

Sound for Film and Television

Third Edition

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Tomlinson Holman



AMSTERDAM • BOSTON • HEIDELBERG • LONDON • NEW YORK • OXFORD
PARIS • SAN DIEGO • SAN FRANCISCO • SINGAPORE • SYDNEY • TOKYO

Focal Press is an imprint of Elsevier



Focal Press is an imprint of Elsevier
30 Corporate Drive, Suite 400, Burlington, MA 01803, USA
The Boulevard, Langford Lane, Kidlington, Oxford, OX5 1GB, UK

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Library of Congress Cataloging-in-Publication Data

Holman, Tomlinson.

Sound for film and television / Tomlinson Holman. – 3rd ed.

p. cm.

Includes bibliographical references and index.

ISBN 978-0-240-81330-1 (alk. paper)

1. Sound—Recording and reproducing. 2. Sound motion pictures. 3. Video recording. 4. Motion pictures—Sound effects. 5. Television broadcasting—Sound effects. I. Title.

TK7881.4.H63 2010

778.5'2344—dc22

2009044200

British Library Cataloguing-in-Publication Data

A catalogue record for this book is available from the British Library.

ISBN: 978-0-240-81330-1

For information on all Focal Press publications
visit our website at www.elsevierdirect.com

09 10 11 12 13 5 4 3 2 1

Printed in the United States of America

Working together to grow
libraries in developing countries

www.elsevier.com | www.bookaid.org | www.sabre.org

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Preface to the Third Edition

This book is an introduction to the art and technique of sound for film and television. The focus in writing the book has been to span the gulf between typical film and television production textbooks, with perhaps too little emphasis on underlying principles, and design engineering books that have few practical applications, especially to the film and television world. The guiding principle for inclusion in the text is the usefulness of the topic to film or video makers.

The first three chapters provide background principles of use to anyone dealing with sound, especially sound accompanying a picture, and, by way of examples, demonstrate the utility of the principles put into practice. The rest of the book walks through the course of a production, from the pickup of sound by microphones on the set to the reproduction of sound in cinemas and homes at the end of the chain.

How to Read This Book

Depending on who you are, there are various approaches you can take to reading this book.

If you have to start on a set tomorrow morning, read Chapter 4, Capturing Sound, and Chapter 8, Sync, Sank, Sunk, tonight. These two chapters contain the most salient features that you have to know to get started. Of these, the sync chapter is the harder one, and you may have to call the postproduction house to know what to do, explaining to them what you are about to embark on—above all, be careful: cameras that say they are 24 P may in fact be 23.976 P. Be sure to have camera, mixer/recorder, and slate model numbers so that the post house can help you. If the production has not determined a postproduction house, your audio rental facility should be helpful.

Then, having mastered the material in these chapters, move on to the other chapters related to recording sound, 5, 6, and 7. You will find in them concepts that the background provided by Chapters 1, 2, and 3 will be helpful in explaining. From there, work linearly through the book from Chapter 9 through Chapter 13. Note that the Glossary at the end should help in defining terms.

For a university course in film sound, I start with the first background chapters and proceed forward straight through the book. I do skip some material in a starting course, which is here for completeness but is beyond the scope of early courses. We use the book at multiple levels in our program at the University of Southern California.

For the sake of completeness, some information has been included that may be tangential to end users. This information has been made separate from the main text by being indented and of smaller type.

Examples

No study of film and television sound would be complete without listening to a lot of film and television shows. This is practical today in classrooms and at home because with a decent home theater sound system, available for a few thousand dollars, the principles given in the text can be demonstrated. Here are some film examples that are especially useful.

