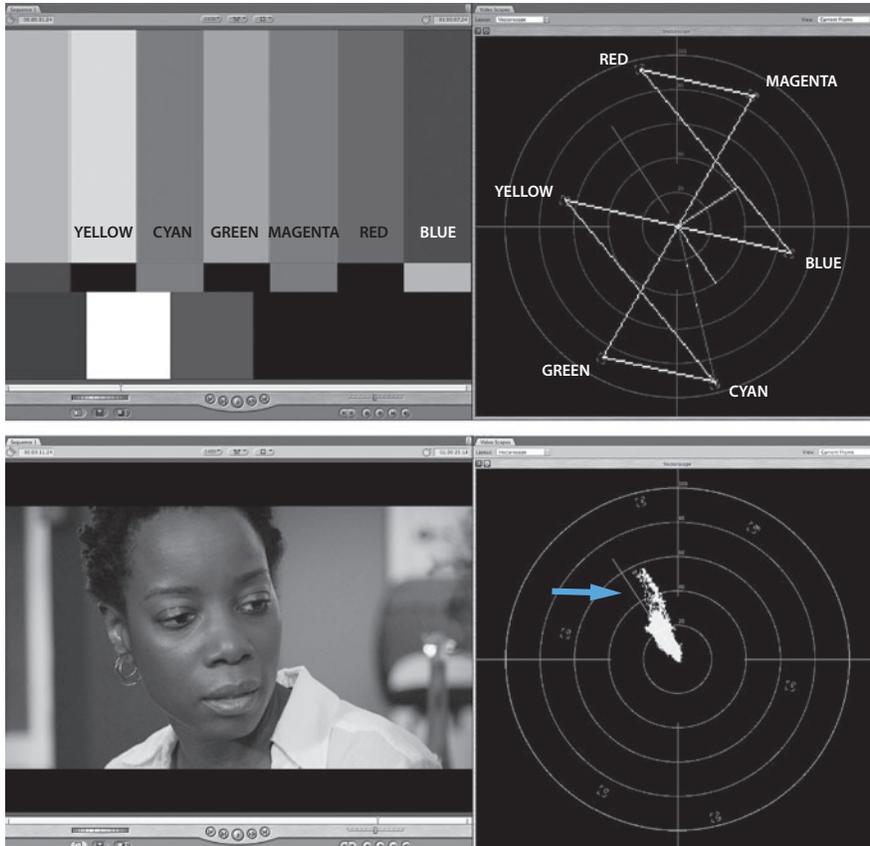


Figure 24-3 Most color correction adjustments are quite subtle. The original image (a) appears somewhat flat and pale. By adjusting luminance values we can create sharper contrast and more depth to the image (b). Adjusting the color further refines the image. In this case increasing saturation and adding a slight amber hue provides a sense of the heat of the summer sun (c). See the color insert.



■ **Figure 24-4** The vectorscope graticule shows small boxes that correspond to the three primary colors—red, green, and blue—and their complementary colors—cyan, magenta, and yellow (*top*). All skin tones should fall along the skin tone line (*arrow*) when corrected accurately (*bottom*). See the color insert.

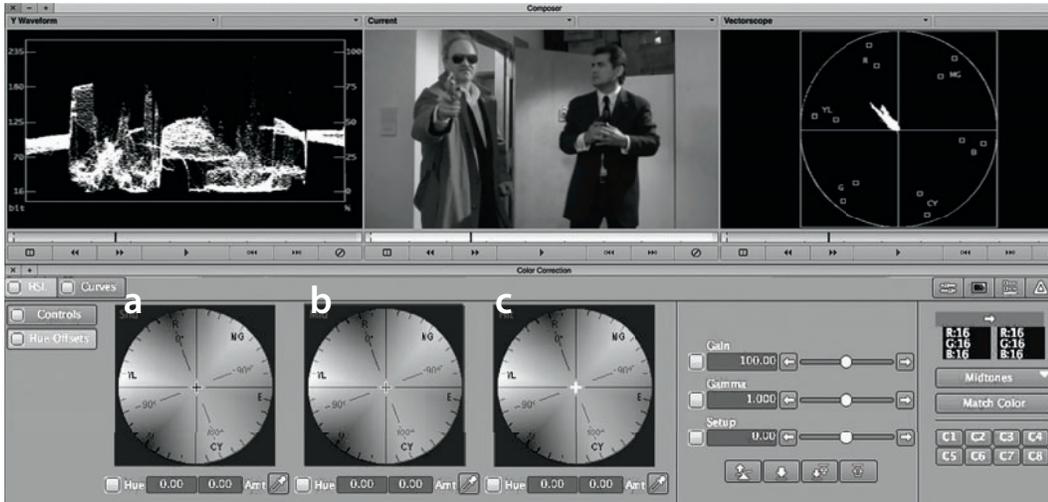


■ **Figure 24-5** The curve level (*top*) and the color wheel level (*bottom*) of the Lumetri color tool in Premiere Pro add greater precision to your NLE color grading capabilities, allowing you to isolate specific color channels or brightness ranges for adjustment. See the color insert.

section, **Basic Correction**. This panel is designed for quick and simple color correction tasks like white balance adjustments, straightforward contrast and exposure corrections, skin tone tweaking, and so on. In many cases, with films that have a fairly naturalistic tone, this may be all the color work you need. The **Creative** tab allows you to select from a list of installed LUTs to apply pre-set “looks” to your image. You can also make subtle adjustments to the pre-sets in order to dial in the precise look you’re after (see “Applying LUTs to Log Footage” later). The **Curve** section gets into more complex territory, allowing you to adjust the effective gamma curve of the image in total or the curve for a specific color channel (i.e., red, green, or blue). This is called **curve editing**, and you can even select a very specific color in your image and adjust the saturation of only that particular hue in isolation (**Figure 24-5**). Finally, the **Color Wheel** section allows you to make hue, color, and brightness adjustments to very specific areas of the image as defined by brightness values, meaning, you can modify the *shadow* areas, the *mid-tone* areas, or the *highlight* areas.

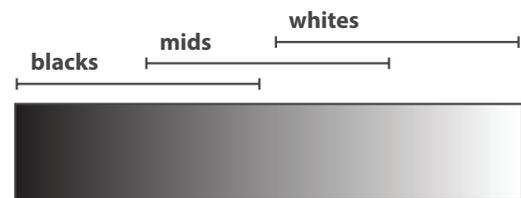
The Lumetri color wheel tool is similar to the traditional **three way color corrector**, which is a very powerful and familiar color grading layout for professional colorists¹ and is also the color tool found in the Avid Media Composer (**Figure 24-6**). The three way color corrector allows you to alter luminance values and chrominance values within three separate areas of your image, more or less independently of one another. The three areas are the **shadows** (or **blacks**), **mid-tones** (or **mids**), and **highlights** (or **whites**), and each

¹ Premiere Pro also has a traditional three way color corrector but since the introduction of the Lumetri Color Panel, they have hidden it in the “Obsolete” pull down menu of the color tools. If you prefer the three way color corrector, it’s in there, so go find it.



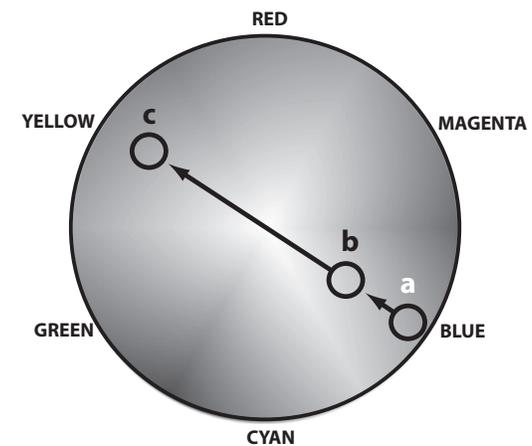
■ **Figure 24-6** The traditional three way color corrector, like this one found in Media Composer, is a powerful and familiar color grading layout. Adjustments can be made to luminance and chrominance values within three separate areas of your image: shadows (a), mids (b), and highlights (c).

area has its own **color wheel** and **luminance slider** for executing the modifications. Brightness or color adjustments made with the shadows control will affect the darkest parts of the image, like dark objects, dark clothing, and shadows. Using the highlights control will affect the very brightest parts of the image, like practical lights, windows, and white objects. The mids control has the broadest range and generally includes everything in between blacks and whites. Keep in mind that these areas are not strictly distinct; they do overlap somewhat, as will the adjustments you make (**Figure 24-7**).



■ **Figure 24-7** The traditional three way color corrector, like this one found in Media Composer, is a powerful and familiar color grading layout. Adjustments can be made to luminance and chrominance values within three separate areas of your image: shadows (a), mids (b), and highlights (c).

In both the Lumetri color wheel panel and Avid’s three way corrector, one makes changes to the brightness of the image by simply dragging the luminance slider. Adjustments are made to the color balance by dragging the **balance indicator**, which starts at the middle of each color wheel by default (**Figure 24-8**). Dragging the indicator toward any area of the color spectrum infuses the image with that particular color; the farther you move away from the center, the more intense (saturated) the color becomes. **Complementary colors**, like blue and yellow, are opposite each other on the color wheel because, by adding more of one color, you are reducing its complement.



■ **Figure 24-8** Dragging the balance indicator into a specific area of the color wheel balances the image toward that particular color. The closer to the edge you go, the more intense the color becomes: (a) intense blue; (b) lighter blue; (c) intense yellow. See the color insert.

Beyond correcting wayward white balancing and inaccurate exposures, there are an enormous number of visual possibilities with all of these color correction tools. You can, for example, adjust luminance exclusively in the blacks to brighten up the shadows a tad so that we can see some detail in the shadows, or if in one scene the light outside a window is a little too bright, you can use the luminance slider in the white areas to bring it down a bit. Perhaps you want to push a hint of blue tint into the shadows to create a certain mood. Just click and drag the blacks color balance indicator slightly further into the blue range of the color wheel (see **Fig. 24-3**).



■ **Figure 24-9** Basic color grading on Log footage begins by correcting a color chip chart and flesh tones recorded at the head of each roll. Shown here is the original Log footage (*top half*) compared to the graded footage (*bottom half*). If you haven't shot a color chart, use a representative frame that includes flesh tones. See the color insert.

Grading Log Footage From Scratch

We previously explored shooting Log footage in Chapter 14 so you already know that Log video recording captures as much of the available color and luminance response of the sensor as possible by employing a flat gamma profile, causing the original footage to appear dull and gray. Log footage, however, contains much more color and brightness information than footage with Rec. 709 “baked in” and this means we have more to work with when color grading in postproduction. With Log gamma we gain greater visual latitude and flexibility to dial in very precise looks.

Grading Log footage basically has two parts; first, we do basic correction on the footage to get to a generally acceptable image, then we turn our attention to the more powerful tools to introduce creative color grading and stylistic looks (if that's part of your visual palette).

Basic Log color correction is best accomplished using a chip chart. If you followed the standard procedures for digital cinematography that we explained on page 221, then you should have recorded a few seconds of a color chip chart (with flesh tones) (**Figure 24-9**). If you don't have a chip chart, then you'll need to find a representative frame that includes flesh tones if they are in the scene.

Basic Log Color Correction:

1. **Expand the Contrast Range:** The first step is to expand the flat gamma profile of the Log footage, in other words, tweak the contrast to make full use of the latent dynamic range in the image. First adjust the highlights (or whites) luminance slider to bring the white areas of the frame somewhere around the 90–100 IRE range on your waveform. Then use the shadow (or blacks) luminance slider to bring any pure black areas in the frame into the 8–0 IRE range. We'll get to the mid-tones later, and precise tweaking of blacks and whites will also be done later, with the creative grading of your image.
2. **Increase Color Saturation:** Next we turn our attention to chroma correction. Start by increasing the color saturation (the intensity of color) of the entire image. Already, you should see the image come into its own. Bring the saturation up until you see full, vivid colors. An **under-saturated** image will appear washed out and bland, colors in an **over-saturated** image will “scream” or even bleed into other areas. Reds in the image will usually oversaturate first, so keep your eye on the reds.
3. **Adjust Mids:** Now, go back to the contrast settings and adjust the mid-tone (mids) contrast range. With this adjustment, you'll really see the image revealing the potential it has for depth and texture. Mid-tone adjustments are strongly related to chroma saturation, so you may find yourself moving back and forth between saturation tweaks and mid-tone adjustments to really dial in the right balance.
4. **Hue and Flesh Tones:** Finally, turn your attention to flesh tones (if you have a character in the scene). As we mentioned earlier, first make sure that the character's skin falls along the vectorscope's skin-tone line; tweak the hue settings until it does. Then adjust color saturation and luminance again until you arrive at flesh tones that look most natural.

The best tool to accomplish these initial Log footage color correction steps is the three way color corrector, but the Lumetri “Basic” panel will also suffice. In any case, these four simple steps will unlock the full image potential from your flat, gray Log footage. From here you can simply continue to do minor tweaks along these lines to polish the look, or you can enter into creative color grading territory where further color decisions and adjustments

are made considering in the narrative context of the scene and, of course, the overall tone and visual palette of your project.

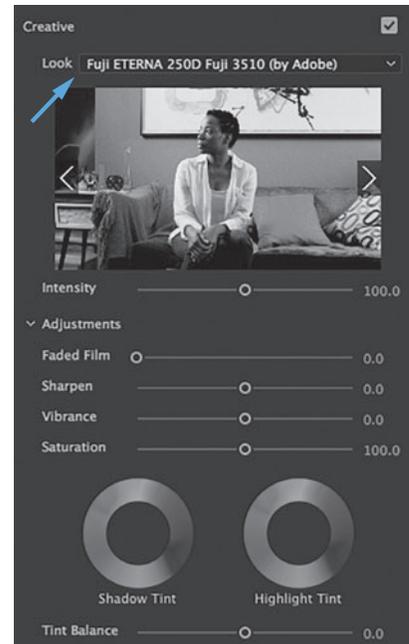
Applying LUTs to Log Footage

In Chapter 14 we already explored the use of viewing LUTs in production when shooting Log files. Essentially, a LUT (short for **Look Up Table**) is a piece of software code containing a bundle of image settings that modify the luminance, color, and gamma values in a video image to create a specific look. In the context of production, a LUT (in the camera or monitor) only temporarily changes the image for viewing purposes, without altering the original Log file recording in any way. In other words, LUT settings are not “baked in” to the recorded footage. In the context of the postproduction workflow LUTs are used as creative color grading tools that will determine the color values (the look) of the final output of your program.

