

**Making Films Sound Better:
The Transition to Dolby Sound in Hollywood Cinema**

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By

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Abstract

This thesis explores the transition to Dolby multichannel sound in the Hollywood film industry from 1975 to 1979. Despite the industrial and cultural dominance of Dolby over the past thirty years, this historical moment remains largely overlooked in the history of sound technology and American cinema. Dolby essentially challenges classical notions of cinematic sound space and audience immersion. Whereas monaural film sound was directed *at* the audience, Dolby *surrounds* the audience by utilizing not only frontal loudspeakers, but also a U-shaped array of speakers beside and behind them, producing what the thesis defines as a “representational metaspace.” As a representational sound technology, Dolby is shaped not only by theories of sound space, but also by the aesthetic decisions and demands of Hollywood filmmakers. Case studies of *Close Encounters of the Third Kind* (1977) and *Apocalypse Now* (1979) concretize the historical, theoretical, and aesthetic properties that define Dolby sound space.

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Introduction

The Walls Have Ears: Film Sound in Three Dimensions

Not only as spectators, but as listeners, too, we are transferred from our seats to the space in which the events depicted on the screen are taking place.¹

As Bela Balazs has suggested in the above quotation, film sound can immerse the audience in the space of fiction. Indeed, the process whereby the audience is “transferred” from the space of the auditorium to the space of the diegesis is a decidedly audiovisual enterprise that requires both sight and sound to sustain the illusion of spatial displacement. For Balazs, however, sound, more than the film image, “reveal[s] for us our acoustic environment, the acoustic landscape in which we live.”² In this sense, sound completes the illusion by providing an added dimensionality that one scholar has called a “texture within which one can move around and live.”³

Significantly, Balazs’ comments on the nature of film sound are no doubt derived from his experience with monaural (single channel) sound. Given the dominance of monaural sound in Hollywood cinema from 1927 until 1977, it is not surprising that his theorizing concerned a form of sonic practice that pervaded the American film industry for nearly fifty years. Implicit in his account, however, is an accepted form of filmic perception that has the sound film speaking “to us more directly from the screen.”⁴ His use of the word “from” implies that sound emanates from a fixed point in front of the audience. In this way, the audience understands sound to originate from the characters

and environments on screen, producing, as Balazs' has argued, a general sense of spatial *immersion*.

While Balazs does not specify the period of film history in his argument, the concept of audience immersion is a thread that weaves itself through decades of industry practice and, later, through academic discourse. Hollywood's interest in matters of audience perception and immersion has raised a number of complex issues that continue to be worked out at the levels of theory and practice. From the conversion to sound in the late 1920s, sound engineers began to investigate the ways in which sound could enhance the motion picture experience, leading them to oscillate between the spectacle of "talking pictures" and the narrative invisibility that dictated Hollywood's image editing style. Whether it was the early tests in synchronized sound, or the short-lived experiments of stereo sound in the 1950s, immersion seemed to offer one way to describe the desired effect of sound cinema.

Balazs' analysis of cinematic immersion is invaluable for its insinuation that sonic experience can modify the audience's sense of space. Undoubtedly, his notion of the immersed audience is not limited to critiques of classical film sound, but can also be read more specifically as a conduit to theories about contemporary stereo and multichannel film sound. The resurrection of stereo sound by Dolby Laboratories in the 1970s represents an important moment in the last quarter century of Hollywood cinema where the dominant modes of classical sound theory and practice were called into question for their applicability in the contemporary sonic landscape. Here, suddenly, fifty years of monaural sound practice was challenged by a sound technology that raised astonishingly demanding questions about the representational nature of film sound. In effect, Dolby

technicians and, later, filmmakers forged a new set of sonic principles that not only drew on classical Hollywood sound style, but also demonstrated how multichannel sound could be integrated successfully within the strictures of Hollywood film production and exhibition.

As a new form of sensory media, Dolby sound fundamentally reconfigures the relationship between audience member and diegesis. Whereas monaural film sound was directed *at* the audience, Dolby sound *surrounds* the audience by utilizing not only frontal loudspeakers, but also a U-shaped array of loudspeakers beside and behind them. In essence, it produces a three-dimensional effect that insulates the audience within a perimeter of multi-directional sound. What is more, by increasing the dynamic range and level of detail available on a sound track, this technology attempts to secure a sense of aural fidelity to the narrative world depicted on screen. A number of important questions spring from the technological impetus of Dolby sound, including: how did Dolby negotiate the theoretical and practical exigencies of Hollywood sound production? Why was Dolby considered more “realistic” than other stereo sound processes from the 1950s? How, in short, did Dolby effectively immerse the audience without drawing too much attention away from the action on screen?

Whether troped as immersive or as a mode of perceptual fidelity, Hollywood’s transition to Dolby sound between 1975 and 1979 remains largely overlooked in the history of sound technology and American cinema. Some of the very best historical and theoretical works to emerge in the areas of technology and representation are surprisingly silent on the issues of Dolby and, more generally, multichannel film sound. Few contemporary film scholars seem interested in the links between Dolby and classical

sound practice, not to mention its relationship to broader issues of technology and cinematic representation. Besides the small number of academic papers on this topic, the bulk of research in this area has come from the technical writing of Hollywood sound engineers, technicians, and aestheticians, who have treated this historical period as a marker of a new era in sound film, leading one critic to call it the “second coming of sound.”⁵

Unlike the conversion to sound period in the 1930s, which continues to receive a concentrated focus from academics, contemporary developments in sound reproduction and representation are categorically and mysteriously overlooked. Perhaps Dolby has not penetrated the academic consciousness the way the conversion period has, or perhaps the study of multichannel sound appears to offer no immediate theoretical and historical solutions to questions of audience perception and industry practice. Given the industrial and cultural dominance of Dolby sound over the past thirty years, however, it is imperative that we attempt to demystify this technology and recognize its historical significance.

With this in mind, the general goal of this thesis is to examine the development of Dolby sound from its origins in the music industry to its integration into the Hollywood film industry. Despite the rather broad historical framework that this goal implies, my aim is to study Dolby as a representational technology that questions classical assumptions of sound space and the notion of audience immersion. Casting a new light on Hollywood’s transition to Dolby allows us to look more closely at the technical, representational, and industrial implications of this historical moment, and will provide

the necessary framework with which to proceed with further studies of contemporary sound technologies and specific film soundtracks.

Like Balazs' cinema of transference, I suggest that Dolby reconfigures our traditional understanding of sound space to involve an aesthetic of immersion that I call the "representational metaspace." Defined and described throughout this project, the "metaspace" differentiates Dolby from other earlier film sound processes. In essence, I argue that the Dolby process produces this representational effect at the levels of sound theory and practice. In what first appears as the result of an autonomous technological device actually emerged from the experiments of contemporary sound engineers, technicians, and especially from filmmakers who were keen to utilize the multichannel format for their various films.

The larger purpose of this thesis is to consider Dolby as a representational sound technology that is shaped not only by the technical experiments of sound engineers, but also by the aesthetic decisions and demands of Hollywood filmmakers. In this sense, I treat the word "technology" not only as the application of science, especially to industrial or commercial objectives, but also as a function of aesthetic necessity. Indeed, the period from 1975 to 1979 reflects the zenith of aesthetic experimentation by directors such as Robert Altman, Francis Ford Coppola, George Lucas, Ken Russell, and Steven Spielberg, to name just a few who used the Dolby process, and, in turn, shaped its design and implementation based on their artistic and narrative concerns. With each modification to the Dolby system, however, one aspect remained the same: the goal of immersion within the cinematic "metaspace."