- *Citizen Kane*: the scene in the living room at Xanadu in which Kane and his love interest interact, photographed with the great depth of field that was the innovation of Greg Toland for the picture. The sound in this scene can be contrasted with that in the next scene of Kane and his girlfriend in the back seat of a car. In the first scene, the sound is very reverberant, emphasizing the separation of the characters. In the second, the sound is very intimate, emphasizing the change of scene that has taken place. Orson Welles brought the techniques he had learned in radio to films. This is used to illustrate Chapter 1, Objective Sound, and the difference that attention to such factors can make.
- *Days of Heaven*, reel 1: from opening to arrival of the train at the destination. After an opening still photo montage accompanied by music, we come in on an industrial steel mill in which the sound of the machinery is so loud we often cannot hear the characters. A fight ensues between a worker and his boss, and the content of the argument is actually made stronger by the fact of our not being able to discern it. This illustrates frequency masking, a topic in Chapter 2. A train leaves for the country then, accompanied by music, and the question posed is: Do we hear the train or not and what does it matter if we do or don't? A voice-over narration illustrates the speech mode of perception, when it abruptly enters and demands our attention. The lyrical music accompanied by the train motion is a strong contrast with the sound that has come before, and is used in the vaudeville sense of “a little traveling music, please”—making it an effective montage. At the end of the scene there is a cross-fade

between the music and the reality sound that puts an end to the montage, punctuating the change in mood.

- *Das Boot*, reel 1: the entrance of the officers into the submarine compound until the first shot of the submarine on the open ocean illustrates many things. At first the submarine repair station interior is very noisy, and the actors have to raise their voices to be heard. Actually, the scene was almost certainly looped, therefore it was the direction to the actors that caused their voices to be raised, not the conditions under which they were recorded. Next, the officers come upon their boat, and despite the fact they are still in a space contiguous with the very noisy space, the noisy background gives way to a relatively quiet one, illustrating a subjective rather than a totally objective view. Then the submarine leaves the dock, accompanied by a brass band playing along in sync (an example of prerecorded, or at least postsynced, sound). The interior of the boat is established through the medium of telling a visitor where everything is. Sound is used to help establish each space in the interior: noise for the men's quarters, and a little music for the officer's, Morse code for the radio room, and mechanical noise for the control room. Next we come upon a door from behind which we hear a loud sound, then going through the door, we find it is the engine room with the very noisy engine causing the actors to speak loudly once again. The whole reel, up to the going to sea shot, is useful in the ways that sound is used to tell the story.
- *Cabaret* is useful for two principal purposes. The first is to show a scene that involved extensive preproduction preparation of a music recording, then filming, then using the prerecorded and possibly postrecorded materials after the picture was edited to synchronize to the perspective of the picture. The scene is of the Nazi boy singing "The sun on the meadow is summery warm . . ." until the main characters leave with the question, "Do you still think you will be able to control them?" What is illustrated here is very well controlled filmmaking, for we always hear what we expect to, that is, sound matched to picture, but over a bed of sound that stays more constant with the picture cuts. The second point of using *Cabaret* is that filmmaking is a powerful,

but neutral, tool that can help move people to heights of folly. Whether the techniques taught here are used for good or ill is in the hands of the filmmaker.

- *Platoon* demonstrates a number of sound ideas in the final battle scene. Despite the fact that it is difficult to understand the characters while they are under fire, the effect of their utterances is bone chilling nevertheless. The absolutely essential lines needed for exposition are clearly exposed, with practically no competition from sound effects or music. On the other hand, there is one line that can be understood only by lip reading, because it is covered by an explosion. Still, the meaning is clear and the "dialog" can be understood because the words spoken are so right in the context of the scene.

Other films that I have found to be of enduring interest are listed in the Appendix II Filmography at the end of the book.

ACKNOWLEDGMENTS

Art Baum read the entire book in minute detail and provided great feedback. Martin Krieger also read the entire manuscript for clarity. Others read specific areas of their expertise, which is often beyond my own. Mark Schubert, of the live Metropolitan Opera broadcasts, and Paul Chapman, Senior Vice President of Technology at Fotokem, were particularly helpful on synchronization issues. The discussion of the Gestalt psychologists and psychoacoustics in Chapter 2 owes a great deal to Dr. Brian C. J. Moore's book *An Introduction to the Psychology of Hearing*. Other readers included colleagues Tom Abrams, Midge Costin, and Don Hall. Dr. Dominic Patwaran contributed to my well-being during the writing of this book.