As we discussed earlier, you can certainly do color grading to your Log footage from scratch, and indeed many people do this, but many, many film projects begin by applying a LUT to the footage that gets them most of the way to the color grade look they’re after, and *then* they use the color correction tools to further tweak the settings. So, in effect, you can think of LUTs as a sort of shortcut color grading tool. Those four steps I discussed earlier for basic Log footage color correction? BOOM! Done in one step by simply applying a basic LUT.

Applying LUTs is simply a matter of selecting a clip, a scene, or even the entire video timeline and then applying a LUT to it that gets you closest to the look and style you’re after (Figure 24-10). You can cycle through various LUTs, testing which one works best because, as with all postproduction processes, applying LUTs does not alter the original footage—instead it’s just an intermediate grading process that determines the program output. Once you find a LUT that gets you most of the way toward the visual look you’re after, you can then further tweak the luminance and chroma settings, scene by scene, using the color grading tools in your NLE to dial in the precise look you’re after.

Both Premiere Pro and Media Composer offer a fairly broad variety of pre-set LUTs built right in to the program. Some of them are LUTs that are specific to camera systems (e.g., Canon C-300, Arri Alexa, Nikon D-800) and other LUTs are designed to duplicate the look of specific film stocks (e.g., Fuji Eterna 250, Kodak 2395) while others simply apply a variety of cine gamma or specialty looks (like monochrome film, or a golden glow, or a silvery blue hue, or a tobacco sepia tint, and so forth) (Figure 24-11). Beyond the built-in NLE LUTs you can also install **custom LUTs** that you’ve purchase (or procured for free) from websites like Color Grading Central and Ground Control Color, or you can create your own custom LUT by saving all the settings that you’ve established through grading your footage from scratch—and then you can apply your custom LUT to other scenes in your film. Installing Custom LUTs into the LUT menu of the Lumetri Creative panel (PP) or the Media Composer LUT list is a fairly easy operation.



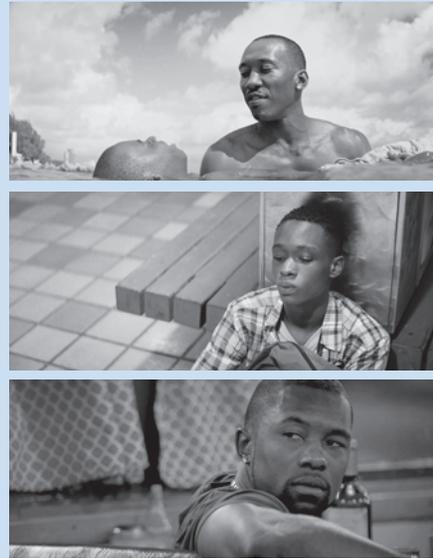
■ **Figure 24-10** Using the Lumetri Creative level, a built in film style LUT (Fuji ETERNA 250D) was applied to this clip by simply dragging the LUT onto the clip in the timeline. See the color insert.



■ **Figure 24-11** Both Premiere Pro and Media Composer offer a fairly broad variety of pre-set LUTs built right in to the program. See the color insert.

When carefully considered, crafted, and executed, color grading and LUT application can contribute a subtle yet significant tonal emphasis to a film. The shading, colors, and tonalities provide the narrative with a visual, emotional context. A good example of this can be seen in Barry Jenkins' *Moonlight* (2016) which tells the story of a gay black man whose sexuality causes him to be emotionally and physically terrorized for much of his adolescence. The story is told in three episodes each corresponding to a life stage and referring to his nickname in that period: Part 1, the child "Little," Part 2, the teenager "Chiron," and Part 3, the adult "Black." Although the time period for each episode is not stated explicitly, one cannot help but sense that we are watching a recounting of past events, and this is due in no small measure to the film (which was shot digitally) using the color grading process to emulate the rich, filmic look of discontinued celluloid film stocks (Figure 24-12). The film's cinematographer James Laxton describes the use of specific film-based LUTs, which he and colorist Alex Bickel devised throughout the production:

[...] each of the movie's three parts drew directly on the specific look and feel of a different film stock to help convey its message. Fujifilm tells part 1—using the stocks' blue and green to express the brilliance of the water in Miami and the city's lush vegetation. After all, this is what stands out to a child—the vibrancy and intensity of the surrounding world. Agfa film tells part 2: Chiron's teenage perspective



■ **Figure 24-12** For Jenkins' *Moonlight*, cinematographer James Laxton and colorist Alex Bickel created three different custom LUTs, each with unique color characteristics, to represent the three stages in the protagonist's life. See the color insert.

on the world is echoed in the duller, more washed-out color spectrum. Finally, Kodak was used for part 3; the film's warmer hues emphasized and communicated the welcoming atmosphere of the diner scene and the romantic finale.

(From "The Photographic Inspirations Behind *Moonlight*, 2016's Best Picture," by A. Strecker, LENS CULTURE.com)

Advice from the Color Grading Trenches

When color correcting, keep in mind that your computer monitor is not necessarily calibrated to give you accurate colors. Whenever color correcting with your NLE, you should plan to screen the final results on an HD **monitor** that has been calibrated to give the most accurate color possible. Also, just like your sense of hearing, your eyes and your brain are incredibly adept at adjusting and normalizing the changes you've made to your image. Before you know it, a green skin tone may begin to look normal. So always locate the **color effect toggle button** which will turn all of the new color settings off so that you can quickly compare your adjustments to the original image. You should also look away from your computer quite frequently as you color grade to keep your eyes fresh.

Regardless of the accuracy of your monitor, if you're using *any* color correction tool for the first time, you'll quickly realize that simply pushing sliders and dragging your mouse around the color wheel can create a visual mess: skin tones suddenly take on a Martian quality, or an image that had fine exposures suddenly looks terribly dull or overly crispy, or while you're adjusting the color of the grass, the sky takes on a sickly tone. Color correction tools are something that should be researched thoroughly before you go grabbing sliders and whanging them around. Also, color correction is not just about the buttons you need to push: there is considerable technique and aesthetic judgment involved that goes beyond the scope of this book, so I have listed some resources in the Recommended

Readings to help familiarize you with this step of the finishing process. However, if you're on a deadline or your production is simply too crucial for OJT (on the job training), you should consider using a professional colorist or an emerging creative person who has experience (and some professional aspirations) in this area.

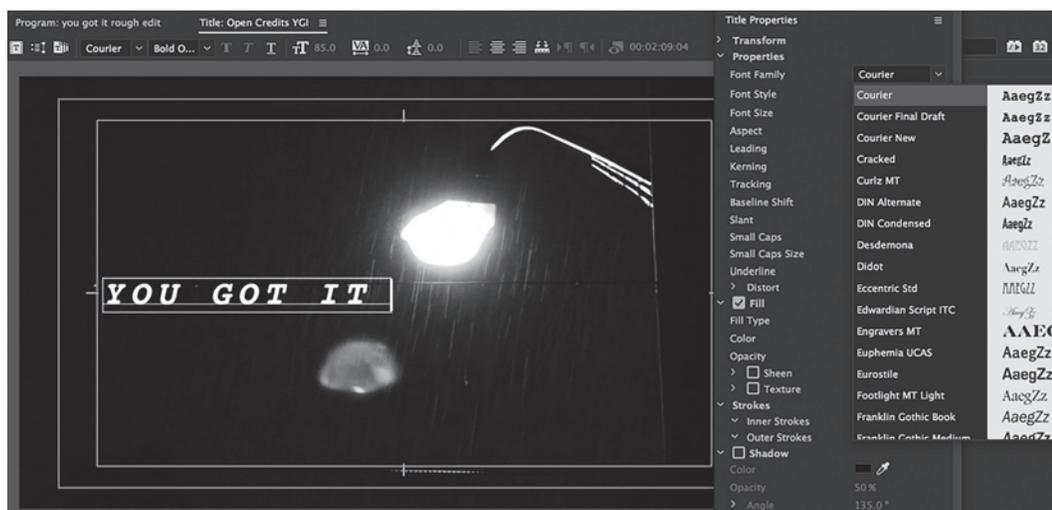
One final word of caution: color correction, like any other visual effect, should be used with intelligence and some restraint. Creating red highlights in the shadows might look cool, but you need to consider its purpose in your film. Once again, technology is there to serve our ideas; however, we need to be clear about what our ideas are in the first place in order to use these tools effectively and appropriately. To be sure, if your shooting, lighting, and exposures were controlled and accurate, you may not need extensive color grading; perhaps you'll just need to even out a few shots or scenes. If it ain't broke, don't fix it, but if you can improve your movie's look through color grading, then by all means, use it. That's what it's there for.

TITLES AND CREDITS

The final step, before we can master our film, is to put titles and credits on the film. Most NLE systems contain a **title tool** with more typographical options than you could (or should) ever use in a lifetime. You can choose from dozens of fonts, sizes, and colors; you can adjust the opacity of the text, create drop shadows or fuzzy edges, make the text scroll up and down, or crawl sideways, or fly in from the four corners of the screen; you can have your credits fade-in, wipe-in, or all of the above at the same time. You can, of course, create titles against simple color backgrounds, like any color text on black or any color on white. Or by adding an additional video track to your timeline, you can superimpose your opening or closing credits over scenes from your film (Figure 24-13).

Despite the myriad titling options included in all popular NLE systems, some filmmakers who have very specific graphic design ideas for their titles might go to an even more powerful third-party graphics or typography software, like Adobe Illustrator; or title sequences requiring sophisticated layering or animation may be generated in Adobe After Effects. In those cases, the third-party graphic files are imported back into the NLE system to cut into the program like any other media clip.

Think of your credits as an aspect of your film that is as important as any other visual element. Take time to design them. Do you want them to appear over moving images? Be combined with still images in some way? Just be simple but beautifully designed type on a black background? If they have color, what would be appropriate for the mood and visual palette of the film? Do you want them to move (scroll) or to fade up and out one page at a time (cards)? If you have music under the titles, how does their movement relate to the



■ **Figure 24-13** The title workspace offers endless options to easily create professional quality titles. Notice the title-safe overlay that helps your text remain within the “safe area” of all displays. Superimposed titles, like the one pictured, are placed on a second video track on the timeline.

■ Figure 24-14

Titling tools can create professional looking text, but sometimes a more creative approach to a title sequence will better set the tone of your film, like this droll title sequence from *Napoleon Dynamite* (2004) which uses grim food and mundane items from the life of a high school misfit. See the color insert.



rhythm and tempo? It is easy, in the tired euphoria of locking picture and finishing sound, to short-change your titles, but in reality, they add a very important graphic touch that defines, and establishes, the overall tone of your film (Figure 24-14).

One important word of advice: take your time creating your credits. The people who worked on your movie deserve proper credit. Especially for people initiating their careers in film, credits can be as important as pay. It is not unusual for talented people to work only for the credit, especially if they believe the film will be good. If you slap your credits together at the last minute, you run the risk of forgetting people, giving them improper credit, or misspelling their names. All of these are serious faux pas and can alienate the people you've worked with, who are among your most important resources as a filmmaker. In Chapter 18 I talked about treating everyone on the film with respect. Giving proper credit is at the core of this respect. Also, do not forget to acknowledge those people who helped make your film a reality, though they may not have directly worked on it, by putting them on a "thanks to..." or "special thanks to..." list.

■ THE PROGRAM LEADER

No matter how you are mastering your project, you must include a program leader at the beginning of your final program edit before output. **Program leader** is a standardized set of information elements that help anyone viewing or projecting your film to set up an accurate screening experience. The program leader elements include, in this order, **color bars** and **reference tone** (60 sec.), **program slate** (20 sec.), **countdown** (10 sec.) and **audio 2 pop** (one audio frame), **program start** (at T.C. 1:00:00:00).

Bars and Tone (from T.C. 58:30:00–59:30:00)

If you plan to broadcast your movie over television or cable, or submit it to film festivals, it's important

to give the recipient of your film some way to accurately calibrate their equipment so that your images (color and brightness) and your audio levels will play back accurately. The standard calibration tools, which we lay down at the head of our tape, are **color bars** and **tone**. We have already mentioned color bars with respect to calibrating field monitors (see page 284). The leader elements discussed here are the same Society of Motion Picture and Television Engineers (SMPTE) standard color bars, which allow the projectionist or broadcast engineer to accurately calibrate the chrominance and luminance of their playback equipment. The 1kHz reference tone, which is recorded on the sound track under the color bars, allows them to calibrate the audio so that your program is played back neither too soft nor too loud.

in practice

Program Slate (from T.C. 59:30:01–59:50:00)

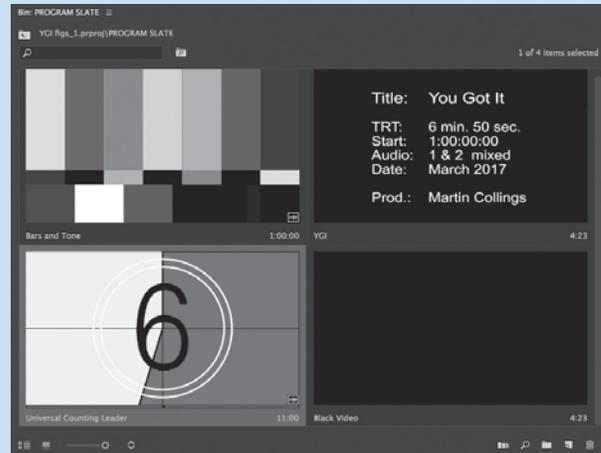
In addition, standard professional tape leader includes a **program slate**, which is a simple list of the information that is important to a broadcaster or programmer, including: **Title** (of the film), **TRT** (total running time), **Start T.C.** (standard is 1:00:00:00), **Audio** (i.e., mixed or stereo unmixed), **Date** (of completion) and the project’s **Producer**. Some editors insert 20 seconds program slate in the program leader after bars and tone, while others first insert 10 seconds of black after bars and tone and then 10 seconds of program slate—either way works as the timing is the same, 20 seconds.