Given what I take to be the centrality of Dolby to the emergence of an immersive, three-dimensional sound cinema in the 1970s, I have loosely divided this thesis into two separate sections. The first, comprising Chapters 1 and 2, examines the primary functions and practices of sound space construction in classical Hollywood film, which dovetails into a discussion of Dolby sound space. The second section, comprising Chapters 3 and 4, applies the historical and theoretical framework developed in the first section to two specific films from the transition period. The purpose of these last two chapters is to evaluate how filmmakers use Dolby, and, in turn, how Dolby affects the narrative impetus of their films.

In Chapter 1, I will provide a brief history of stereo sound in the Hollywood film industry, its changing forms at the level of aesthetic practice, and its relationship to the industry as a whole. As well, I will consider the historical significance of Dolby sound and its technical and ideological effect(s). The archive of information that informs this chapter and others is culled from the experiments and observations of Hollywood sound engineers and technicians who documented their findings in technical journals and trade publications. I also draw on critical works that examine specific matters relating to stereo sound in hope of placing these issues within a larger historical context.

Chapter 2 returns to many of these issues, but this time centers on sound theory as it has been applied to Dolby by technicians, classical Hollywood sound engineers, and, more importantly, film scholars. Looking at various theories of sound space, I explore a complex array of assumptions and practices from the 1930s through to the 1970s that inform the way in which Dolby sound is understood and implemented by sound editors.

Here, I demonstrate how the “representational metaspace” comes to define Dolby sound space by disconnecting sound theory from its monaural lineage.

Chapter 3 offers a case study of *Close Encounters of the Third Kind* (1977), one of the very first and most significant films to utilize the Dolby Stereo format. While this chapter explores the specific use of Dolby techniques to immerse the audience in the space of the film, it also considers the changing listening technique of the audience in the Dolby era, and the importance of offscreen sound to the multichannel environment. Chapter 4 builds on this analysis in order to deconstruct the sound design of *Apocalypse Now* (1979), the first Dolby film to incorporate six channels of independent sound. Using specific sequences from this film, I elaborate on the notion of “sound design” and suggest that multichannel sound space permits the sound editor to take on a greater artistic role in the production of not only the soundtrack, but also the narrative as a whole.

Significantly, this thesis is limited to the transition to Dolby in the late 1970s. Even though Dolby has arguably gained in reputation and design since 1979, it is important to consider the initial effects and ramifications of this sound technology on Hollywood personnel and audiences. While I briefly explore the realm of exhibition, this study is more concerned with the larger historical and aesthetic functions of Dolby sound as they apply to the practices of filmmakers and sound editors. In one sense, I suggest an approach that allows us to define, in a rather broad fashion, the ways in which Dolby is shaped by filmmakers, and is experienced by audiences. Opening the discourse of film sound to this historical moment and to new technology is the goal of what follows.

NOTES

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¹ Bela Balazs, "Theory of the Film: Sound," in Elisabeth Weis and John Belton, eds., *Film Sound: Theory and Practice* (New York: Columbia UP, 1985): 125.

² *Ibid.* 116.

³ Jo Tacchi, "Nostalgia and Radio Sound," in Michael Bull and Les Back, eds., *The Auditory Culture Reader* (Oxford: Berg, 2003): 281.

⁴ Balazs: 116.

⁵ Charles Schreger, "Altman, Dolby, and the Second Sound Revolution," in Elisabeth Weis and John Belton, eds., *Film Sound: Theory and Practice* (New York: Columbia University Press, 1985): 355.

Chapter 1

Presented in Stereo:

Antecedents, Stereo Sound, and the Dolby “Revolution”

...But even before Dolby, throughout the history of the talkie, the sound slowly unfurled into the low and high frequencies, thickened, spread, and refined itself. No one noticed. No one said: the sound is different.

Dolby is not a Jesus Christ, dividing an era before from one after. The change was more gradual. Compact (but often very beautiful) at the outset, restricted to narrow band of frequencies into which it had trouble cramming all its constituents, voices, music, and sound effects, sound has slowly expanded.¹

The decidedly vague history of stereo sound has, in some respects, fogged our understanding of Dolby. In his essay, “Quiet Revolution...And Rigid Stagnation,” Michel Chion defined the transition to Dolby as a “quiet revolution.” Indeed, by the mid-1980s nearly ninety percent of all Hollywood films were released in some form of Dolby Stereo. Yet despite exhaustive technical and aesthetic experimentations, Chion has suggested in the above quotation that Dolby had gone virtually unnoticed by audiences and critics. In downplaying its larger technical and cultural significance he argues that Dolby was not a savior to the soundtrack. Instead, he observes Dolby as a continuation of previously established Hollywood stereo practice, which explains why “no one noticed” that the dynamics of earlier stereo sound were similar in practice and performance to the Dolby model. That the coming of Dolby seemed to be an outgrowth of earlier stereo processes is a simplified account of a much more complex issue.

The purpose of this chapter is to examine the factors contributing to the emergence of Dolby multichannel sound within Hollywood cinema. I will demonstrate not only how these circumstances have consequently shaped our broader understanding of the soundtrack, but also how the specific nature of this sound model reveals specific theoretical and cultural forces that have their roots in the film industry's experiments with stereophonic sound in the 1930s, 40s, and 50s. In order to properly recognize the conditions that define Dolby as it is known today I examine how stereo sound has come to be defined historically and theoretically in light of its various manifestations. This genealogy casts a new light on the oft-ignored history of stereo and its relationship to changing notions of cinematic *realism*.

The rediscovery of stereo sound in the 1970s points to the role of sound as a “guarantor” of reality.² As I will demonstrate, much of the history of stereo sound concerns issues of cinematic *realism*, and the soundtrack's ability to represent a sound space *realistically*. This gives new meaning to Chion's assessment of a *quiet revolution*, whereby Dolby renders the natural *quietude* of the world without the distraction of tape hiss, distortion, or other technical artifacts. In effect, I argue that the Dolby soundtrack not only effaces signs of its technical construction, but also becomes a cultural symbol and purveyor of “quality” and “realistic” soundtracks.

As James Lastra has correctly noted, “the importance of realism as a category of analysis and evaluation was not restricted to the field of aesthetics, but infiltrated and shaped the course of industrial research and the development of techniques as well.”⁵ While early experiments in stereo were completed without the cinema in mind, the

theoretical motivation behind the use of stereo in films was greatly informed by these foundational investigations.

By focusing on the historical evolution of stereo sound, this chapter provides a technological base by which to proceed and a primer for the theoretical issues to be tackled in subsequent chapters. Although a taxonomy of early stereo processes may appear to have little bearing on the larger study of Dolby sound space, the historical relevance is directly proportional to our understanding of Dolby as a technological, aesthetic, and cultural phenomenon.