DEDICATION

This work is dedicated to the hardworking men and women, often unsung, who perform feats of skill and amazing perseverance every day in the making of sound for film and video.

SOUND FOR FILM AND TELEVISION DEFINED

Sound for film and television is an aural experience constructed to support the story of a narrative, documentary, or commercial film or television program. Sound may tell the story directly, or it may be used indirectly to enhance the story. Although there are separate perceptual mechanisms for sound and picture, the sound may be integrated by the audience along with the picture into a complete whole, without differentiation. In such a state, the sound and picture together can become greater than the sum of the parts.

In most instances, film and television sound for entertainment and documentary programming is constructed in postproduction by professionals utilizing many pieces of sound mixed seamlessly together to create a complete whole. The sources used for the sound include recordings made during *principal photography* on sets or on location, sound effects libraries and customized recordings, and music, both composed for the film and from preexisting sources. Sound for film and television is thus a thoroughly constructed experience, usually meant to integrate many elements together seamlessly and not draw specific attention to itself.

The relative roles of picture and sound can change with regard to storytelling from scene to scene and moment to moment. A straight narrative picture will probably have dialog accompanying it, whereas a picture montage will often be accompanied by music, or at least manipulated sound effects, as the filmmaker varies the method of storytelling from time to time to add interest to the film and provide a moment for audiences to soak up the action, make scene transitions, and so forth.

Nearly everyone involved in the production of a film or television program affects, and is affected by, sound. Writers use sound elements in their storytelling, with suggestions in the script for what may be heard. Location scouts should note bad noise conditions at potential shooting sites because, although the camera can “pan off” an offending sign, there is no such effective way to eliminate airplanes flying over from the soundtrack—the “edges” of a sound frame are not hard like those of a picture frame. Directors need to be keenly aware of the potential for sound, for what they are getting on location and what can be substituted in postproduction, as sound is “50 percent of the experience” according to a leading filmmaker.

Cinematographers can plan lighting so that a sound boom is usable, with the result being potentially far better sound. Costumers can supply pouches built into clothing that can conceal microphones and can supply booties so that actors can wear them for low noise when their feet don’t show. Grips, gaffers, and set dressers can make the set quiet and make operable items work silently. Often, the director need only utter the word to the crew that sound is important to him or her for all this to occur.

ROLES OF SOUND

Many kinds of sound have a direct storytelling role in filmmaking.¹ Dialog and narration tell the story, and narrative sound effects can be used in such a capacity, too, for example, to draw the attention of the characters to an off-screen event. Such direct narrative sound effects are often written into the script, because their use can influence when and where actors have to take some corresponding action.

Sound also has a subliminal role, working on its audience subconsciously. Whereas all viewers can tell the various objects in a picture apart—an actor, a table, the walls of a room—listeners barely ever perceive sound so analytically. They tend to take sound in as a whole, despite its actually being deliberately constructed from many pieces. Herein lies the key to an important storytelling power of sound: the inability of listeners to separate sound into ingredient parts can easily produce “a willing suspension of disbelief” in the audience, because they cannot separately discern the functions of the various sound elements. This fact can be manipulated by filmmakers to produce a route to emotional involvement in the material by the audience. The most direct example of this effect is often the film score. Heard in isolation, film scores² often do not make much musical sense; the music is deliberately written to enhance the mood of a scene and to underscore the action, not as a foreground activity, but a background one. The function of the music is to “tell” the audience

¹This term is used instead of the clumsier, but more universal, “program making.” What is meant here and henceforth when terms such as this are used is the general range of activities required to make a film, video, or television program.