SMPTE Countdown and Program Start (from T.C. 59:50:01–1:00:00:00)

SMPTE countdown is a visual numeric countdown in seconds, from 10 to 2 (one frame) that inserts pure black for the last 1 second and 23 frames of the countdown. The countdown leader also includes just one frame of audio reference tone exactly where the “2” frame in the countdown is. This is known as the **2-pop**. Then, the very first frame of your program comes precisely after the end of the black, at TC 1:00:00:00. Countdown leader allows the broadcast engineer or projectionist to easily cue your tape for screening. By pausing in the black, after the #2

frame, they can begin your program with a little buffer of black before the first image appears on screen.

All NLE programs provide bars, reference tone, and countdown, ready to insert into your program just like any other editing asset, and the program slate is simply a clip created with the title tool (Figure 24-15).



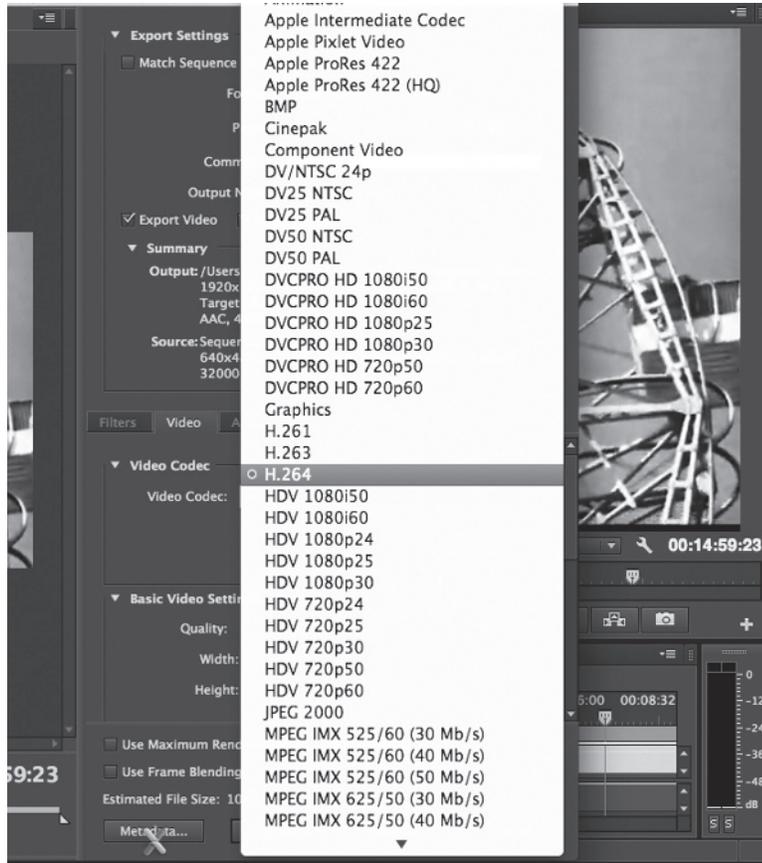
■ **Figure 24-15** All of the elements of a professional program leader in their own edit bin (PP): (clockwise from upper left) bars and tone, slate, black slug, SMPTE countdown.

■ **MASTERING AND DISTRIBUTION COPIES**

Picture locked, sound mixed, color corrected, and titles and program leader in place; you are ready to take your film out of the computer and into the real world. The first step is to create full-resolution **program masters**. **Mastering** simply means exporting your film at the highest possible resolution both as a digital master file on a hard drive and onto a high-quality HD tape format. These program masters serve dual purposes: they archive your film and they are used to create future distribution copies in a multitude of down-resolution formats depending on your needs. It is generally recommended that you master your film by exporting it with the highest quality editing codec available (e.g., Apple Pro Res 422 or Avid DNxHD 422). Master files are huge, so make sure you have a dedicated, *archive quality* hard drive with enough storage space; and don’t use this drive for any other purpose but storing your master. Many people further recommend creating multiple masters on multiple drives for backup safety. Additionally, it’s not uncommon to master to a tape format like HDCAM SR which is capable of recording up to 4K uncompressed resolution. Why tape? Many people believe that tape offers superior archiving capability and you can also make tape sub-masters and distributions copies for festivals or venues that require tape submissions. Outputting to tape is done via Firewire or Thunderbolt cable to a tape deck. And be aware that DVDs and Blu-ray discs are for distribution only and not for mastering.

Output Formats for Distribution

Obviously, when selecting your output format to create distribution files, the first question to ask yourself is: “Where will my film be distributed?” These days this is a very complex question. Broadcast and festivals may require an Apple Pro Res HQ file or perhaps a



■ **Figure 24-16** The Export Settings window in Premiere Pro. Notice the wide variety of export codecs you can choose from (and this menu is only partial).

tape format like HDCAM or DVCPRO HD, or occasionally a DCP (see box on page 579). Blu-ray authoring and distribution requires different codecs, and web streaming outlets and mobile devices open up myriad format options and possibilities.

Thankfully, all NLE systems offer a huge range of output options that employ various codecs, resolutions, frame sizes, frame rates, and so on (**Figure 24-16**). Different codecs are compatible with different distribution uses. For example, the MPEG 2 codec is used for authoring DVDs and Blu-ray discs; and MPEG 4 and H.264 are commonly used for streaming over the web. You can also export a QuickTime movie of your project at different levels of compression (from high res to low res) depending on your distribution outlet. In short, you'll need to research all your possible distribution avenues and their format requirements. But you can't possibly anticipate everything, and this is why you need a high-resolution master; down the road you can transcode for any distribution eventuality as it arises, and this future proofs your film.

DVD and Blu-Ray

While not as prevalent as they once were, DVD and Blu-ray discs are still common distribution formats, particularly in the home video and educational markets. Discs are rarely used for exhibition, but until recently DVDs were the standard for **festival screeners** or **demo reels**.

Nowadays these functions are mostly served by online (sometimes password-protected) screeners on websites like Vimeo, IMDb, or YouTube; however, there are still a few festivals, programmers, curators, and agencies that require a DVD submission for pre-selection screening.

Both Blu-ray discs and DVDs are optical discs that store the binary data for your sounds and images as microscopic bumps and indentations, called **pits**, in the surface of the disc. These pits are written as one long, ultrafine spiral called the data track and are read with a laser beam as the disc spins in the drive bay. The primary difference between these two formats is the precision of the laser and the size and number of the data pits. The red laser found in the DVD system is capable of reading data tracks that are 0.74 microns wide, while the much sharper blue laser (hence the name) with its shorter wavelength can read data off tracks that are 0.32 microns wide. This allows for much more data to be packed on a disc, and the blue laser also provides for faster data rates. What this adds up to is resolution; DVDs can only support standard-definition video resolutions whereas Blu-ray is capable of high definition.

DVDs encode the image and sound data using the MPEG 2 compression codec. Blu-ray can use either MPEG 2 or the newer H.264/MPEG-4 AVC codec. For projects shot at 24p and edited at 24p or 23.976 fps, you can output, encode, and author either type of disc at these frame rates as well. Keeping your frame rate at 24p or 23.976 fps allows you to put more footage, less compressed, onto the disc, because you have fewer frames and less data per minute.

■ DIGITAL CINEMA FINISHING

We've already explored the DCI technical standards and the general workflow for Digital Cinema project in Chapter 8 (page 197) and Chapter 19 (page 450) respectively, so now let's look at the finishing workflow. After you have color graded your original high-res files and relinked them (and your final mixed sound track) to your Edit Decision List (EDL) through the conforming process, you are ready to create your program master, or in Digital Cinema terms, your **Digital Cinema Distribution Master (DCDM)**. The DCDM contains your completed movie in an uncompressed and unencrypted state and is therefore not distributable; the DCDM is considered a master source format for future copies. The next step in the workflow is for the lab to compress your program to create the format specific distribution copy called the **Digital Cinema Package (DCP)**. The DCP resolution and delivery standards are currently 2K (2048 × 1080 pixels) and 4K (4096 × 2160 pixels) with a 24p for either resolution (you can also deliver at 48p for 2K projection). The video encoding standard is JPEG 2000, the surround sound audio file format is PCM WAVE (.wav) and the picture, sound, and subtitles are delivered in the MXF file container format. These elements in these particular formats and files constitute the DCP, which is stored on a hard drive and distributed to theaters. At the theater, the DCP data is ingested right into the 2K or 4K projector server for exhibition (Figure 24-17). The DCDM and DCP are naturally delivered on archive quality hard drives, but some people take the extra precaution of engaging a video archiving service for long term storage.



■ **Figure 24-17** For Digital Cinema projection, a hard drive with the DCP is sent to theaters, and then ingested into a 2K or 4K projector server for exhibition. Pictured is the Barco DP2K 32B Alchemy cinema projector.

DCI standards are complex and rigorous, and require a filmmaker to use a lab to create both the DCDM and the DCP. This, of course, means money. Often low-budget filmmakers will initially distribute in high-resolution HD formats for festival screenings, and later, once they've secured a theatrical distributor, let the distributor pay for the DCP process. And remember, virtually any acquisition format can be transcoded to meet the DCI standards, but shooting 24p at 2K or 4K resolutions will make for a smooth workflow from production to screening.

Pressed or Burned?

Not all DVD and Blu-ray discs are created equal. **Pressed discs** physically mold the pits of the data track into the surface of the polycarbonate plastic, which is then coated in aluminum. This is the kind of disc you find when you buy a commercial movie. **Burned discs** use recordable media and are created using a laser to burn a color dye layer in the media surface.

Pressed discs offer much better compatibility and physical longevity but must be created by a professional disc mastering service. The cost for having discs professionally mastered is quite low, but they are only available in bulk quantities, which means 250 or more discs! That's a lot of distribution. If you plan to go this route, the disc mastering service you choose will instruct you as to the specific file format they prefer to work with.

But what if you only need a dozen discs? Then you're likely to burn your own using record-once-only **recordable discs** (i.e., **DVD+R**, **DVD-R**, or **BD-R** for Blu-ray). When we create a DVD+R or BD-R copy, it's called "burning" a disc, instead of "pressing" a disc, because the record laser essentially burns faux "pits" (color dye layers) into the disc surface, which fool the playback laser into thinking that it's scanning and reading into the dimensions of a pressed pit. Encoding, authoring, and burning your own DVDs or BDs requires a



■ **Figure 24-18** The interface for Adobe Encore DVD, a powerful DVD authoring program.

computer with a DVD burner or Blu-ray burner and a DVD authoring program like Adobe Encore or Pinnacle Studio (**Figure 24-18**). Make sure you thoroughly research the capabilities and options these programs offer before you encode, author, and burn your discs. Also remember, discs that are designed to write, erase, and rewrite data, like **DVD+RW** and **BD-RE**, are not recommended for distribution.

■ DISTRIBUTING YOUR FILM

Distribution refers to the process of getting your movie out into the world and seen by audiences. Producers often say that making the film is only half the labor; getting it out there is the other half and can take years. Distribution is hard and essential, and requires innovative thinking, tenacity, and a robust work ethic—those who bring an entrepreneurial spirit into the distribution process will be rewarded.

At this point in the history of filmmaking, the distribution frontier is like the wild west: Traditional players and paradigms are disappearing, new platforms are emerging quickly to take their place (and many new approaches are falling away just as fast). There's gold out there—and pioneers are scrambling to claim it. The mercurial nature of distribution requires filmmakers to educate themselves about the abrupt shifts and emerging opportunities of the moment.

Distribution is commonly described in terms of **markets** or **outlets**. These can be loosely thought of as the various ways your film will reach audiences. These are the major markets as currently understood in the independent feature film world:

- Festival
- Traditional Theatrical
- Crowdsourced Theatrical
- Digital: Video Hosting/Sharing
- Digital: Video on Demand
- Broadcast and Cable
- Educational
- Home Video

While it is true that different markets require different approaches, *all* distribution strategies necessarily involve deploying a combination of outlets in coordination. In other words, you should not think of these outlets in isolation from one another. An intelligent distribution strategy will roll out a film in such a way that each outlet will build on the successes of the previous ones.

■ THE PROMOTIONAL WEBSITE

No matter what your film format or distribution strategy, you will need to create a strong presence on the web and this includes a promotional website. Some websites are built around a filmmaker and their work in total, while others are dedicated to promoting a single film. These sites often incorporate blogging and social network dispatches to keep fans abreast of the progress of the films and the filmmaker (**Figure 24-19**).

Two Filmmaker Websites

Gemma Lee is a director based in Australia. She works regularly making commercial spots and music videos, and has also independently made several award-winning shorts. Her website is a good template for a filmmaker who negotiates these various worlds—and is also making the transition from the short form to feature films. The design of her website also elegantly reflects her own visual and directorial style and aesthetic. **Go to:** gemmalee.com.au

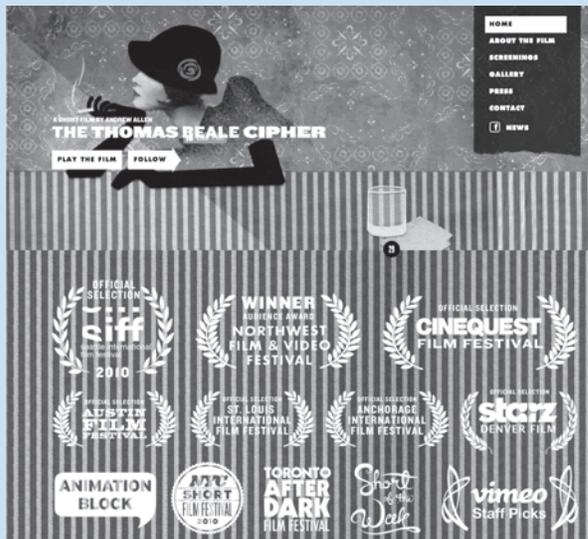


Figure 24-19 The website for the short film *The Thomas Beale Cipher* is a great example of an effective promotional website built around one specific project. Notice in the upper right the easy navigation to learn more about the filmmaker and the film.