Antecedents and Experiments

In 1881, nearly fifteen years before the first public showing of a motion picture, French engineer Clément Ader developed the first commercial device for stereophonic playback. In a demonstration at the Paris International Exhibition of Electricity, Ader relayed a live musical performance from the Paris Opera House to a set of headphones at the Palais d'Industrie using telephone lines that were laid throughout the Paris sewers. By utilizing a number of microphones to transmit the live music, Ader divided the signal into two separate channels, which contributed to the listening subject's ability to discern multiple aspects of the performance: solo voice, instruments, and even audience applause. Ader's experiment represented the first attempt to reproduce an "illusion" of depth using a multichannel audio device.⁴ By 1890, Ader's "musical telephone" had become known as the Theatrophone and these coin-operated telephones were installed in numerous

Parisian hotels and cafés where the paying public could experience live musical performances in discernible two-channel sound.⁵

Ader's discovery of the stereo effect suggests not only the commercial features of this technological form, but also its phenomenological consequences as a representational device. Thus, the audio experiment at the Palais d'Industrie contributes to our understanding of a field of study known as psychoacoustics. Tomlinson Holman writes:

Psychoacoustics is the field pertaining to perception of sound by human beings. Incorporated within it are the physical interactions that occur between sound fields and the human head, outer ears, and ear canal, and internal mechanisms of both the inner ear transducing sound mechanical energy into electrical nerve impulses and the brain interpreting the signals from the inner ears.⁶

The human auditory system absorbs a variety of sounds, compares them, and attempts to construct "their apparent depth of field."⁷ As a result, the ideal relationship between external listening devices (headsets) and the listening subject is one that produces an illusionary naturalism to the perceived sound image. Put more complexly, the auditor is encouraged to believe that she is witness to a dimensional sonic event when, in reality, she is actually hearing two or more relatively distinct channels of sound coalesce at the site of her hearing. Early psychoacoustic investigations focused on the lateral (left and right) spatialization of sound and the ability for auditors to experience sound "images" through the movement of sound across multiple channels. In fact, I will argue that the psychoacoustic experiments of the 1930s influenced the adoption of a certain type of stereo sound in Hollywood cinema. More specifically, these antecedents provided the skeletal structure to Hollywood's initial use of stereo.

Given the fact that little evidence remains of Ader's experimental headsets, we can only theorize that the listening subject would have been able to construct a dimensional sound event from the crude stereo device. The distinctive quality of the left-right dynamic offered subjects an opportunity to spatialize the sounds in their minds. Ideally, the end result was a sound event that recreated a spatially dimensional, "natural" mode of human hearing.

Despite its relative success in France and the United Kingdom, the Theatrophone (and its British counterpart, the Electrophone) were replaced by wireless radio services in the 1920s. However, experiments in stereo sound continued in Britain and the United States. The most celebrated of these experiments was conducted by Harvey Fletcher at Bell Telephone Laboratories and Electrical Research Products Inc. in 1933. Using telephone lines to transmit a live musical performance from Philadelphia to Washington, D.C., Bell engineers positioned three microphones across the stage in front of an orchestra, which were fed to three loudspeakers in the auditorium where the sound was reproduced. The position of each microphone matched the approximate location of each loudspeaker. Edward W. Kellogg has noted that "the various orchestral sounds seemed to come from the appropriate places, and a moving source such as a man walking across the stage and talking seemed at the receiving end to move about."⁸

What is most significant about the Bell Labs experiment is the number of loudspeakers used to achieve the perceived stereo effect. Unlike Ader's headset model, the listening subjects in Washington were positioned at various angles around three loudspeakers. Two-channel stereo proposed a spatial problem due to the relative width of the stage. For subjects at the far left or right of the auditorium, a two-channel format

would shift the acoustic information to one end, thus creating a sonic imbalance and destroying the illusion of lateral movement. To solve this, the placement of a middle or “center” loudspeaker re-adjusted the lateral spacing, thereby ensuring a modest stereo illusion to even those at the far reaches of the hall. While an infinite array of frontal loudspeakers would have been ideal, Bell Labs concluded that the left, center, and right dispersal of loudspeakers was a “practical” alternative to the representation of a greater number.⁹ Indeed, psychoacousticians have determined that when “stereo is heard from off-centre, the image will be pulled towards the nearer speaker. The centre speaker is primarily to pull central images back for the off-centre listener.”¹⁰

More significantly, this demonstration was part of a larger investigation by Bell Labs into what was called “auditory perspective.”¹¹ This broad term suggests a more widespread motivation by technicians and engineers who were devising the three-channel format. The basic representational function of the Bell Labs model was in the reproduction of a naturalistic sound event. The perceived goal for Fletcher and his colleagues was a seamless “facsimile of the original music,” whereby the audience in Washington (if they were to close their eyes) would have been able to imagine the orchestra’s presence in front of them. One practical result of Fletcher’s experiment was that in order for a natural sound event to exist a “control box” would be employed to monitor and contain any unwanted “noise.” Fletcher explained his findings to the readers of *The Journal of the Acoustical Society of America*:

It was shown that by means of this system [music could be] reproduced without the introduction of apparent distortion or noise. This system not only made possible the production of a facsimile of the original music, but it also had what is called an enhancement feature. The part of the equipment used for this

enhancement is labeled “control box” ... By means of these controls the director of the orchestra, while listening to the reproduced music, raised and lowered at will the intensity level of each channel by means of dials attached to the attenuators. By means of appropriate switches, he could increase or decrease the level of the bass, or make the music less or more shrill by throwing in or out networks having a sloping frequency loss characteristic.¹²

Fletcher’s testimony implied a willingness to manipulate the original “live” event to suit the conditions and possible expectations of the re-produced sound. In other words, by using an audio filter, unwanted sounds were eliminated (or suppressed to the point of inaudibility), and orchestral timbre, volume, and bass were refracted through the prism of the three loudspeakers. Most fundamentally, the reproduction in Washington stressed an *ideal* naturalness, devoid of any technical artifacts, and rich with evocative volume, instrumentation, and movement. In subsequent demonstrations, namely one at the 1939 World’s Fair in Flushing, New York, the live performance was replaced by a recording of an orchestra using a wire recorder. According to one technician, the results were similar to the earlier experiment with the sole exception being the relative versatility of the apparatus, freed from its telephonic connection.¹³

In broader terms, however, the relationship between these two “performances” was indicative of a larger theoretical debate in the sound engineering community. The importance of realism as a desired objective had a seismic impact on the representational strategies of sound technicians in both the recording industries and, by corollary, the Hollywood film industry in the 1930s. Concurrent with Harvey Fletcher’s stereo experiments in the early 30s, sound engineers were virtually split into two

representational camps: one advocated a perceptual *fidelity* model, and the other championed an *intelligibility* model.

In his study of the conversion to sound period, *Sound Technology and the American Cinema*, James Lastra has observed that the “two understandings of realism in sound representation basic to the transition period embody different conceptions of the epistemological and referential properties of sound representations felt to be constitutive of ‘good’ representational practice.”¹⁴ The methodological impetus of these approaches has been summed up by Rick Altman: “the real can never be represented; representation alone can be represented.”¹⁵ It is this definition of cinematic “realism” that concerns the present argument, and further defines how stereo sound technologies including Dolby represent a specific kind of cinematic realism.