²The actual score played with the film, not the corresponding music-only CD release.

how to feel, from moment to moment: soaring strings mean one thing, a single snare drum, another.

Another example of this kind of thing is the emotional sound equation that says that low frequencies represent a threat. Possibly this association has deep primordial roots, but if not, exposure to film sound certainly teaches listeners this lesson quickly. A distant thunderstorm played underneath an otherwise sunny scene indicates a sense of foreboding, or doom, as told by this equation. An interesting parallel is that the shark in *Jaws* is introduced by four low notes on an otherwise calm ocean, and there are many other such examples.

Sound plays a grammatical role in the process of filmmaking too. For instance, if sound remains constant before and after a picture cut, the indication being made to the audience is that, although the point of view may have changed, the scene has not shifted—we are in the same space as before. So sound provides a form of continuity or connective tissue for films. In particular, one type of sound represented several ways plays this part. *Presence* and *ambience* help to “sell” the continuity of a scene to the audience.

SOUND IS OFTEN “HYPERREAL”

Sound recordings for film and television are often an exaggeration of reality. One reason for this is that there is typically so much competing sound at any given moment that each sound that is recorded and must be heard has to be rather overemphatically stated, just to “read” through the clutter. Heard in isolation, the recordings seem silly, overhyped; but heard in context, they assume a more natural balance. The elements that often best illustrate this effect are called *Foley* sound effects. These are effects recorded while watching a picture, such as footsteps, and are often exaggerated compared to how they would be in reality, both in loudness and in intimacy. Although some of this exaggeration is due to the experience of practitioners finding that average sound playback systems obscure details, a good deal of the exaggeration still is desirable under the best playback conditions, simply because of the competition from other kinds of sound.

SOUND AND PICTURE

Sound often has an influence on picture, and vice versa. For instance, making picture edits along with downbeats in a musical score often makes the picture cuts seem very right. In *The Wonderful Horrible Life of Leni Riefenstahl*, we see Hitler’s favorite filmmaker teaching us this lesson, for she cut the waving flags in the Nuremberg Nazi rally in *Triumph of the Will* into sync with the music, increasing the power of the scene to move people.

Scenes are different depending on how sound plays out in them. For example, “prelapping” a sound edit before a scene-changing picture edit³ simply feels different from cutting both sound and picture simultaneously. The sense is heightened that the outgoing scene is over, and the story is driven ahead. Such a decision is not one taken at the end of the process in postproduction by a sound editor typically, but more often by the picture editor and director working together, because it has such a profound impact on storytelling. Thus involvement with sound is important not only to those who are labeled with sound-oriented credits, but also to the entire filmmaking process represented by directing and editing the film.

SOUND PERSONNEL

Sound-specific personnel on a given film or television job may range from one person, that being the camera person on a low-budget documentary with little postproduction, to quite large and differentiated crews as seen in the credits of theatrical motion pictures. In typical feature film production, a production sound recordist serves as head of a crew, who may add one or more boom operators and cable persons as needed to capture all the sound present. On television programs shot in the multicamera format, “filmed in Hollywood before a live studio audience,” an even larger crew may be used to control multiple boom microphones, to plant microphones on the set, and to place radio microphones on actors, and then mix these sounds to a multitrack tape recorder. Either of these situations is called production sound recording.

Following in postproduction, picture editors cut the production soundtrack along with the picture, so that the story can be told throughout a film. They may add some additional sound in the way of principal sound effects and music, producing, often with the help of sound-specific editors, “temp mixes” useful in evaluating the current state of a film or video in postproduction. Without such sound, audiences, including even sophisticated professional ones, cannot adequately judge the program content, as they are distracted by such things as cutting to silence. By stimulating two senses, program material is subject to a heightened sensation on the part of the viewer/listener, which would not occur if either the picture or the sound stood alone. A case in point is one of an observer looking at an action scene silently, and then with ever increasing complexity of sound by adding each of the edited sound sources in turn. The universal perception of observers under these conditions is that the picture appears to run faster with more complex sound, despite the fact

³By cutting to the sound for the incoming scene before the outgoing picture changes.

that precisely the same time elapses for the silent and the sound presentations: the sound has had a profound influence on the perception of the picture.