The Streetlight Films website promotes the work of director Ramin Serry and producer Shauna Lyon. This talented duo have enjoyed success with feature films and shorts films and are most recently developing a web series—and their website design represents all of it effectively as an impressive and unified body of work. Serry and Lyon’s two short films “Don’t Call It a Comeback” (2013) and “Future Hero” (2014) (both Vimeo staff picks) can be viewed on the site in their entirety while their feature films and web series are represented by trailers. The site also contains contact and twitter feed information,

a “News and Press” section detailing all of their festival accolades, and an “extras” page with behind the scenes and outtakes videos. They even include a video interview with Roger Ebert discussing their feature film *Maryam* (2002). **Go to:** www.streetlightfilms.com

Two Film Specific Websites

Charles Haine and J.T. Abrogast’s 2013 feature film *Angel’s Perch* is supported by an excellent website that stands as a good example of a site designed around a single, independent, self-distributed feature film. On page 584 I discuss the crowd-source theatrical release strategy for this film, and their website continues to serve as a hub of information for anyone wishing to host a screening of their film. It includes the trailer, press reviews, filmmaker statements, a full press kit, and links to social media, to the film’s various digital streaming services, and to Amazon where people can purchase the movie on DVD or Blu-ray. **Go to:** angelsperch.com

Andrew Allen’s website promotes just one short animated film, “The Thomas Beal Cipher” (2010), but it is no less stylish and informative than any of the other sites. This website instantly communicates the film’s success by splashing all of its awards across the homepage. From here, visitors can negotiate simple menus to stream the film, read about its conception, download a press kit, remain abreast of past and future screenings, and contact the filmmaker. A website like this can assure that the film will enjoy exposure well beyond its initial festival run. **Go to:** thomasbealecipher.com

Self-Distribution

Initially, as an emerging filmmaker you are obliged to **self-distribute**, meaning it’s all up to you to initially get your film out into the world, onto screens, and noticed. Once you’ve completed your film, it’s likely that you’ll start your self-distribution via the festival circuit and through web distribution platforms simultaneously.

One thing to remember is that distribution begins long before the film is finished. A filmmaker needs to establish relationships with potential audiences early on, sometimes right up in preproduction. This is called **audience building**. If you did a **crowdsourced** funding campaign, like Kickstarter or Indiegogo, you will already have started to develop a cohort of interested people. If you can keep those people engaged throughout the production and editing phases, you will have begun to build your audience before you even lock picture.

Audience building, for short or long films, also requires that you establish a strong **web presence** by building a website, a YouTube or Vimeo Channel, a project blog, and so on. **Promotional websites** can be built around a single film (common for features) or designed to showcase the work of a filmmaker (common for directors who do short films,

music videos, commercial work, etc.). Promo websites for films projects should contain everything a potential festival programmer, film critic, film writer, film buyer, or other interested person needs to know. It provides a filmmaker profile with contact information; it lists all screenings and awards and furnishes published articles or press reviews; and if you're promoting a specific film, it should contain a complete online press kit (downloadable) with a synopsis, high-quality stills, and cast and crew information. In addition, your website should provide links for streaming, VOD download, or disc purchasing. Feature film websites will often stream trailers, while filmmaker websites might stream short films in their entirety.

Self-distribution also requires that you harness the power of social media by creating a Facebook page, maintaining email lists, and starting up a Twitter account for you and your project. All of these tools can help keep fans current with the progress of the movie from preproduction through to distribution and will help create a sense of anticipation for the release of your movie. If used well you can get people to attend your screenings at festivals or theatrical premieres where audience numbers (and sometimes votes) are important.

If your film manages to garner festival attention and press accolades, or your work hits viral status online, you will be in a good position to approach distributors. These are the people who can then help you gain access to the platforms that might actually be lucrative.

Distributors

The rights to distribute in each market are generally handled separately. Some rights you may wish to maintain, while others you may delegate to a distributor. A **distributor** is a third-party entity (individual or organization) that specializes in getting your film broad exposure and monetizing your work. In exchange for this, they keep a percentage of the income generated. Sometimes a distributor will approach you (especially if you've already proven yourself at festivals or online), while at others times you will reach out to them to find out if they are interested in working with your project. Either way, be sure to take some time to research the field. Try to speak with other filmmakers who have experience with various distributors. Who are the distributors who have a history of handling films like yours (subject and production scale)? What are their track records? How innovative are they with their release strategies?

When you sign a contract with a distributor, you will be granting them either exclusive or nonexclusive rights to sell your film in a particular market, for a specific territory (geographical area) and for an agreed upon term (amount of time). If the rights granted are exclusive for a particular market, you will not be able to assign those same rights to anybody else, or perhaps even to market in that area yourself. In exchange for these rights, the distributor will grant you royalties and possibly an advance against future royalties. The percentage of sales that you get back as royalties varies depending on the distributor, the market, and the other terms of the agreement.

Film Festivals

Before engaging a distributor, there is usually a period of self-distribution where you begin the process of promoting your film yourself. The first arena you will likely tackle is the **film festival circuit**. Festivals are an important place to generate press, build "buzz," and even find a distributor. There are literally thousands of festivals globally, and the number is growing all the time. Submitting to festivals can be overwhelming and expensive. Thankfully there are online services, like withoutabox.com and filmfreeway.com, that aid you in researching the numerous possible festivals and completing submissions. That said, it is important to create a festival strategy *before* submitting blindly to hundreds of festivals you may know nothing about.

Most filmmakers already know about, and aspire to submit their films to, the prestigious, top-tier festivals like Sundance, South by Southwest (SXSW), Tribeca Film Festival, Toronto

International, Festival de Cannes, Berlin Film Festival, Rotterdam International Film, and so on. Doing well in these festivals, of course, can catapult a career, but if you are an emerging filmmaker, you should think carefully about putting all your eggs in the top-tier basket. It's no secret that it's easier to be programmed into these festivals if you already have a high profile in the field or if you know someone who is well connected to the festival in some way. Also, many elite festivals will not take your feature film unless it is a verifiable world premiere (or at least continental premiere)—meaning you cannot have shown it elsewhere and you cannot show it for the entire period that they are making their programming decisions. This can slow your distribution strategy greatly, and if you don't get in, you've lost valuable time.

Beyond the elite, highly competitive, festivals, there are numerous smaller festivals, regional festivals, and niche topic festivals, that are also excellent for drawing substantial audiences, generating buzz, and getting the attention of film reviewers. At these smaller festivals your film can certainly acquire important exposure, impressive awards, and distribution interest—without worrying about whether or not you're giving them a premiere. The Rhode Island, Hamptons, Montclair, Florida, Boulder, Athens, Vancouver, Woodstock, Ashland, and Austin Film Festivals, and of course Slamdance (to name only a very few), are all great springboards for emerging filmmakers.

There are also many outstanding festivals dedicated exclusively to short films, including the following international short film festivals: Palm Springs (USA), Oberhausen (Germany), Aspen (USA), Clermont-Ferrand (France), Los Angeles (USA), Shortshorts (USA), Flickerfest (Australia), and Encounters (England). These, and the many regional film festivals that also program short films, are terrific opportunities to showcase your talent and mingle with the filmmaking community—and maybe even pick up an award. The other important thing to note is that some of these regional and short film festivals are “Oscar qualifying,” meaning that if your short film wins an award it automatically qualifies for entry into the Academy Award short film competition.

The festivals I've mentioned here are not even close to being a comprehensive list, so you'll need to dig in and do some research. Find out where films similar to yours have played and done well. Talk to other filmmakers to find out what festivals they think are worth submitting to. Try to find out what each festival can do for you. Some are good for getting industry press, while others are known for attracting distributors. Other festivals are especially valuable for establishing your reputation in the film (or television, or online) community, while others offer awards that align with your project's subject, genre, or style. You'll need to decide which objective is most important to you and target the festivals that are the best fit for your project.

I'd like to add one additional piece of advice on this subject. If it's at all possible, it's a good idea to volunteer or intern at a regional film festival. Not only will you gain insight into the inner workings of the festival process, but you'll meet lots of film folks, and even move up in the film festival world if you stick with it and do a good job. Every student I've known who's done this has gained valuable experience and contacts that they drew on when distributing their own movies.

Traditional Theatrical

If you can make a mark theatrically ... then what happens is you can make money on Pay TV, free VOD, home streaming, the windows can go on forever. Our job in the theatrical marketplace is to make the film distinctive to catch the audience and I don't think that's going away.

Michael Barker, Co-President Sony Pictures Classics (From
“How to Make Sure Your Film Gets a Theatrical Release,”
by R. Koo, nofilmschool.com, 2015)

These days, **theatrical distribution** can be tough for independent films in general, and for upstart filmmakers it's nearly impossible. In the United States and Europe, the number of available screens for small independent films is diminishing rapidly. There are still benefits to gaining a theatrical release, but given that most theatrically released indie films only manage a very brief run in a major city or two, large ticket sales isn't one of them.

The principle value of a theatrical release for low-budget indie films these days comes from the prestige that this coveted industry imprimatur bestows on the film, the joy of seeing your film on the big screen, and most importantly, the press exposure. Theatrical release in large urban areas leads to reviews, and reviews (good ones at least) lead to buzz and recognition. A review in the major press is almost impossible to secure unless you have a national television broadcast or a theatrical release, and even if you don't sell too many tickets in theaters, that kind of exposure will give your film legs as it winds its way through the other distribution platforms, like video on demand. A potential viewer scanning Netflix or Amazon is faced with dozens of new releases. It helps enormously if they can say, "Oh yeah, I heard about this film, I read a review."

In any case, the bottom line is, you need a distributor to undertake a traditional theatrical campaign, and a crafty distributor will know that theatrical release is only one piece of a broader distribution strategy.

Because of the value of major press attention, some filmmakers pay for their own theatrical releases by renting a theater to promote the film themselves. This is known as **four-walling** and can cost upwards of \$10,000 for a week in New York or Los Angeles, but there is an alternative ...

Crowdsource Theatrical

The **crowdsource theatrical** release strategy is still relatively young, but is getting more robust year by year. The two biggest players in this arena, Tugg.com and Gathr.us, are prime examples of the ways the internet and crowdsourcing strategies are converging to meet the needs of both filmmakers and audiences.

Tugg has an exhibitor network that covers many screens in the United States, including nationwide chains such as AMC, Cinemark, and Regal as well as hundreds of regional and independent cinemas around the country. With Tugg, the first step is to submit your film. If it is accepted, someone on your team (or someone in the community) becomes the film's promoter. Once a promoter and theater are identified in a specific community, your team promotes the screening event to individuals and organizations. When a threshold of advanced ticket sales is met, then your theatrical screening is confirmed. Tugg helps with the operations, logistics, promotion, and customer service. The filmmaker receives 35% of ticket sales, and your community promoter (which you can do yourself) receives 5% for getting a buzz going and selling tickets.

The crowdsource theatrical strategy has proven to work well with films that involve a social issue, because connecting with regional and national organizations dedicated to these issues can be an effective way to connect to large groups of interested viewers. This was the case with Charles Haine's 2013 film *Angel's Perch*, which tells the story of an architect from Pittsburgh who must return to his tiny, rural hometown to care for his aging grandmother who suffers from Alzheimer's (**Figure 24-20**). The film was shot almost entirely in a small logging town in West Virginia. The film's producers, J.T. Abrogast and Kimberly Dilts, were able to capitalize on three critical elements in their theatrical release campaign which started in West Virginia: local interest in a film shot in the region, the army of loyal followers they maintained from their crowdsource funding campaign, and the connections they forged with the West Virginia chapter of the Alzheimer's Association who helped them raise grant money and spread the word about the screenings throughout the region.²

² "How 'Angel's Perch' Filmmakers Took Their Narrative Feature Film on Tour," by Christopher Boone, nofilmschool.com, 4/11/15.

On the other hand, straight up pop-movies with no immediate social issue tie-ins are also starting to make lucrative use of the crowdsource theatrical strategy. Rooster Teeth's Sci-fi comedy *Lazer Team* (Matt Hullum, 2015), which follows the wacky misadventures of four local losers who unwittingly become the defenders of mankind, managed to create a very successful international Tugg campaign that took in over a million dollars in ticket pre-sales during its initial release.³

Crowdsource theatrical release is still a very new strategy, and while the time and effort involved in hosting screenings one by one in multiple communities can be substantial, and not necessarily remunerative, this convergence of crowdsourcing and theatrical distribution seems like it will be around for a while.

■ **Figure 24-20** Crowdsource theatrical. The Tugg page for Haine's *Angel's Perch* with a synopsis, filmmaker information, and instructions on how to host a screening.

[As a filmmaker] you might not even be halfway there once you finish your film. When you really start to go uphill is when you get to releasing. It takes a lot of work and bandwidth to have a successful release. And bandwidth to filmmakers can be more precious than money. You have to build partnerships early on so you have organizations, individuals, and networks who can tap into their collective audience and influence. Otherwise if you're hoping for a big acquisition at Sundance, you're setting yourself up to fail, once you are on the festival circuit [if that doesn't happen] and you don't have a solid release plan.