Joseph P. Maxfield, a Bell Labs engineer, has outlined the basic premise of the first representational camp in a 1926 article:

Phonographic reproduction may be termed perfect when the components of the reproduced sound reaching the ears of the actual listener have the same relative intensity and phase relation as the sound reaching the ears of an imaginary listener to the original performance would have had.¹⁶

As a phonographic technique for recording musical performances, this “invisible auditor” approach has been examined by Lastra and Rick Altman in relation to its use in early sound films. The “invisible auditor” or perceptual fidelity model testified to sound engineers at institutions such as Bell Labs and Western Electric who were preoccupied with the facsimile of a live event. Both scholars have suggested that this model treated the recording of a sonic event as “unique and autonomous,” and as a “function of its unique conditions of production.”¹⁷ In other words, Maxfield and other engineers

assumed that the listening subject was placed “within” the space of the original recording; she was a witness to the reverberations and architectural contours of the site of recording. Lastra has noted:

This standard meant that the represented event, acoustic space, timbre, etc. should duplicate the original, and that the auditor was conceptually and practically a part of the space of representation—literally a witness to the performance. Thus the demands of one social practice of sound reproduction and reception, those typical of serious concert music, shaped the theorization of a whole range of sonic phenomena.¹⁸

A range of practical implications arose from the intended use of the fidelity model. On the surface of Fletcher’s stereo experiments, it would seem that the objective was a perceptual duplication of a sound event in Philadelphia to the hall in Washington, D.C. In fact, the three-channel format ensured an “accurate” spatialization of sound. However, Fletcher’s own writing contradicts this argument. The system’s “enhancement” feature effectively negated the inherent realism of the fidelity model. Kellogg confirmed that throughout the 1930s, similar demonstrations were carried out, and “every effort was made by the engineers of the Bell Telephone Laboratories and Electrical Research Products Inc. to minimize all forms of distortion and to reproduce the sound in the full dynamic range of the original.”¹⁹ Therefore, even though the representational demands of these experiments were governed by an *idealized* notion of “realism,” the practical result was far from a “facsimile” of the original performance. The resultant reproduction—whether performed live or recorded—was enhanced, manipulated, and idealized.

It is worth remembering that Bell Laboratories’ primary enterprise was the telephone industry, which “had acoustic requirements different from those of music recording.”²⁰ Thus, a second practice emerged at roughly the same. Termed the

“intelligibility model” by Lastra, the functional demands of the telephone industry stressed the importance of clear, unencumbered speech. This model placed sound material in a hierarchy of importance. The dominance of the human voice allowed telephone systems to reduce the power required to transmit sonic information since 60 percent of the voice’s “acoustic energy (the lower frequencies)” were eliminated.²¹ As for the reproduction of music, Lastra has shown, however, that engineers continued to place a premium on the ability to replicate the conditions of an original sound event in order to “achieve a satisfactory simulation of actual presence.”²² The telephonic model of intelligibility “was nevertheless routinely considered a ‘special case’ deviation from the ideal of absolute perceptual fidelity.”²³

Fletcher’s experiments in stereo, then, were remarkably even with Bell’s concurrent investigations into telephonic and duplication models of representation. While the Washington and World’s Fair demonstrations may have been imagined as a true copy of the original sound, it was more probable that the manipulative techniques of the telephone industry contaminated the purity of the desired reproduction. This was most concretely observed in the employment of three loudspeaker channels rather than two to produce a stereo effect. Fletcher has argued that

On a large stage it has been found that three channels are sufficient to give a good illusion of the sounds coming from all parts of the stage. We developed a three-channel system not only because it gave better representation of movement on a large stage, but also because of the possibility of using the center channel for solo work while still retaining the stereophonic features of the orchestra on the two side channels.²⁴

It is important to recognize Fletcher’s motivation for the installation of a center loudspeaker. Not only was it used to balance the stereo effect for patrons at extreme

angles, but it served a telephonic purpose to isolate “solo work” from the stereo environment. In Fletcher’s case, “solo” sound materials might have included individual instruments, a singer’s voice, or the spoken words of the orchestra conductor. In any event, the purported realism of the apparatus was questioned again as engineers actively manipulated the sonic environment to place solo activities “front and center.” In reality, however, a soloist might have been positioned at the far left of the orchestra, but the reproduction nonetheless placed her dead center.

The negotiation of these competing models reached its apex in the early sound film years. While James Lastra and Rick Altman have each outlined the industrial motivation behind the conversion to sound period, each has neglected to relate these findings to the realm of stereo recording and representation in Hollywood films of the 1940s and 1950s.²⁵ As I outlined above, the principal theoretical developments related to the early sound film were directly applicable to the emergence of two- and three-channel stereo sound. Fletcher’s experiments at Bell Labs reiterate the claim that the desired goal of stereo representation was a duplication of the original sound event. Terms such as “auditory perspective” and “better representation” have their roots in a perceived “realism” or “naturalness” that dictated what a performance *should* sound like.²⁶ In order to achieve this standard of reality, however, a number of technical and spatial liberties were taken that transformed the recorded event into a refracted copy of the original. Guided by psychoacoustic properties, Fletcher’s three-channel stereo model limited distortion and noise by enhancing and re-configuring the live symphonic performance, in effect, transforming the original event into a spatialized and dimensional sound field with

no functional equivalent in reality. What impact, however, did these experiments and demonstrations have on the first use of stereo in Hollywood film?

Fantasound and Representational Challenge

While Hollywood had been producing sound films since 1927, it was not until 1940 that stereo sound was used in conjunction with a filmed presentation. Sound engineers who had been conducting stereo experiments on strictly musical performances adapted their techniques and loudspeaker configurations to suit the needs of the cinema. As a result, Fletcher's key experiments with Bell Labs served as the prototype for subsequent demonstrations of the stereo effect. Indeed, it was established that a visual anchor helped the position of sound to be located in the sound space.²⁷

While the majority of films were released in one-channel monophonic sound, emitting from below or behind a porous screen, two Hollywood studios began to investigate the spatial properties of stereo. In fact, the large amount of technical literature written in industry journals between 1939 and 1941 testifies to sound engineers' keen interest in exploring the technical and aesthetic possibilities of the stereo effect. Yet the initial forays into cinematic stereo were, in actuality, a collection of mono signals that spread across Fletcher's three-channel apparatus. The technical literature focuses on two innovations almost exclusively, Warner Bros.' Vitasound and Walt Disney's Fantasound.

A short-lived phenomenon, Vitasound premiered in 1940 with *Santa Fe Trail* and *Four Wives*. In keeping with Fletcher's three-channel setup, Vitasound employed three similar loudspeakers, a center channel for dialogue and two side channels as well as a

control tone. During musical passages, the two side channels (left and right) were literally “switched on” by the control tone. Kellogg writes:

The design of the system is based on the theory that the volume range which the film ... affords is adequate for dialog and such other sounds as come from the center speaker only, and that higher sound levels will be wanted only for music and sound effects for which the spread-sound source will also be wanted.²⁸

The effect was decidedly not true stereo since Fletcher’s lateral movement of sound across the channels was not utilized. In this case, the desire for increased loudness provided the motivation for this three-channel format. It was observed that “musical reproduction gives greater satisfaction if it comes from several sources.”²⁹ The rudimentary and clumsy application of Fletcher’s model in Vitasound proved an absolute failure.