When the picture has been edited, sound postproduction begins in earnest. Transfer operators take the production sound recordings and transfer them to an editable format such as into a digital audio workstation. Sound editors pick and place sound, drawing on production sound, sound effects libraries, and specially recorded effects, which are also all transferred to an editable format. From the edited soundtracks, various mixes are made by rerecording mixers (called dubbing mixers in England). Mixing may be accomplished in one or more steps, more generations becoming necessary as the number of soundtracks cut increases to such an extent that all the tracks cannot be handled at one time. The last stage of postproduction mixing prepares masters in a format compatible with the delivery medium, such as optical sound on film, or videotape.

THE TECHNICAL VERSUS THE AESTHETIC

Although it has a technical side, in the final analysis what is most important for film and television sound is what the listener hears, that is, what choices have been made throughout production and postproduction by the filmmakers. Often, thoughts are heard from producers and others such as, “Can’t you just improve the sound by making it all digital?” In fact, this is a naive point of view, because, for instance, what is more important to production sound is the microphone technique, rather than the method of tape recording. Unwanted noise on the set is not reduced by digital recording and often causes problems, despite the method used to record the production sound.

When film sound started in the late 1920s, the processes to produce the soundtrack were very difficult. Camera movement was restricted by large housings holding both the camera and the cameraman so that noise did not intrude into the set. Optical soundtracks were recorded simultaneously with the picture on a separate sound camera and could not be played back until the film was processed and printed and the print processed. Microphones were insensitive, so actors had to speak loudly and clearly. Silent movie actor’s careers were on the line, as it was discovered by audiences that many of them had foreign accents or high, squeaky voices.

Today, the technical impediments of early sound recording have been removed. Acting styles are much more

natural, with it more likely that an actor will “underplay” a scene because of the intimacy of the camera than “overplay” it. Yet the quality achieved in production sound is still subject to such issues as whether the set has been made quiet and whether the actor enunciates or mumbles his or her lines. Many directors pass all problems in speech intelligibility to the sound “technician,” who, after all, is supposed to be able to make a high-quality recording even if the director can’t hear the actor on the set!

A CONFUSION WITH DIRECTING ACTORS

One confusion for actors is that the frame of reference for what is left and what is right changes between theater and film. Actors have had the notion of left and right beaten into them, that it is from their vantage point facing the audience, called *stage left* and *stage right*. However, film and television employ the opposite convention. Called *camera left* and *camera right*, the point of view is that of the camera. This confusion has slowed down more than one production over the course of time, when the director yells “Go left,” and the actors move camera right.

THE DIMENSIONS OF A SOUNDTRACK

The “dimensions” of a soundtrack may be broken down for discussion into frequency range, dynamic range, the spatial dimension, and the temporal dimension. A major factor in the history of sound accompanying pictures is the growth in the capabilities associated with these dimensions as time has gone by, and the profound influence this growth has had on the aesthetics of motion-picture soundtracks. Whereas early sound films had a frequency range capability (bandwidth) only about that of a telephone, steady growth in this area has produced modern soundtrack capabilities well matched to the frequency range of human hearing. Dynamic range capability improvements have meant that both louder and softer sounds are capable of being reproduced and heard without audible distortion or masking. Stereophonic sound added literally new dimensions to film soundtracks, first rather tentatively in the 1950s with magnetic sound release prints and then firmly with optical stereo prints in the 1970s, which have had continued improvement ever since. Still, even the monophonic movies of the 1930s benefited from one spatial dimension: adding reverberation to soundtracks helped place the actors in a scene and to differentiate among narration, on-screen dialog, off-screen sound effects, and music.