Brian Parsons, Tugg.com From "How to Make Sure Your Film Gets a Theatrical Release," by R. Koo, nofilmschool.com, 2015)

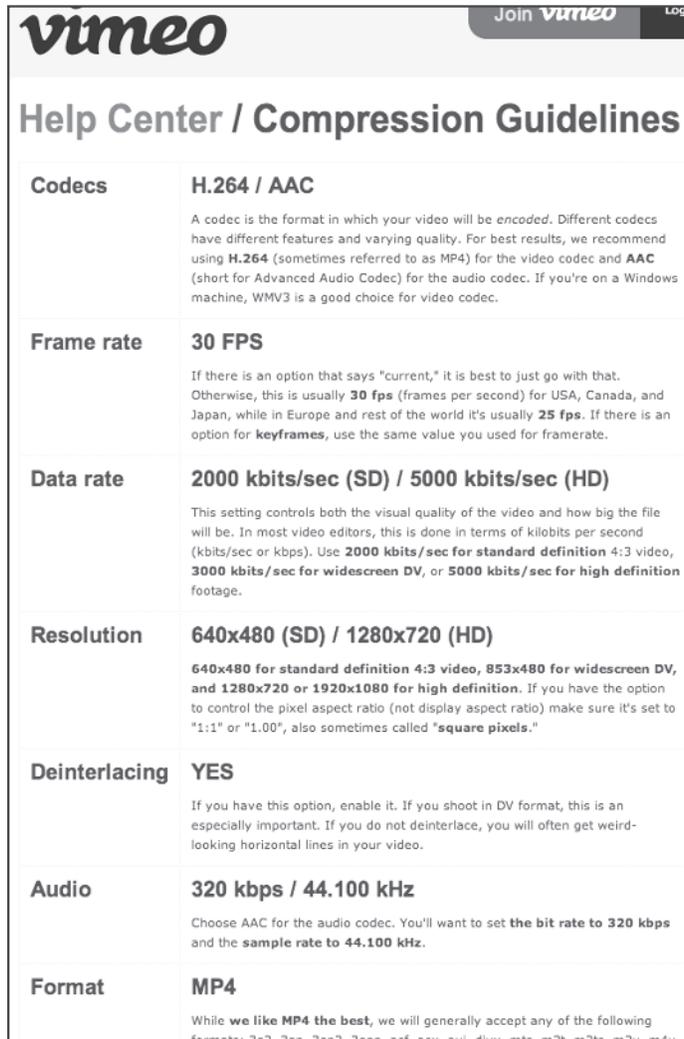
Digital: Video Hosting/Sharing

For emerging filmmakers, one of the most important capabilities of the web is the ability to provide free online streaming to gain public exposure by sharing films, rough cuts, and trailers with colleagues, potential employers, funders, and the public in general. This is the service that **video hosting/sharing websites** provide, along with the ability to create your own filmmaker channel with links to other filmmakers, websites, and playlists. In addition, if your uploaded video reaches a certain number of views (e.g., 10,000+ hits on YouTube) you may start receiving revenue from the host site.

More and more films, especially shorts, are being uploaded and streamed for free on YouTube and Vimeo, which, for all practical intents and purposes, represent the duopoly of video hosting sites. There are some smaller alternatives like Dailymotion, Metacafe, and Veoh, but for filmmakers seeking maximum exposure, the big two are unavoidable.

There also a number of **curated video hosting** sites that select videos from those submitted in order to carefully control the format, subject, and quality of the films streaming from their service. Three noteworthy curated video hosting sites for student and independent filmmakers are *Short of the Week*, *Snag Films*, and *studentfilmmaker.com*. Short of the Week (shortoftheweek.com) is essentially a rolling online film festival for shorts.

³ "'Lazer Team' Scores \$1 Million in Presales for Tugg Screenings," by Dave McNary, Variety.com, 1/27/16.



Codecs	H.264 / AAC A codec is the format in which your video will be encoded. Different codecs have different features and varying quality. For best results, we recommend using H.264 (sometimes referred to as MP4) for the video codec and AAC (short for Advanced Audio Codec) for the audio codec. If you're on a Windows machine, WMV3 is a good choice for video codec.
Frame rate	30 FPS If there is an option that says "current," it is best to just go with that. Otherwise, this is usually 30 fps (frames per second) for USA, Canada, and Japan, while in Europe and rest of the world it's usually 25 fps . If there is an option for keyframes , use the same value you used for framerate.
Data rate	2000 kbits/sec (SD) / 5000 kbits/sec (HD) This setting controls both the visual quality of the video and how big the file will be. In most video editors, this is done in terms of kilobits per second (kbits/sec or kbps). Use 2000 kbits/sec for standard definition 4:3 video, 3000 kbits/sec for widescreen DV , or 5000 kbits/sec for high definition footage.
Resolution	640x480 (SD) / 1280x720 (HD) 640x480 for standard definition 4:3 video, 853x480 for widescreen DV, and 1280x720 or 1920x1080 for high definition. If you have the option to control the pixel aspect ratio (not display aspect ratio) make sure it's set to "1:1" or "1.00", also sometimes called "square pixels."
Deinterlacing	YES If you have this option, enable it. If you shoot in DV format, this is an especially important. If you do not deinterlace, you will often get weird-looking horizontal lines in your video.
Audio	320 kbps / 44.100 kHz Choose AAC for the audio codec. You'll want to set the bit rate to 320 kbps and the sample rate to 44.100 kHz .
Format	MP4 While we like MP4 the best , we will generally accept any of the following formats: 3g2, 3gp, 3gp2, 3gpp, asf, asx, avi, divx, m4e, m7e, m7ts, m7v, mdu.

■ **Figure 24-21**

Every video sharing service provides technical guidelines to help you output your film correctly for web streaming.

The staff curates exceptional short films from an open submissions process and selects “winners” in several categories. These films are highlighted and streamed from the website homepage. But many submissions remain on the site for streaming and are organized for viewers by genre, topic, style, country of origin, and so on. Many of the curators at Short of the Week are filmmakers themselves and the site, by design, attracts people truly interested in cutting edge short films—no one, for example, goes to Short of the Week seeking the latest mannequin challenge videos. Snag Films (snagfilms.com) offers a huge, carefully selected library of independent narrative and documentary films (features, shorts, and series) streaming for free. Like YouTube, Snag Films can offer so many films streaming for free because it is advertiser supported. Finally, studentfilmmaker.com is more than just an information and networking website for student filmmakers, it also offers streaming services for student short films and regular online student film festivals.

With hosting sites that allow you to upload content yourself, like YouTube and Vimeo, it is important that you carefully read the format standards and uploading requirements, as they are not uniform and are frequently changing (**Figure 24-21**). Since the adoption of the H.263/MPEG-4 AVC codec in 2008, many sites are capable of offering multiple resolutions from 320 ×240 (very poor quality, but fast stream) to 720p HD (much better quality, but a bit slower) to 1080p HD (best resolution but slowest). It is this relatively recent bump in image quality that has made these services truly valuable for filmmakers.

Digital: Video on Demand

Video on demand (VOD) platforms are essentially video hosting sites that carefully curate their library of films and, of course, monetize the streaming process for both the website and the filmmaker—and they do this in a number of ways. Some get revenue through advertising (Snagfilms, Hulu), others through viewer subscriptions (Netflix, Hulu Plus, and Amazon Video) and others charge a fee per film download, called **transactional VOD** (iTunes, Vimeo on Demand, Google Play). VOD is undoubtedly the future of film distribution and promises huge audiences, but it also requires crafty marketing and promotion to direct viewers to your specific film. The major players in the VOD field are also changing regularly—so research is always necessary.

The major VOD websites do not negotiate with individual filmmakers, and up until now it has been mandatory to go through a distributor to get your film onto these, most lucrative, platforms. However, that may be changing. More and more, filmmakers are getting onto the major VOD platforms through an aggregator. **Aggregators** like Quiver, Juice, Distribber, Walla, and bitMax are conduits between the filmmaker and the major VOD platforms; they charge you a flat rate per platform (Netflix, or iTunes, or Google Play, Amazon, etc.). In some cases, the aggregator can simply place your film on the platform; for sites where content is closely curated, like with Netflix, they will “pitch” the film for you. Once your project is accepted, the aggregator will handle all of the technical and logistical requirements necessary to deliver your movie to one or more of the major VOD sites, and some even help you with promotional materials.

The newest trend in DIY distribution is reflected in the proliferation of **open platform VOD services**. Platforms such as Vimeo on Demand, Amazon CreateSpace, and Distrify allow you to essentially develop and run your very own VOD space utilizing their HD player, download technology, rental/sales/billing mechanism, and analytic tools. This strategy effectively cuts out the middle man altogether; however, this means that you must manage your own marketing and promotion strategy to somehow get web traffic to your film.

Obviously, a published book like this one can never remain completely current with a constantly evolving organism like web distribution; it is up to you, the emerging filmmakers, to stay current with the technological state of the art. It is indeed the wild west out there—but there is gold in them there hills! That “gold” is the professional recognition and financial return potential of your film—recompense for your hard work. It’s well worth your while to invest time and effort to research and develop the most effective, ambitious, and remunerative distribution strategy possible.

THE WEB SERIES: THREE CASE STUDIES

The Fully Integrated Approach: *Stingray Sam*

Not feature film, not a short film, watch it on your cellular telephone, on your television, at the movie theater, on your toaster oven—Stingray Sam is the first episodic thriller developed for these modern technologies!

(From the *Stingray Sam* trailer)

Director Cory McAbee and his producing partners Becky Glupczynski and Robert Lurie brought back the idea of the serialized drama and updated it for the 21st century. Their 2009 multi-format, micro-budget, genre mash-up film *Stingray Sam* is equal parts musical, cowboy film, sci-fi flick, and social satire. *Stingray Sam* follows the exploits of the titular character (played by McAbee) and his former prison cellmate the Quasar Kid as they begin their post-incarceration life by saving a cute little girl in distress.

Although the plot description sounds like a project destined for a small cult following, *Stingray Sam* has in fact found wide acclaim with festivals, audiences, and the critical press. This was largely the result of two groundbreaking ideas that were built into the very conception of the project. The first was to devise a story format and visual aesthetic that could be screened equally successfully on cell phones, televisions, and in movie theaters. The plot of the film was carefully constructed in six,

ten-minute episodes that can be easily downloaded into a cell phone to watch individually and sequentially. The six episodes, however, can also be stitched together to form a feature-length film, which can be screened in movie theaters or on DVD at home. It is in this long form that *Stingray Sam* made the initial rounds on the film festival circuit, gaining fans, press, and positive word of mouth along the way (Figure 24-22).

The second strategy was to retain all rights to the film and self-distribute by developing a web-based “direct to fan” marketing strategy. The fan base came from the film festival buzz, the success of McAbee’s previous movie *The American Astronaut*, the success of McAbee and Lurie’s rock band the Billy Nayer Show,



Figure 24-22 “Coming soon to screens of all sizes!” The website for McAbee’s innovative *Stingray Sam*, which was a groundbreaking model for creative self-distribution.

and carefully moderated releases of free episodes on YouTube, Vimeo, and the Cory McAbee website in order to get people hooked and wanting more. This fan base and its broader network is diligently (but not obnoxiously) cultivated via email, official blogs, fan blogs, Facebook, and Twitter, and all marketing roads lead back to the website—which one quickly realizes is not just a promotional tool for a single film; rather it is a synergistic collection of related creative media, artist information, and merchandise. The remarkable creativity of McAbee’s distribution strategy has made *Stingray Sam* something of a prototype for other filmmakers wishing to directly reach a wide public through self-distribution on the web.

The YouTube Series: *Ladies Room*

The initial concept for the 2016 web series *Ladies Room*, produced by Y-Films, was simple; Vice President Ashish Patil wanted to create a YouTube comedy series that took place in a single location and figured, why not the women’s bathroom? Writers Neha Kaul Mehra and Ratnabali Bhattacharjee ran with the concept and created a series of six, ten-minute (more-or-less) episodes that eavesdrop on best buddies Khanna and Dingo in six different bathrooms to find out just what goes on when girls retreat to the ladies’ room as a group. Turns out, they get high, fret about love, sex, work, and pregnancy, fight, get high, exchange dubious life philosophies, cry, video-chat

with the boss, text the boyfriend, destroy plumbing, dance, and get high (Figure 24-23).⁴

Directed by Ashima Chibber and distributed on YouTube (with social media links), *Ladies Room* is irreverent, controversial, fresh, innovative, raunchy, strange, groundbreaking, gross, and ultimately very funny—in other words, the perfect recipe for viral video status. And indeed, the six episodes have so far received over 14 million views, copious press mentions, and some serious advertising sponsorship.