The development of Fantasound for Disney’s *Fantasia* (1940), however, contains theoretical and practical applications that inform subsequent uses of stereo in Hollywood film. In the production of the soundtrack for *Fantasia*, RCA engineers recorded Leopold Stokowski’s Philadelphia Orchestra using eight optical tracks, thus enabling Stokowski to later mix various “solo” elements of the orchestra in a way he saw fit. The innovative multi-track recording also made possible the ability for over-dubs or repeated takes that could be inserted back into the original performance.³⁰ For final playback, the multiple tracks were mixed onto four mono channels. Similar to Fletcher’s model, three front loudspeakers (left, center, right) were employed, while the addition of a fourth track represented the first time when off-screen sound emitted from loudspeakers beyond the view of the screen. Located at the sides and back of the auditorium, these “were brought into operation by relays responsive to notches in the edge of the film.” The final

soundtrack was printed on a separate strip of film and projected simultaneously with the image track via a control track.³¹

While the story of the development of Fantasound is more technically complex than I offer here, my primary purpose for discussing this innovation is linked to the above discussion on perceived “naturalness” and “realism.” As opposed to Fletcher and the engineers at Bell Labs and elsewhere, Walt Disney and his RCA engineers approached stereo sound in an alternate fashion. Whereas earlier experiments had insisted on “realism” to the point of making it a science, Fantasound “proposed to make ... spread-sound effects an art.” Since Stokowski’s orchestral recording was designed to be manipulated, there was no inherent need to retain an “original” spatial dynamic. Kellogg has argued that “Duplication of an original distribution of sound sources was a secondary consideration, and the choice of directions from which sounds were to come was to be entirely at the discretion of the directors, musicians, and technicians.” Engineers experimented with moving sound sources across the front channels and to the rear loudspeakers to further enhance the drama and emotional intensity of the music. As Garity and Hawkins have confirmed, “This condition is not necessarily met by having the actual source move from near one microphone to near the other, but it can be met when the gain is reduced to one speaker and increased to the other by means of a knob or control tone.”³² In fact, RCA engineers innovated panning potentiometers (dubbed “Panpots” by Garity and Hawkins), which moved single-channel sound to or from the array of loudspeakers, thus converting the mono grouping into spatial multichannel.³³

While some have commented that Fantasound produced a quasi-stereo effect since its lateral channels were not the product of a bi-lateral recording, a more important

aesthetic decision governing stereo logic was at hand. In the distribution of sounds to various loudspeakers, RCA engineers eschewed the two theoretical models espoused by sound engineers during the conversion period. The impressionistic nature of the music provided Disney and his technical crew the aesthetic possibility to localize sounds based on their dramatic function. Eschewing the concert-listener approach, the audience was not privy to a spatially coherent recording, but rather one that privileged the function of music over the perceptual fidelity of the recording (which, in this case, did not exist). Furthermore, since the film contained little dialogue, not even the intelligibility model could provide an adequate theoretical base to explain the aesthetic demands of Fantasound.

Ultimately, Fantasound foregrounded aesthetic function and sidestepped the two models of cinematic representation detailed above. However, it did in fact borrow certain properties from both theories. The crisp sonics and amplified performance certainly added a greater sense of cinematic “realism” to the entire enterprise. Owing its spirit to the intelligibility model, the constant foregrounding of certain orchestral elements over others (the human voice, for instance, during the “Ave Maria” episode) prompted a loose hierarchy within the sound space.

As RCA aestheticians experimented with panning techniques and surround sound for *Fantasia*, Hollywood sound engineers working on traditional mono, behind-the-screen presentations recognized the importance of what A. Lindsley Lane called the “illusion of occurrence” to govern sound space in films. Lane’s “illusion” manifested itself not as the “live,” “original” recording, but as a representational *effect*. Likewise, the sound space in *Fantasia* did not reflect any one particular event, but an amalgamation of

several pre-digested sounds which moved artificially in and around the theater space via the multichannel apparatus. Consequently, Lastra has suggested that at this point in time the “norm of the invisible auditor gave way to the ideal auditor.” Since classical film relied on the foregrounding of narratively important information (usually human speech), then it follows that sonic events had to be manipulated and hierarchized in order for narrational and dramatic demands to be met.

The 1950s and “Greater Realism”

While Fantasound and other early innovations of stereo or ‘spread-sound’ disappeared without much fanfare because of their great cost, and American involvement in World War II, Hollywood returned to the multichannel realm in the early 1950s. Concurrent with innovations in wide-screen technologies, studios combated dwindling box-office revenues by expanding both the traditional screen size and mono soundtrack of certain high-profile pictures. Viewed as a response to television, “big” screens and “big” sound were expected to provide the necessary antidote to draw people back into the theaters. As John Belton has stressed, however, “Stereo thus continued to be connected not with the average movie-going experience of the 1950s audience but rather with special presentation large-screen processes and with blockbuster spectacles.”³⁴

During this tumultuous time of supposed technological “evolution,” a variety of five-, six-, and seven-channel stereo systems—from Cinerama to Todd-AO Scope—eschewed traditional standards of intelligibility and strove to reproduce the sound event as a faithful, “realistic” facsimile of the “actual” event. In other words, cinematic *realism*

once again reared its head to provide the theoretical incentive to sound engineers who had hoped to create a cinema of audience involvement. Hazard E. Reeves, principal engineer and co-developer of Cinerama, noted that “for *Fantasia*, motion picture sound technology seemed to be riding a plateau with no expanding and innovative upwards direction of accomplishment.”³⁵ He made a case for a more realistic sound cinema in the following passage from the *SMPTE Journal*:

The first Cinerama production ran for 122 weeks in New York City alone. Audiences laughed, cried, screamed, flinched, clenched their fists, and even fainted as planes roared over their heads. They raced down rollercoasters, or weaved precariously by small plane between the cliffs of the Grand Canyon, illusions heightened by a cinematic process that made them a part of the action taking place on the screen. Critics were astounded, praising Cinerama as ‘the most important step in motion pictures since the advent of sound,’ ‘a new film form...the like of which has never been projected on the screen,’ ‘the movies’ answer to television,’ ‘it seems to pull the audience into the picture,’ and ‘this invention makes the difference between seeing something on a flat page and seeing it in true life,’ ‘spectacular and thrilling,’ ‘[an] intense ... feeling of realism ... not a few visitors are overcome physically.’³⁶

Made possible by the use of magnetic tape technology, which increased the overall quality of sound recordings, the technological change advocated by Reeves leaned heavily toward reconfiguring stereo logic to evince a particular *type* of cinematic “realism.” That sounds should move laterally across the screen to mimic on-screen movement was the primary benchmark of 1950s stereo.

Analogous to stereo developments in cinema at this time were those in the recording industry. And while two-channel stereo dominated domestic sound equipment, the same argument stressing perceptual fidelity was felt at industrial and cultural levels. One advertisement in *The Gramophone* stated that when using one machine, “Suddenly

you are there with the artists. You know *exactly* where each [instrument] is positioned...and what each is playing. Move around and it is just like changing your seat in the auditorium.” One reviewer also noted that it was the “spreading away from the single-channel speaker hole that gives the impression of reality, the illusion of being present at the performance itself (the loudspeaker, of course, had better not be visible if the illusion is to be complete!).”³⁷ As in Hollywood, there existed a palpable yearning to reproduce a perceptually accurate sound image.

Essentially, the representational *effect* of classical Hollywood soundtracks was challenged by an overt desire to reproduce the “real” movement and direction of the depicted screen action. In his study of stereo sound in the 1950s, John Belton has argued that while the intent was a “greater realism” for cinema sound, the result was routinely regarded as being overly artificial.³⁸ The literal approaches of sound engineers to reproduce every on-screen movement in a three-dimensional sound space contributed to Belton’s assertion that these experiments offered a form of “excess” and spectacle that was anything but naturalistic. For the better part of twenty-five years, cinema audiences had become accustomed to monophonic sound from behind the screen.³⁹ Belton’s notion that small theaters playing black-and-white, mono presentations offered a more familiar realism than the special multichannel event films is quite probable. In order to better understand the representational effects of 50s stereo, I examine two properties of the new technologies: traveling dialogue and loudspeaker placement.