Festival and Free Streaming: *The Mute Series*

Not unlike the “single location” concept for *Ladies Room*, Andy Lambert also devised his highly successful, multi-award winning *The Mute Series* around strict, pre-determined, formal limitations. According to his website:

Casting a deadpan, mordant eye over mini-moments of absurdity, MUTE films are made with strict adherence to three rules:

Rule 1. no dialogue / Rule 2. no camera movement / Rule 3. only one shot

The result is an on ongoing series (12 and counting) of funny, highly stylized, ultra-short narrative videos

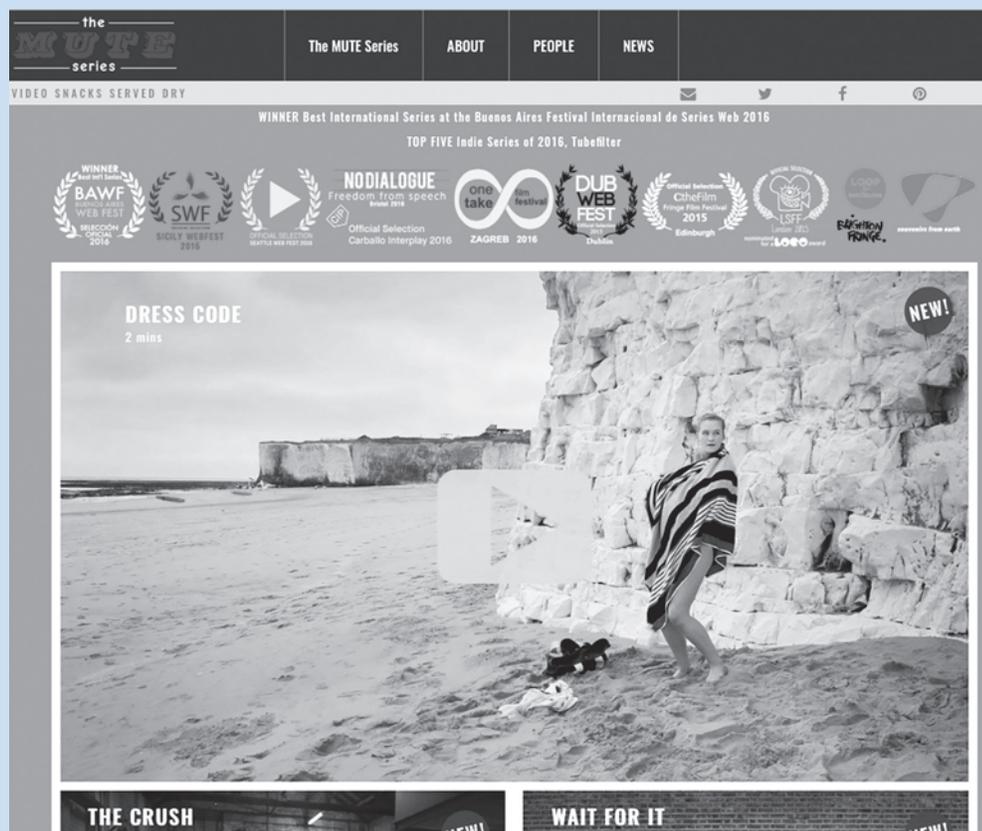


■ **Figure 24-23** The irreverent YouTube web series *Ladies Room* was designed to become a viral video and with over 14 million views, it succeeded.

⁴ “YRF’s ‘Ladies Room’ is a Refreshingly Real Show about Women, Starring Women,” by Karuna E. Parikh, Firstpost.com, 7/15/16.

(two minutes or under) that work equally well on a 27-inch computer screen or a cell phone. Feeling a bit like a cross between Jacques Tati, Bill Wegman video art, and the commercial spot, Lambert's innovative work is conceptually streamlined and relatively easy to produce, but fiendishly difficult to pull off successfully. The highly compressed form encourages the viewer to watch the curious behavior on display extra closely, but the minimal context and lack of words pushes these small moments into absurdist comedy. The fact that these short-shorts are designed as a series is precisely what makes them especially addictive.

The Mute Series is a good example of how the goal of successful distribution is not always monetary. Lambert streams his short films for free from his Vimeo channel and the website muteseries.com, and as far as I know he makes no significant money from this. However, Lambert has enjoyed extensive festival screenings and has won a number of notable awards, which in turn has led to a healthy amount of press attention. So, the principal benefit to the filmmaker in this case is an enhanced reputation as a creative, innovative, award winning filmmaker; for a person who makes their living directing commercial spots, an elevated creative profile is worth its weight in gold (Figure 24-24).



■ **Figure 24-24** The benefits to getting your work “out there” aren’t only financial. Gaining exposure, building your reputation, and garnering prizes are also significant measures of success, as with Lambert’s award winning *The Mute Series* on Vimeo.



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Recommended Readings

Note: I have intentionally left off the dates of publication for these books because many of them are technical in their content and are therefore regularly updated and re-published in new editions. To get the most current information and perspective, you should always seek the most recent edition available.

■ GENERAL FILM STUDY

Looking at Movies: An Introduction to Film

by Richard M. Barsam and Dave Monahan; W.W. Norton and Co.

The Film Experience

by Timothy Corrigan and Patricia White; Palgrave Macmillan.

The Cinema Book

by Pam Cooke and Mieke Bernink; British Film Institute Publishing.

Film Style and Technology: History and Analysis

by Barry Salt; Starword.

■ SCREENWRITING AND SCREENPLAYS

The Shooting Script

(especially *Pieces of April*, by Peter Hedges; *The Squid and the Whale*, by Noah Baumbach; and *Sideways*, by Alexander Payne and Jim Taylor); New Market Press.

Rushmore

by Wes Anderson and Owen Wilson; Faber and Faber.

Developing Story Ideas

by Michael Rabiger; Focal Press.

Crafting Short Screenplays that Connect

by Claudia Hunter Johnson; Focal Press.

Alternative Scriptwriting

by Ken Dancyger and Jeff Rush; Focal Press.

The Screenwriter's Manual: A Complete Reference of Format & Style

by Stephen E. Bowles, Ronald Mangravite, Peter A. Zorn; Allyn & Bacon.

■ PREVISUALIZATION

Film Directing Shot by Shot: Visualizing from Concept to Screen

by Steven D. Katz; Michael Wiese Productions.

■ PRODUCING

A Killer Life

by Christine Vachon with Austin Bunn; Limelight Editions.

Producing and Directing the Short Film and Video

by Peter W. Rea and David K. Irving; Focal Press.

Contracts for the Film & Television Industry

by Mark Litwak; Silman-James Press.

IFP/Los Angeles Independent Filmmaker's Manual

by Eden H. Wurmfeld and Nicole Laloggia; Focal Press.

Film Budgeting: Or, How Much It Will Cost to Shoot Your Movie?

by Ralph S. Singleton; VNU Inc.

Clearance and Copyright: Everything the Independent Filmmaker Needs to Know

by Michael C. Donaldson; Silman-James Press.

■ DIRECTING

On Filmmaking: An Introduction to the Craft of the Director

by Alexander Mackendrick; Faber and Faber.

Film Directing Fundamentals: See Your Film Before Shooting

by Nicholas Proferes; Focal Press.

Directing Actors: Creating Memorable Performances for Film & Television

by Judith Weston; Michael Wiese Productions.

The Film Director's Intuition: Script Analysis & Rehearsal Techniques

by Judith Weston; Michael Wiese Productions.

Directing Feature Films: The Creative Collaboration between Director, Writers, and Actors

by Mark W. Travis; Michael Wiese Productions.

Directing: Film Techniques and Aesthetics

by Michael Rabiger and Mick Hurbis-Cherrier; Focal Press.

■ ART DIRECTION

What an Art Director Does: An Intro to Motion Picture Art Design

by Ward Preston; Silman-James Press.

Production Design and Art Direction (Screencraft Series)

by Peter Ettedgui; Focal Press.

The Art Direction Handbook for Film

by Michael Rizzo; Focal Press.

■ CINEMATOGRAPHY

The Filmmaker's Eye

by Gustavo Mercado; Focal Press.

The Language of the Lens

by Gustavo Mercado; Focal Press (forthcoming).

Cinematography for Directors: A Guide for Creative Collaboration

by Jacqueline B. Frost; Michael Wiese Productions.

Lighting for Film and Digital Cinematography

by Dave Viera and Maria Viera; Wadsworth Publishing.

Matters of Light & Depth

by Ross Lowell; Lowell Ligth Mfg. Co.

The Filmmaker's Guide to Digital Imaging

by Blain Brown; Focal Press.

Contemporary Cinematographers on Their Art

by Pauline B. Rogers; Focal Press.

New Cinematographers

by Alex Ballinger; Collins Design.

Cinematography (Screencraft Series)

by Peter Ettedgui; Focal Press.

Masters of Light: Conversations with Contemporary Cinematographers

by Dennis Salvato and Larry Salvato; University of California Press.

■ SOUND

Audio-Vision

by Michael Chion; Columbia University Press.

Practical Art of Motion Picture Sound

by David Yewdall; Focal Press.

Sound for Film and Television

by Tomlinson Holman; Focal Press.

■ PRODUCTION TECHNICAL REFERENCE

Set Lighting Technician's Handbook (4th edition)

by Harry Box; Focal Press.

Camera Assistant's Manual

by David E. Elkins; Focal Press.

The Professional Cameraman's Handbook

by Sylvia E. Carlson and Verne Carlson; Focal Press.

Digital Cinematography

by Paul Wheeler; Focal Press.

The Green Screen Handbook

by Jeff Foster; Focal Press.

■ POSTPRODUCTION

In the Blink of an Eye
by Walter Murch; Silman-James Press.

Technique of Film and Video Editing: History, Theory, and Practice
by Ken Dancyger; Focal Press.

On Film Editing
by Edward Dmytryk; Focal Press.

Modern Post: Workflows and Techniques for Digital Filmmakers
by Scott Arundale and Tashi Trieu; Focal Press

Color Correction Look Book: Creative Grading Techniques for Film and Video
by Alexis Van Hurkman; Peachpit Press

Color Correction Handbook: Professional Techniques for Video and Cinema
by Alexis Van Hurkman; Peachpit Press.

■ ON FILMMAKERS AND METHODS

Digital Filmmaking
by Mike Figgis; Faber & Faber.

Notes on the Cinematographer
by Robert Bresson; Green Integer.

Hitchcock
by Helen G. Scott and François Truffaut; Simon & Schuster.

On Directing Film
by David Mamet; Penguin.

Making Movies
by Sidney Lumet; Vintage.

Who the Devil Made It: Conversations with Legendary Film Directors
by Peter Bogdanovich; Ballantine Books.

Moviemakers' Master Class: Private Lessons from the World's Foremost Directors
by Laurent Tirard; Faber and Faber.

Catching the Big Fish
by David Lynch and Jeremy P. Tarcher; Penguin.

Recommended Filmmaking Apps for Mobile Devices

The last few years have seen a veritable explosion in mobile device apps for the filmmaker. Some are great and many are garbage. Drawing from my own experience, and those of my students and my filmmaking friends, I have listed the apps that seem to be the most commonly used and trusted. Most of these are for the iPhone or iPad, but I've indicated a few that are for the Android platform. Clearly, many more apps will be developed every year, a few useful and others useless, but below is a list of the most worthwhile filmmaking apps as of January 2018.

■ SCRIPT AND STORYBOARD APPS

- *Scripts Pro*
Simple scriptwriting app for portable writing that integrates with Final Draft and Celtx.
- *Celtx Script*
The popular screenplay formatting program designed for iOS.
- *Celtx Shots*
Create, manage, annotate, and arrange storyboards from photos or drawings, and create overhead diagrams for blocking or lighting design. Syncs with Celtx studio.
- *Storyboard Quick Direct* (Android)
Create storyboards from location photos on your smartphone and overlay characters, animations, and screen directions.

■ PRODUCTION PLANNING AND DESIGN

- *Shot Designer*
Incredibly useful preproduction tool. Allows you to create overhead diagrams for location layout, camera setups, character blocking, camera moves, and lighting designs. And you can incorporate storyboards.
- *Lighting Designer*
Create overhead lighting diagrams with character blocking and lighting unit functions.
- *Magic Hour*
Tells you when AM and PM “magic hour” will occur in your location and how long it will last.
- *Shot Lister* and *Shot List*
Two useful apps for creating, organizing, and managing shot lists and shooting schedules. You can also include storyboards and photos with *Shot List*. Take your pick.

■ ON SET TOOLS 1: UTILITY

- *FiLMiC Pro* (iPhone and Android)
Transforms your smart phone into a viable film production camera by adding many functions found on camcorders and DSLRs like manual focus, aperture, and white balancing, and variable ISO and shutter speed settings.
- *DSLR Filmmaker Toolkit*
A Swiss Army Knife of film apps. Includes a slate, shot logs, director's viewfinder (camera specific), DOF calculator, sunrise and sunset times, and spirit leveler.
- *AJA DataCalc*
Calculates data rates and storage needs for nearly every video format, audio format, resolution, and compression protocol in use.

■ ON SET TOOLS 2: CAMERA AND LENS RELATED

- *pCam Film+Digital Calc* and *Toland ASC Digital Assistant*
There are many DoF calculators available, but David Eubanks' pCam was one of the first thoroughly useful filmmaking apps available and the *Toland ASC Digital Assistant* app was developed by the ASC. Both of these apps do more than simply calculate DoF for numerous popular camera formats, they will also calculate field of view parameters and exposures based on multiple variables including light intensity, filters, FPS, ISO, shutter angles, and so on.
- *Digital DoF* and *Visual DoF*
These are more basic DoF calculators than the two mentioned above and are highly useful on the set to determine the precise near and far limits of focus for any given lens, focus distance, and sensor format.
- *Pocket AC* (Android)
Includes many tools, tables, and functions for A.C.s including: DOF calculators, a data rate and storage calculator, exposure tools, field of view previews, insert slates, shutter angle exposure calculators, and information on numerous cameras and lenses on.

■ ON SET TOOLS 3: DIRECTOR'S VIEWFINDERS, ETC.

- *CineScope*
Changes your iPhone's video aspect ratio to 1.85:1, 16:9, 1.33:1, or even to a custom aspect ratio. Very useful for location scouting, shot planning, and informal rehearsal shoots. This app was developed by D.P. Rachel Morrison.
- *Artemis Director's Viewfinder* (iPhone and Android)
Allows you to visualize (and communicate) your shot composition by displaying overlays that correspond to the field of view of various focal length lenses.
- *SL Director's Viewfinder* (Android)
Allows you to visualize (and communicate) your shot composition by simulating the field of view and perspective of different lenses and different camera formats. You can take photos of the final decisions to use in your storyboards.

■ ON SET TOOLS 4: SLATE AND LOGGING

- *Filmslate* (iPhone, iPad); *Movieslate* (iPhone, iPad); *SL Digislate* (Android)
There are a number of film slate/clapperboard apps on the market that allow you to do timecode slating and even logging on your smartphone or iPad. These three are the most commonly used ones. I'm not sure they should replace a physical slate but ... they're out there.
- *Cinema Forms*
Create and manage your production paperwork including call sheets, script breakdowns, shooting logs, talent releases, location contracts, and so on.
- *Drylab Camera Report*
The digital version of paper camera logs. With this app you can include a wide range of information for every shot, including the usual scene and take numbers, lens, aperture, filter, timing, and notes, but you can also include stuff like focus distance, shot GPS coordinates, angle and orientation readings, and so on.

■ ON SET TOOLS 5: LIGHTING RELATED

- *Green Screener*
Helps you determine if your green screen lighting is even throughout by creating bands where exposure is inconsistent.
- *Set Lighting* (iPhone) and *Set Lighting Technician* (Android)
Complete lighting reference tool for electricians and gaffers. A compendium of lighting units and their specs categorized by source type (Tungsten, HMI, LED, and so on).

Information on power needs, lighting accessories, bulbs, power distribution schematics, and so on.

- *The Grip App* (iPhone and Android)

A database for grips. Includes information and instructions for many commonly used grip items broken down into four general categories: Dollies, Cranes, Hardware (flags, stands, etc.), and Rigs (knots, car rigs, truss, etc.).

- **EDITING**

- *Adobe Premiere Clip*

Stripped down version of the full NLE software package that allows you to edit on your phone or iPad. Connectivity with the Adobe Creative Cloud allows you to import your edits to the full Premiere Pro version.

- *iMovie*

A simple and effective app for editing video and audio on the fly. The tried and true original.



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- Vozvrashcheniye (The Return)*. Dir. Andrei Zvyagintsev. Ren Film, 2003. (Fig. 3-12 L)
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- Raging Bull*. Dir. Martin Scorsese. Chartoff-Winkler Productions, 1980. (Figs 3-18 through 3-25)
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- The Artist*. Dir. Michel Hazanavicius. La Petite Reine, 2011. (Fig. 3-29)
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Sideways. Dir. Alexander Payne. Fox Searchlight /Michael London Prod., 2004. (Figs 4-8, 4-12)

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Up in the Air. Jason Reitman. Paramount Pictures, 2009. (Figs 4-10, 4-27, 4-33)

Blade Runner. Dir. Ridley Scott. The Ladd Company, 1982. (Fig. 4-11)

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Strangers on a Train. Dir. Alfred Hitchcock. Warner Bros. Pictures, 1951. (Fig. 4-23)

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Sideways. Dir. Alexander Payne. Fox Searchlight Pictures/Michael London Prod., 2004.

Sabotage. Dir. Alfred Hitchcock. Gaumont British Picture Corporation, 1936. (Fig. 5-8)

La La Land. Dir. Damien Chazelle. Black Label Media, 2016. (Fig. 5-9)

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Snapshot (short). Dir. Andrew Lund, 2005. (Fig. 5-13)

■ CHAPTER 6

Pieces of April. Dir. Peter Hedges. IFC Productions, 2003. (Fig. 6-1)

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Chop Shop. Dir. Ramin Bahrani. Noruz Films, 2007. (Fig. 6-3)

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Kids. Dir. Larry Clark, Killer Films, 1995.

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Une Femme est Une Femme. Dir. Jean-Luc Godard. Euro International Film, 1961. (Fig. 7-3 R)

Brief Reunion. Dir. John Daschbach. Mirror Movies, 2011. (Fig. 7-4)

The Last Temptation of Christ. Dir. Martin Scorsese. Universal Pictures, 1988. (Fig. 7-5)

Super Spree (short). Dir. Matt Post, Drewstone Productions, 2011. (Fig. 7-6)

The Miracle (short). Dir. George Racz, 2006. (Fig. 7-9 L)

Chop Shop. Dir. Ramin Bahrani. Noruz Films, 2007. (Fig. 7-9 R)

Paranoid Park. Dir. Gus van Sant. MK2 Productions, 2007. (Fig. 7-10)

Ballast. Dir. Lance Hammer. Alluvial Film Company, 2008. (Fig. 7-15 B)

Vive le Premier de Mai (short). Dir. Didier Rouget, 1999. (Fig. 7-16)

■ CHAPTER 8

Butterfly Dance. Thomas Edison. Edison Manufacturing Company, ca. 1894–95. (Fig. 8-1)

The Revenant. Dir. Alejandro González Iñárritu. New Regency Pictures, 2015. (Fig. 8-9 T)

Tangerine. Dir. Sean Baker. Duplass Brothers Productions, 2015. (Fig. 8-9 B)

The Hurt Locker. Dir. Kathryn Bigelow. Voltage Pictures, 2008. (Fig. 8-11)

Gladiator. Dir. Ridley Scott. Dreamworks, 2000. (Fig. 8-13)

■ CHAPTER 9

10 on Ten. Dir. Abbas Kiarostami. MK2 Productions, 2004.

Taste of Cherry (*Ta'm e guilass*). Dir. Abbas Kiarostami. Abbas Kiarostami Productions/CiBy 2000, 1997. (Fig. 9-3 L)

Ten. Dir. Abbas Kiarostami. Abbas Kiarostami/Key Lime/MK2 Productions, 2002. (Fig. 9-3 R)

Hardcore Henry. Dir. Ilya Naishuller. Bazelevs Production, 2015. (Fig. 9-34 R)

Tiny Furniture. Dir. Lena Dunham. Tiny Ponies, 2010. (Fig. 9-36 T)

Blue is the Warmest Color. Dir. Abdellatif Kechiche. Quat'sous Films, 2013. (Fig. 9-36 C)

Belle. Dir. Amma Asante. DJ Films, 2013. (Fig. 9-36 B)

Adieu Au Langage. Dir. Jean Luc Godard. Wild Bunch, 2014. (Fig. 9-37)

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The Celebration (Festen). Dir. Thomas Vinterberg. Nimbus Film, 1998.

Julian Donkey Boy. Dir. Harmony Korine, 392 Productions, 1999.

Tangerine. Dir. Sean Baker. Duplass Brothers Productions, 2015. (Fig. 9-39)

■ CHAPTER 10

The Shining. Dir. Stanley Kubrick. Warner Bros., 1980. (Fig. 10-4)

Requiem for a Dream. Dir. Darren Aronofsky. Artisan Entertainment, 2000. (Fig. 10-9)

Goodfellas. Dir. Martin Scorsese. Warner Brothers Pictures 1990. (Fig. 10-11)

The Fisher King. Dir. Terry Gilliam. Columbia Pictures Corp., 1991. (Fig. 10-12 TL)

Searching for Bobby Fischer. Dir. Steven Zaillian. Mirage Entertainment, 1993. (Fig. 10-12 TR)

Man Push Cart. Dir. Ramin Bahrani. Noruz Films, 2005. (Fig. 10-12 B)

No Country for Old Men. Dirs. Ethan & Joel Coen. Paramount Vantage, 2007. (Fig. 10-14)

Let the Right One In (Låt den rätte komma in). Dir. Tomas Alfredson. EFTI, 2008. (Fig. 10-15)

Amour Fou. Dir. Jessica Hausner. Coop 99Filmproduktion, 2014. (Fig. 10-16)

Ed Wood. Dir. Tim Burton. Touchstone Pictures, 1994. (Fig. 10-18)

Ida. Dir. Pawel Pawlikowski. Opus Films, 2013. (Fig. 10-23)

The Big Lebowski. Dirs. Joel & Ethan Coen. Working Title Films, 1998. (Fig. 10-27)

Sideways. Dir. Alexander Payne. Fox Searchlight Pictures/Michael London Prod., 2004. (Fig. 10-28)

■ CHAPTER 11

- Ida*. Dir. Pawel Pawlikowski. Opus Films, 2013. (Fig. 11-1 T)
- Birdman or (The Unexpected Virtue of Ignorance)*. Dir. Alejandro González Iñárritu. New Regency Pictures, 2014. (Fig. 11-1 C)
- The Hurt Locker*. Dir. Kathryn Bigelow. Voltage Pictures, 2008. (Figs 11-1 B, 11-24)
- Fruitvale Station*. Dir. Ryan Coogler. Forest Whitaker's Significant Productions, 2013.
- District 9*. Dir. Neill Blomkamp. Tristar Pictures, 2009
- Eternal Sunshine of the Spotless Mind*. Dir. Michel Gondry. Focus Features, 2004.
- La Promesse*. Dirs. Jean-Pierre and Luc Dardenne. Eurimages, 1996.
- Chelovek s Kino-Apparatom (Man with a Movie Camera)*. Dir. Dziga Vertov. VUFKU, 1929. (Fig. 11-5)
- Tokyo-Ga*. Dir. Wim Wenders. Chris Sievernich Filmproduktion, 1985. (Fig. 11-10)
- Rocky*. Dir. John G. Avildsen. Chartoff-Winkler Productions, 1976.
- Marathon Man*. Dir. John Schlesinger. Paramount Pictures, 1976.
- The Shining*. Dir. Stanley Kubrick. Warner Bros. Pictures, 1980. (Fig. 11-16)
- Breathless (À Bout de Souffle)*. Dir. Jean-Luc Godard. Impéria, 1960. (Fig. 11-18)
- The Evil Dead*. Dir. Sam Raimi. Renaissance Pictures, 1981. (Fig. 11-19)
- Blood Simple*. Dir. Joel Coen. Foxton Entertainment, 1984.
- Raising Arizona*. Dir. Joel Cohen. Circle Films, 1987.
- Miss Julie*. Dir. Mike Figgis. Red Mullet Productions, 1999. (Fig. 11-20 T)
- The Celebration (Festen)*. Dir. Thomas Vinterberg. Nimbus Film, 1998.
- Barry Lyndon*. Dir. Stanley Kubrick. Hawk Films Ltd., 1975. (Fig. 11-22)
- Nine Lives*. Dir. Rodrigo García. Mockingbird Pictures, 2005. (Fig. 11-23)
- No Country for Old Men*. Dirs. Ethan & Joel Coen. Paramount Vantage, 2007. (Fig. 11-25)

■ CHAPTER 12

- The White Ribbon (Das weiße Band – Eine deutsche Kindergeschichte)*. Dir. Michael Haneke. X-Filme Creative Pool, 2009. (Fig. 12-1 L)
- Ida*. Dir. Pawel Pawlikowski. Opus Films, 2013. (Fig. 12-1 R)
- A Girl Walks Home Alone at Night*. Dir. Ana Lily Amirpour. Say Ahh Productions, 2014. (Fig. 12-3 T)
- Renoir*. Dir. Gilles Bourdos. Fidélité Films, 2012. (Fig. 12-3 C)

THX 1138. Dir. George Lucas. American Zoetrope, 1971. (Fig. 12-3 B)

There Will Be Blood. Dir. Paul Thomas Anderson. Paramount Vantage, 2007. (Fig. 12-12 T)

No Country for Old Men. Dirs. Ethan & Joel Coen. Paramount Vantage, 2007. (Fig. 12-12 C & B)

■ CHAPTER 13

Masculin/Féminin. Dir. Jean-Luc Godard. Argos Films, 1966. (Fig. 13-1 a)

Breathless (À Bout de Souffle). Dir. Jean-Luc Godard. Impéria, 1960.

Jules et Jim. Dir. François Truffaut. Les Films du Carrosse, 1962.

The Marriage of Maria Braun. Dir. Rainer Werner Fassbinder. Albatros Filmproduktion, 1979. (Fig. 13-1 b)

Kings of the Road. Dir. Wim Wenders. Wim Wenders Productions, 1976.

Personal Velocity: Three Portraits. Dir. Rebecca Miller. IFC Productions, 2002.

The Celebration (Festen). Dir. Thomas Vinterberg. Nimbus Film, 1998.

Do the Right Thing. Dir. Spike Lee. 40 Acres & A Mule Filmworks, 1989.

Old Boy. Dir. Chan-wook Park. Egg Films, 2003.

Beau Travail. Dir. Claire Denis. La Sept-Arte, 1999. (Fig. 13-1 d)

Chungking Express (Chung hing sam lam). Dir. Wong Kar-Wai. Jet Tone Production Co., 1994. (Fig. 13-1 c)

Fruitvale Station. Dir. Ryan Coogler. Forest Whitaker's Significant Productions, 2013.

Mother of George. Dir. Andrew Dosunmu. Parts and Labor, 2013.

Only Lovers Left Alive. Dir. Jim Jarmusch. Recorded Picture Company, 2013. (Fig. 13-1 e)

A Girl Walks Home Alone at Night. Dir. Ana Lily Amirpour. Say Ahh Productions, 2014.

Moonlight. Dir. Barry Jenkins. A24, 2016. (Figs 13-1 f, 13-29)

La Collectionneuse. Dir. Eric Rohmer. Les Films du Losange, 1967.