When Cinerama premiered in 1952 it boasted seven channels of sound spread throughout a large auditorium, accompanied by a wide-screen three times the size of a normal cinematic image. Five of the seven channels were placed behind the screen, and

two others (which accounted for over 30 actual loudspeakers) were placed on the side and back walls of the theater. During a film presentation, on-screen action would be mimicked by the soundtrack to the point of unnatural redundancy: if an actor moved across the screen, her dialogue and footsteps would move with her from channel to channel. This spatial synchronization was accomplished by affixing a cluster of microphones to the Cinerama camera, thus “binding visual and auditory perspective together” during recording.⁴⁰ Recalling Fletcher’s orchestral demonstration in Washington and the invisible auditor model, sound perspective was effectively captured from the “original” event. Again, Reeves has commented that “Cinerama pursued the goal of creating as accurately as possible what the eye actually sees and the ear actually hears.”⁴¹ The desire, however, to recreate a sound event from a perceived reality resulted in a self-conscious apparatus, which was contrary to nearly half a century of Hollywood’s narrative invisibility. As Belton has argued, this “self-consciousness remained consistent with Cinerama’s overall marketing campaign, which foregrounded the experience of the process...”⁴²

Twentieth Century Fox’s CinemaScope offered a similar representational format (four channels instead of six or seven), while adhering more closely to the rhetoric of invisible style. Fox’s system, introduced in 1953, remained the only true stereo format to be released on conventional 35mm (magnetic) stock, thus allowing for projection in relatively small theaters.⁴³ Consequently, “microphones, like the camera itself, occupied quasi-objective, unmarked positions and functioned as omniscient onlookers rather than as a subjective presence with the position of the camera.”⁴⁴ While microphone and camera were not joined in an “eye-ear” relationship, character speech and sound effects

were nonetheless pan-potted across the sound field. Reacting to the ping-pong movement of sound across the front loudspeakers, engineer Loren Ryder lamented that it was “annoying.” Echoing this position, *New York Times* film critic Bosley Crowther found “the business of switching from one to another outlet ... as the character moves becomes an obvious mechanical contrivance that confuses with the image on the screen.”⁴⁵

In similar circumstances, the re-introduction of a rear channel to several stereo formats proved to be a hard sell to exhibitors. After an initial period of experimentation with rear effects, CinemaScope presentations were hindered by theater owners’ reluctance to add additional loudspeakers and sound equipment. While first-run, 70mm houses benefited economically from stereo sound, smaller houses could not afford the cost of the conversion.⁴⁶ Thus, Fox and other studios needed to provide two prints of the same films: one for the prestige houses (in four channel stereo) and one for the smaller houses (in mono). Belton’s findings reveal that this setback meant that “sound information that was crucial to the narrative or to the audience’s understanding of the film could not be put on the fourth [rear] track because not all theaters could play it back; and even if that information were to be mixed down into a monaural track, it would lack the special spatial properties it originally possessed...”⁴⁷ As a result, by the end of the 1950s Fox ceased all production of true stereo recording and reverted to panning mono signals to the front channels.

As intriguing as these representational experiments are to the modern observer, the focus of my study here remains the degree to which cinematic *realism* as a culturally determined factor appears to subvert the dominant Hollywood model of invisible style. For a few years in the 1950s greater artifice subtended the need for intelligibility and

invisibility. Belton has stopped short of calling this period a complete failure, but instead has referred to it as a “frozen” revolution: “it only went so far and then stopped.”⁴⁸ That stereo neglected to anchor itself in the representational conventions of classical Hollywood is accurate when one considers the theory governing applications in classical film sound. Since the “illusion of occurrence” has governed the spatial configuration of monaural sound practice, classical notions of film sound were thus grounded in the perceived effect of a uniform and “realistic” sound space. As a representational *effect*, sounds were constructed from various sources at different times to *resemble* the spatial qualities inherent in an “original” sound signature.⁴⁹

The psychoacoustic interests of sound engineers during this period resulted in a literalizing of sound space. In simulating the hearing properties of humans, Reeves and other engineers strove to de-mystify the soundtrack by coding it as a science. However, the precise mimicry of screen movement by the multichannel sound limited dramatic function and narrative coherence; Belton reports that audiences were “distracted” by the panned dialogue.⁵⁰ Even though Reeves’ intentions to bring cinema sound as close to reality as possible were noble (and have subsequently influenced similar technological novelties such as IMAX), the representational demand for perceptual fidelity produced, as Belton contends, a more pronounced artifice.

The “Quiet” Revolution

Experimentations in the production of wide-range, low-distortion audio tape effectively led to the introduction of the Dolby noise reduction system to the audio

industry in 1966. Invented by British physicist, Ray Dolby, the patented system eliminated the high-frequency hiss associated with magnetic recordings at the time, while also improving the general fidelity and quality of the audio track.⁵¹ It is not surprising, then, that the first use of the noise reduction technology was for the music recording industry. R.E. Uhlig has described how the system worked:

It divides the audio spectrum into four ranges and electronically processes each range separately; later during playback, it deprocesses each range. During playback, the deprocessing decreases the volume of the low-level signals to their original values and, with them, decreases the unwanted noises.⁵²

It has been noted by Hollywood sound engineers that the noise reduction system contributed to the era's continuing fascination and preoccupation with domestic use of high-quality sound equipment. Uhlig wrote:

Sound equipment in private homes progressed rapidly: phonographs, radios, television, wire recorders, open-reel tape recorders, high-fidelity and stereophonic record players, FM radios, cassette recorders, eight-track tape players, and the modern combinations. With improved fidelity of sound equipment in their homes, people came to appreciate and desire better quality of sound.⁵³

With stereo recordings becoming more prevalent by the late 1960s, it is safe to say that the music industry was producing higher quality sound recordings than the film industry.

Further evidence was reported in the *Journal of the SMPTE*:

In a 1977 industry report to management, a Gallup survey placed 78 percent of frequent movie-goers between 15 and 34 years of age. 53 percent of frequent attendees were reported as being 24 years of age or under. The same survey reports that 39 percent of frequent motion-picture attendees own component stereo equipment in excess of \$400 when purchased. The report concluded that audiophiles are frequent movie-goers, and most people in the age groups [discussed] have been exposed to high-quality sound reproduction, either through outright equipment ownership, or live concert attendance.⁵⁴

A number of historical studies have pointed out that while the music industry effectively adopted stereo sound, magnetic recording, and Dolby noise reduction, Hollywood was producing the same technically antiquated soundtracks as it had been for nearly fifty years.⁵⁵ Despite the short periods of industrial innovation, stereo sound remained a marginal and costly aesthetic device. In 1976, Rodger J. Ross commented on the state of film sound in an article for *Cinema Canada*: “Since the introduction of sound on film over 40 years ago, there have been significant improvements in picture quality in the theatres, but the audio portion has not kept pace.”⁵⁶ Another technician lamented that “little” had changed in theater loudspeaker technology since Fletcher’s experiments in the early 1930s.⁵⁷ In summarizing this period, the editors of *American Cinematographer* dryly noted in 1975 that this was “evidenced by the fact that while most people can listen to high-fidelity stereo sound in their homes, in most theatres the widescreen, high-definition picture has been paired with a colorless mono sound track.”⁵⁸ Indeed, the involvement of Dolby in the film industry was initially concentrated on the exhibition sector, which was in a state of technical disrepair.