The Blair Witch Project. Dirs. Daniel Myrick & Eduardo Sánchez. Haxan Films, 1999. (Fig. 13-2 R)

River of Things: "Ode to a Bar of Soap." Dir. Katherine Hurbis-Cherrier, 1998. (Fig. 13-3)

Persona. Dir. Ingmar Bergman. Svensk Filmindustri AB, 1966. (Fig. 13-4)

Lost in Translation. Dir. Sophie Coppola. American Zoetrope, 2003. (Fig. 13-9 L)

Alphaville. Dir. Jean-Luc Godard. Andre Michelin Productions, 1965. (Fig. 13-9 R)

The Godfather. Dir. Francis Ford Coppola. Paramount Pictures, 1972. (Fig. 13-11 L)

- Mr. Arkadin*. Dir. Orson Wells. Mercury Productions, 1955. (Fig. 13-11 R)
- Beauty and the Beast (La belle et la bête)*. Dir. Jean Cocteau. DisCina, 1946. (Fig. 13-14 TL)
- Sweet Smell of Success*. Dir. Alexander Mackendrick. Hill-Hecht-Lancaster Prods., 1957. (Fig. 13-14 TR)
- Citizen Kane*. Dir. Orson Welles. Mercury Productions/RKO Radio Pictures, 1941. (Fig. 13-14 BR)
- The Virgin Spring*. Dir. Ingmar Bergman. Svensk Filmindustri, 1960 (Fig. 13-14 BL)
- The Night of the Hunter*. Dir. Charles Laughton. Paul Gregory Prod., 1955. (Fig. 13-16)
- Ed Wood*. Dir. Tim Burton. Touchstone Pictures, 1994. (Fig. 13-17)
- Bringing up Baby*. Dir. Howard Hawks. RKO Radio Pictures, 1938. (Fig. 13-18)
- Stardust Memories*. Dir. Woody Allen. Rollins-Joffe Productions, 1980. (Fig. 13-20)
- A Serious Man*. Dir. Ethan & Joel Coen. Focus Features, 2009. (Fig. 13-21 T)
- Amour Fou*. Dir. Jessica Hausner. Coop 99Filmproduktion, 2014. (Fig. 13-21 C)
- Sicario*. Dir. Denis Villeneuve. Black Label Media, 2015. (Fig. 13-21 B)
- Ferris Bueller's Day Off*. Dir. John Hughes. Paramount Pictures, 1986. (Fig. 13-22 TL)
- THX-1138*. Dir. George Lucas. American Zoetrope, 1971. (Fig. 13-22 TR)
- Crash*. Dir. Paul Haggis. Bull's Eye Entertainment, 2004. (Fig. 13-22 BL)
- Raiders of the Lost Ark*. Dir. Steven Spielberg. Lucasfilm Ltd., 1981. (Fig. 13-22 BR)
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- Yield* (short). Dir. Gustavo Mercado, 2006. (Fig. 13-30 R)
- Der himmel über Berlin (Wings of Desire)*. Dir. Wim Wenders. Argos Films, 1987. (Figs 13-40, 13-43)
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- Okoma Atani*. Story Workshop's production, 2010. (Fig. 13-53)
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- Velvet Goldmine*. Dir. Todd Haynes. Killer Films, 1998.
- The Wrestler*. Dir. Darren Aronofsky. Protozoa Pictures, 2008. (Fig. 13-54)

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- Masculin/Féminin*. Dir. Jean-Luc Godard. Argos Films, 1966. (Fig. 14-1)
- Margin Call*. Dir. J.C. Chandor. Before The Door Pictures, 2011. (Fig. 14-4 T)
- Mother of George*. Dir. Andrew Dosunmu. Parts and Labor, 2013. (Fig. 14-4 M)
- Solaris*. Dir. Steven Soderbergh. Twentieth Century Fox, 2002. (Fig. 14-4 B)
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- Mudbound*. Dir. Dee Rees. Armory Films, 2018.
- Black Panther*. Dir. Ryan Coogler. Marvel Studios, 2018.
- Tangerine*. Dir. Sean Baker. Duplass Brothers Productions, 2015.
- Ballast*. Dir. Lance Hammer. Alluvial Film Company, 2008.
- Frozen River*. Courtney Hunt. Harwood Hunt Productions, 2008.
- Chop Shop*. Dir. Ramin Bahrani. Noruz Films, 2007.
- The Death of Mr. Lazarescu*. Dir. Cristi Puiu. Mandragora, 2005.
- Rosetta*. Dirs. Jean-Pierre and Luc Dardenne. Canal +, 1999. (Fig. 14-26)
- The Dreamlife of Angels*. Dir. Erick Zonca. Diaphana Films, 1999. (Fig. 14-27)
- New York Stories*, "Life Lessons." Dir. Martin Scorsese. Touchstone Pictures, 1989. (Fig. 14-28)
- Black Narcissus*. Dirs. Michael Powell & Emeric Pressburger. Independent Prods, 1947. (Fig. 14-29)
- La La Land*. Dir. Damien Chazelle. Black Label Media, 2016. (Fig. 14-30 L)
- The Neon Demon*. Dir. Nicolas Winding Refn. Space Rocket Nation, 2016. (Fig. 14-30 R)
- Do the Right Thing*. Dir. Spike Lee. 40 Acres & A Mule Filmworks, 1989. (Fig. 14-31 T)
- Sleepy Hollow*. Dir. Tim Burton. Paramount Pictures, 1999. (Fig. 14-31 B)
- Repulsion*. Dir. Roman Polanski. Tekli British Productions, 1965. (Fig. 14-32)
- Slumdog Millionaire*. Dirs. Danny Boyle & Loveleen Tandan. Film4, 2008. (Fig. 14-33)
- Mo' Better Blues*. Dir. Spike Lee. 40 Acres & A Mule Filmworks, 1990. (Fig. 14-34)

The Last Laugh (Der Letzte Mann). Dir. F.W. Murnau. Universum Film A.G., 1924. (Fig. 14-35 L)

Delicatessen. Dirs. Jean-Pierre Jeunet and Marc Caro. Miramax Films, 1991. (Fig. 14-35 R)

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Personal Velocity: Three Portraits. Dir. Rebecca Miller. IFC Productions, 2002. (Fig. 14-38)

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Alien. Dir. Ridley Scott. 20th Century Fox, 1979.

2001: A Space Odyssey. Dir. Stanley Kubrick. Metro-Goldwyn-Mayer (MGM), 1968. (Fig. 15-2)

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The Treasure Hunter (Ci Ling). Dir. Yen-ping Chu. Yen-ping Films Prod., 2009. (Fig. 16-1)

FearFall. Dir. Mick Hurbis-Cherrier, TwoBugs Prod. 2000.

Snapshot (short). Dir. Andrew Lund, 2006. (Fig. 16-14)

Nashville. Dir. Robert Altman. American Broadcasting Co. (ABC), Paramount Pictures, 1975. (Fig. 16-15)

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Old Joy. Dir. Kelly Reichardt. Washington Square Films, 2006.

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Chelovek s Kino-Apparatom (Man with a Movie Camera). Dir. Dziga Vertov. VUFKU, 1929. (Fig. 18-3)

Bull Durham. Dir. Ron Shelton. The Mount Company, 1998. (Fig. 18-8)

De Daltons. Dir. Rita Horst. Vrijzinnig Protestantse Radio Omroep (VPRO), 2007. (Fig. 18-9)

Forget About It. Dir. BJ Davis. Beverly Hills Film Studio, 2006. (Fig. 18-10)

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Ex Machina. Dir. Alex Garland. Universal Pictures Intl., 2014. (Fig. 19-8 T)

Tangerine. Dir. Sean Baker. Duplass Brothers Productions, 2015. (Fig. 19-8 B)

Bamboozled. Dir. Spike Lee. 40 Acres & A Mule Filmworks, 2000. (Fig. 19-9)

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Mad Max: Fury Road. Dir. George Miller. Warner Bros. Pictures, 2015. (Fig. 19-13)

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Un condamné à mort s'est échappé ou Le vent souffle où il veut (A Man Escaped). Dir. Robert Bresson. Nouvelles Éditions de Films, 1956.

Tokyo monogatari (Tokyo Story). Dir. Yasujiro Ozu. Shochiku Films, Ltd., 1953. (Fig. 20-4)

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Apur Sansar (The World of Apu). Dir. Satyajit Ray. Satyajit Ray Productions, 1959.

Eternal Sunshine of the Spotless Mind. Dir. Michel Gondry. Focus Features, 2004. (Fig. 20-6 L)

La Promesse. Dirs. Jean-Pierre Dardenne & Luc Dardenne. Touza Productions, 1996. (Fig. 20-6 R)

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Paterson. Dir. Jim Jarmusch. K5 International, 2016. (Fig. 20-7 L)

The Matrix. Dirs. Andy Wachowski & Lana Wachowski. Warner Bros. Pictures, 1999. (Fig. 20-7 R)

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Apocalypse Now. Dir. Francis Ford Coppola. Zoetrope Studios, 1979.

Cold Mountain. Dir. Anthony Minghella. Miramax, 2003. (Fig. 20-31)

The Cutting Edge: The Magic of Movie Editing. Dir. Wendy Apple. A.C.E. Prod., 2004. (Fig. 20-31)

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Mo' Better Blues. Dir. Spike Lee. 40 Acres & A Mule Filmworks, 1990.

Juice. Dir. Ernest Dickerson. Island World, 1992.

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- The Blues: "Feel Like Going Home"*. Dir. Martin Scorsese. British Broadcasting Corp., 2003.
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- Close Up* (Nema-ye Nazdik). Dir. Abbas Kiarostami. Kanoon, 1990. (Fig. 21-4)
- Edge Codes.com: The Art of Motion Picture Editing*. Dir. Alex Shuper. Travesty Productions Inc., 2004.
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- Citizen Kane*. Dir. Orson Welles. Mercury Productions/RKO Radio Pictures, 1941. (Fig. 21-15)
- Rope*. Dir. Alfred Hitchcock. Warner Bros. Pictures, 1948.
- Jeanne Dielman, 23 Quai du Commerce, 1080 Bruxelles*. Dir. Chantal Akerman. Paradise Films, 1976.
- Russian Ark*. Dir. Aleksandr Sokurov. Egoli Tossell Film AG, 2002.
- Cléo de 5 à 7* (*Cleo from 5 to 7*). Dir. Agnès Varda. Rome Paris Films, 1961. (Fig. 21-16)
- 4 months, 3 weeks, 2 days* (*4 luni, 3 saptamâni si 2 zile*). Dir. Cristian Mungiu. Mobra Films, 2007. (Fig. 21-17)
- Syriana*. Dir. Stephen Gaghan. Warner Bros. Pictures, 2005. (Fig. 21-18)
- Traffic*. Dir. Steven Soderbergh. USA Films, 2000. (Fig. 21-19)
- Misery*. Dir. Rob Reiner. Castle Rock Entertainment, 1990. (Fig. 21-20)
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- There's Something About Mary*. Dirs. Bobby & Peter Farrelly. 20th Century Fox, 1998. (Fig. 21-24)
- Cidade de Deus* (*City of God*). Dirs. Fernando Meirelles & Kátia Lund. O2 Filmes, 2002. (Figs 21-25, 21-26, 21-27)
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The Jazz Singer. Dir. Alan Crosland. Warner Bros. Pictures (as The Vitaphone Corporation), 1927.

Dwaj ludzie z szafa (Two Men and a Wardrobe) (short). Dir. Roman Polanski. Państwowa Wyższa Szkoła Filmowa, 1958. (Fig. 22-1)

Le Dernier Combat. Dir. Luc Besson. Les Films du Loup, 1983.

There Will Be Blood. Dir. Paul Thomas Anderson. Paramount Vantage, 2007.

Rififi. Dir. Jules Dassin. Pathé Consortium Cinéma, 1955.

The Artist. Dir. Michel Hazanavicius. La Petite Reine, 2011.

4 months, 3 weeks, 2 days (4 luni, 3 saptamâni și 2 zile). Dir. Cristian Mungiu. Mobra Films, 2007. (Fig. 22-2)

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Rosetta. Dirs Jean-Pierre and Luc Dardenne. Canal +, 1999.

Kid With a Bike. Dirs Jean-Pierre and Luc Dardenne. Les Films du Fleuve, 2011.

Let the Right One In (Låt den rätte komma in). Dir. Tomas Alfredson. EFTI, 2008. (Fig. 22-3)

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Code inconnu: Récit incomplet de divers voyages (Code Unknown). Dir. Michael Haneke. Canal+, 2000. (Fig. 22-7)

His Girl Friday. Dir. Howard Hawks. Columbia Pictures Corporation, 1940. (Fig. 22-8)

2001: A Space Odyssey. Dir. Stanley Kubrick. Metro-Goldwyn-Mayer, 1968. (Fig. 22-9)

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River of Things: "Ode to a Bar of Soap" (short). Dir. Katherine Hurbis-Cherrier, 1998. (Fig. 22-16)

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Chop Shop. Dir. Ramin Bahrani. Noruz Films, 2007. (Fig. 22-19)

Do the Right Thing. Dir. Spike Lee. 40 Acres & A Mule Filmworks, 1989. (Fig. 22-20)

Gone With the Wind. Dir. Victor Fleming. Selznick International Pictures, 1939.

Jaws. Dir. Steven Spielberg. Universal Pictures, 1975.

Fa yeun nin wa (In the Mood for Love). Dir. Wong Kar-Wai. Paradis Films, 2000. (Fig. 22-22)

Star Wars: Episode VI—Return of the Jedi. Dir. Richard Marquand. Lucasfilm Ltd., 1983. (Fig. 22-23)

Reservoir Dogs. Dir. Quentin Tarantino. Dog Eat Dog Prods., 1992. (Fig. 22-24)

Into the Wild. Dir. Sean Penn. Paramount Vantage, 2007. (Fig. 22-25)

River of Things: "Ode to Things" (short). Dir. Mick Hurbis-Cherrier, 1998. (Fig. 22-26)

Yume (Dreams). Dir. Akira Kurosawa. Akira Kurosawa USA, 1990. (Fig. 22-27)

La Promesse. Dirs. Jean-Pierre Dardenne and Luc Dardenne. Eurimages, 1996. (Fig. 22-28 T)

The Wrestler. Dir. Darren Aronofsky. Protozoa Pictures, 2008. (Fig. 22-28 M)

The Silence of the Lambs. Dir. Jonathan Demme. Orion Pictures Corporation, 1991. (Fig. 22-28 B)

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Panic Room. Dir. David Fincher. Columbia Pictures Corp., 2002.

Apocalypse Now. Dir. Francis Ford Coppola. Zoetrope Studios, 1979.

FearFall. Dir. Mick Hurbis-Cherrier, 2000.

Immortal Beloved. Dir. Bernard Rose. Majestic Films International, 1994. (Fig. 23-14)

M. Dir. Fritz Lang. Nero-Film AG, 1931. (Fig. 23-15)

Arrival. Dir. Denis Villeneuve. Lava Bear Films, 2016. (Fig. 23-18)

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Don't Call It a Comeback. Dir. Ramin Serry. 2013.

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Maryam. Dir. Ramin Serry. Center Street, 2002.

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The Thomas Beale Cipher. Dir. Andrew S. Allen. 2010.

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Stingray Sam. Dir. Cory McAbee. BNS Productions, 2009. (www.corymcabee.com/stingraysam) (Fig. 24-22)

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■ ADDITIONAL PHOTOGRAPHY BY

Gustavo Mercado, Mick Hurbis-Cherrier, Peter A. Jackson, Jessica Webb, Alessandra Kast, and Nicole Pommerehncke.

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