Turning their attention to the needs of the film industry, Ray Dolby and his small operation began to investigate the use of noise reduction on film sound. In an attempt to boost the quality of monaural sound tracks, it is fitting that the first use of Dolby technology in the film industry came in the form of mastering soundtrack albums. The first film to employ Dolby noise reduction was Stanley Kubrick’s *A Clockwork Orange* (1971): Kubrick invited Dolby technicians to pre-mix the classical music using the noise reduction system. However, the final mix was not noise reduced, and the film was

released in standard mono optical, thus essentially negating the technicians' efforts to "boost" the sharpness of the music. A steady stream of experiments followed whereby the noise reduction technique was applied to the final mix of a film's soundtrack.⁵⁹

One way to characterize the major impediment to the success of the Dolby soundtrack is with reference to the Academy Characteristic or 'roll-off'. Instituted in 1938 with the aim of standardizing levels of sound reproduction, the Characteristic was achieved by averaging the soundtracks of a number of studio films in an attempt to limit the range of high and low frequency sounds. Members from the Academy of Motion Picture Arts & Sciences screened a series of multi-studio films in various theatres in order to better understand the general capabilities of film soundtracks compared with loudspeaker amplification capabilities. The resultant limitations in frequency response led to the implementation of the Characteristic to reduce distortion and high-range noise. In many respects, "the films were made to match the theaters, and the theaters were made to match the films. All the Academy did...was to codify a situation that already existed."⁶⁰ Still in use in 1971, the Characteristic essentially 'capped' the volume at a level that seemed arbitrary and antiquated. Chief Dolby engineer Ioan Allen explains: "If all you do is eliminate the Academy curve, you'll suddenly hear all the hiss and rumble inherent in the optical track. Dolby noise reduction made it possible to extend the highs and lows without the noise becoming so obvious. We replaced the Academy curve with the 'X' curve, which is a minimal curve, practically no roll-off."⁶¹

In 1973, a joint research venture by Dolby, RCA, and Eastman Kodak further sought to counter the problem by creating a high fidelity stereo soundtrack that bypassed the Academy roll-off using the Dolby CP-100 Cinema Processor. Experiments in

developing the stereo soundtrack were conducted not only to counteract the roll-off, but to place multichannel information on an optical film track. Until this period, “true” stereophonic sound tracks had only been released on magnetic film. Manufactured at a premium cost, the magnetic prints associated with previous stereophonic processes that accompanied wide-screen formats such as Cinerama and CinemaScope were not capable of playback in unconverted theatres, and suffered severe degradation after sustained use.

More fundamentally, the development of a stereo soundtrack led to an important series of psychoacoustic experiments by RCA and Dolby engineers. Echoing Fletcher’s experiments in the 1930s, it was decided that a three-channel system best represented a realistic sound field. Uhlig, one of the RCA engineers, writes:

The farther the viewer is seated away from the center line of the auditorium, the greater the apparent sound shift. Using three discrete tracks seems to be the ideal choice. It best solves the placement problem. However, to narrow each track to fit all three into the width of a monaural track would invite serious adjustment problems in projectors, higher equipment costs, and decreased signal-to-noise ratio. Later, we began experimenting with a system of two tracks plus a derived center channel (a two-track, three channel system). Each track drives a side speaker; the third channel, derived from the signals on the combination of the two tracks, drives the center speaker.⁶²

The process involved the placement of two distinct monaural tracks side by side on an optical 35mm reel. During playback, the Processor “analyzes the differences between the left and right signals and redevelops a center signal, which is sent to a center screen loudspeaker.”⁶³ Thus, the Dolby model was capable of producing three discrete channels of audio: left, right, and a center channel. Cognizant of this development, it is easy to see the similarity to Fletcher’s three-channel format. In fact, the same psychoacoustic

properties and concerns influenced Dolby engineers' decision to implement a three-channel setup.

Consequently, a number of films were initially released in three-channel Dolby, including *Tommy* (1975), *Lizstomania* (1975), and *A Star is Born* (1976). These early releases were even used as demonstration films by Dolby Laboratories in order to sell exhibitors, producers, and studios on the Dolby *experience*. However, in 1977, the sound technology was essentially re-shaped for the releases of George Lucas' *Star Wars* (1977) and Steven Spielberg's *Close Encounters of the Third Kind*. These films incorporated a slightly altered version of Dolby Stereo that included a rear channel and a low frequency bass channel, nicknamed the "Baby Boom," to handle the soundtrack's bottom end frequencies. Ironically, the loudspeakers used to reproduce the bass response had been originally developed for the Todd A-O six-track stereo process. Out of use since the 1950s, Dolby engineers reconfigured the left and right Todd A-O loudspeakers to produce the desired low-end rumble that was missing from traditional loudspeaker designs.⁶⁴

However, the representational motivation of Dolby sound engineers must be acknowledged in order to better understand Dolby Stereo's relationship with notions of cinematic "realism." The early 1970s brought a period of intense investigation and experimentation in film sound and the resultant technological innovation that sprung from this period has been scrutinized in film sound scholarship. In the next few pages I will examine the leading theoretical challenges to Dolby noise reduction and its stereo format. I will recast some essential questions, and posit an objection to the prevailing notions of Dolby Stereo.

Changing the Way Films Sound

In her study of sound editing practices, Mary Ann Doane has argued that the role of film sound is ideologically determined to conceal its apparatus by reducing noise and distortion that might call attention to itself.⁶⁵ In order to maintain the invisibility of the narrative, techniques in sound editing were developed to mask the heterogeneous nature of film sound. While much of Doane's project concerned sound editing practices during the conversion period, her argument was taken up by John Belton in his essay, "Technology and Aesthetics of Film Sound." Written on the cusp of Dolby's mass diffusion into the Hollywood film industry, Belton offered a pointed critique of Dolby sound practice, and a distrust of the modern stereo sound field:

What the sound track seeks to duplicate is the sound of an image, not that of the world. The evolution of sound technology and, again, that of studio recording, editing, and mixing practice illustrate, to some degree, the quest for a sound track that captures an idealized reality, a world carefully filtered to eliminate sounds that fall outside of understanding or significance; every sound must signify.⁶⁶

Thus, Belton has argued that sound technology has been caught up in the representation of an artificial naturalness. Uhlig's statement that Dolby noise reduction eliminated "unwanted" noise upholds the theoretical motivation behind this technological development. In this sense, "Dolbyized" recordings have been rightly observed as clean and eerily quiet. However, the criticism leveled at Dolby noise reduction veers off course from an understanding of traditional Hollywood "invisible" sound editing.

According to Belton, the filtration and manipulation of sounds at all levels of production amounted to a soundtrack that was “too perfect,” “unnatural,” and “ideal.”⁶⁷ I would argue, however, that Dolby is most often used as a representational technology, not one that reproduces an “original” sound event. Since the noise reduction system alters the “original” sound by compensating for the technical glitches of the recording equipment, a “better” and infinitely unrealistic result is attained. Belton’s remark that one longs for “the rough, jittery camera movement, floor squeaks, and unmixed, ambient sound of films like Jean Renoir’s *La Chienne* (1931),”⁶⁸ is rather perplexing. As we have discovered, the general practice of Dolby stereo sound revolved around an accepted representational standard, one that perpetuated the Hollywood code of invisibility and also brought the audience closer to the image. Labeling Dolby as an unnatural process, Belton forgets that throughout the history of stereo (and mono), mixing and editing techniques have been largely accomplished in post-production, which denies the existence of an original, pre-existent event. While Belton insists that soundtracks were once “recorded,” and are now “built,” he does not consider the role of the intelligibility model in early sound film. As Lastra points out, “even Maxfield, the ever proponent of absolute fidelity, came to recognize the necessity of ‘a certain faking’ in order to ensure an effective recording.”⁶⁹

What is most informative to my study of stereo’s relationship to cinematic “realism,” however, is the marketing campaign that accompanied the releases of *Star Wars* and *Close Encounters* in 1977. Given the representational demands of Dolby sound and Hollywood film style in general, it would appear contradictory to focus attention on the “invisible” sound apparatus. In other words, if the audience was made aware of the

apparatus (by panning dialogue, for instance), then the illusion of narrative transparency would be lost, and the apparatus would be demystified. However, the representational status of Dolby requires that it announce itself in order to offset its ability to efface the noisy effects of the apparatus. Furthermore, since the Dolby brand had been associated with the audio industry for almost a decade, it can be suggested that their reputation as a purveyor of *quality* enhanced the overall effectiveness of its diffusion into the film market.⁷⁰

In light of this, Dolby emerged not only as a representational technology, but also as a cultural commodity. Bolstered by the tremendous box-office earnings of both *Star Wars* and *Close Encounters*, Dolby began an advertising campaign that boldly called attention to its illusionist capabilities. A full-page print advertisement in *Variety* displayed the previous week's box-office returns for *Star Wars*, and above the numbers was the mast headline: "Dolby makes films sound better."⁷¹ Below the headline, the "Double-D" Dolby logo was prominently figured in white script, set against a solid black background. The process of marketing Dolby as a sound technology that changes how films sounded was, of course, not new: Cinerama, CinemaScope, Todd-AO, and a variety of other 50s stereo formats used similar advertising gimmicks. However, Dolby had the advantage of being relatively transparent. Dolby could exist in large, specialty theaters or small, local houses.

Given previous experience with stereo formats, it was no surprise that exhibitors initially balked at the chance to install Dolby sound processors. In fact, as late as 1977 *Variety* reported of exhibitor skepticism regarding Dolby, prior to the releases of *Star Wars* and *Close Encounters*—two of the first films to receive widespread releases in

Dolby Stereo. *Variety* noted during this period that the “biggest problem selling exhibits a Dolby system...is convincing them that the Dolby set-up is not just another sound gimmick.”⁷² Consequently, while Dolby had been experimenting with three- and four-channel stereo for films such as *Tommy* and *Nashville* (1975), the system failed to attract serious attention from exhibitors and studios. The subsequent blockbuster releases of *Star Wars* and *Close Encounters* generated a general interest in the sound technology, which essentially led to the adoption of Dolby decoders in North American theatres. In the spring of 1977 *Variety* stated:

...better sound in the theatres may be part of the fight to get some of the public back into the filmgoing routine [since] the demographics of the frequent film patron matches up with the demographics of the group that supports the bulk of the hi-fi and music industries.⁷³

Douglas Gomery has noted that, unlike the costly conversions in the 1950s, the cost to install Dolby Stereo was fewer than ten thousand dollars; indeed, *Variety* pinned the cost at \$3500.⁷⁴ Furthermore, exhibitors who did not convert their theatres to play the full stereo system could nonetheless use a stereo print for playback in mono, a feature known as “backwards compatibility.” This ensured that no additional costs would be incurred to strike mono and stereo prints: both formats could be fitted on to a conventional 35mm optical film strip. For an industry that had never adopted a uniform standard for stereophonic playback, Dolby Stereo was routinely acknowledged as an “especially attractive [system] both commercially and technically.”⁷⁵

In all, the initial transition to Dolby sound represented an intriguing moment in the history of Hollywood sound technology. As a cultural symbol, Dolby emerged as a representational form that commented on its own supposed transparency by advertising

itself as a producer of high “quality” soundtracks. In this sense, the Dolby system can be understood not only as a self-conscious device, but also as an invisible *effect* that fits within the bounds of Hollywood’s demand for invisible style.

Conclusion

Throughout its varied and tumultuous history, stereo film sound has both benefited and suffered from theoretical and practical assumptions that have governed its implementation. In this chapter I have outlined the basic assumptions of stereo sound, which are implicitly drawn from the demands of classical Hollywood “invisible” style. In some sense, the technical nature of stereo allowed for a great number of possible uses, many of which were attempted, exploited, and investigated over its history. However, the persistent demand for narrative clarity and stylistic invisibility changed stereo sound’s function from a duplicative device to one that was representative of a perceived sound space. Thus, stereo sound became a constructed effect that resembled a “realistic” space without having to reproduce the original event. We have seen that when stereo sound adopted a scientific motivation, the narrational and dramatic requirements of the image and the soundtrack were blurred and the audience became caught in a self-conscious attempt at reproducing an otherwise fictional sound field.

By corollary, the introduction of Dolby Stereo in the 1970s offers intriguing insight into the minds of the engineers, technicians, and critics that developed and commented on this technological device. Indeed, we can subdivide Dolby into two categories, one technological and one cultural. As a sound technology, Dolby propagates

the myth of invisible style with its dissimulated and quiet apparatus, and effectively continues to utilize the principles of the “intelligibility” model espoused by early sound engineers. As a cultural object, the Dolby name takes on a signification of its own, a watchword that suggested *quality* and high performance. In the chapter to follow I will explore the representational demands of Dolby sound space as it relates to loudspeaker placement, and, more fundamentally, to the emergence of a “representational metaspace.” In pursuing the link between theoretical motivation and aesthetic practice, the aim of this project concerns not only Dolby as a representational device, but also as a sound technology that is influenced and shaped by engineers, technicians, and filmmakers.

NOTES

¹ Michel Chion (Trans. Ben Brewster), “Quiet Revolution...And Rigid Stagnation,” *October 58 Rendering the Real* (Autumn 1991): 72.

² Rick Altman, McGraw Jones and Sonia Tatroe, “Inventing the Cinema Soundtrack: Hollywood’s Multiplane Sound System,” in James Buhler, Caryl Flinn, and David Neumeyer, eds., *Music and Cinema* (Hanover: Wesleyan Press, 2000): 346.

³ James Lastra, *Sound Technology and the American Cinema: Perception, Representation, Modernity* (New York: Columbia UP, 2000): 157.

⁴ Richard Elen, “Whatever Happened to Ambisonics?” *Audio Media Magazine* (November 1991), <http://s2n.org/Articles/Ambisonics.html>. Accessed: 24 February 2005. Ader’s headset was not ‘true’ stereo since each channel of sound was not fully independent. The stereo effect resulted from splitting the sounds from twelve microphones into two channels.

⁵ Carolyn Marvin, *When Old Technologies Were New: Thinking About Electric Communication in the Late Nineteenth Century* (New York: Oxford UP, 1988): 208-210.

⁶ Tomlinson Holman, *5.1 Surround Sound: Up and Running* (Boston: Focal Press, 2000): 204.

⁷ Michael Arick, “In Stereo! The Sound of Money,” *Sight & Sound* 57.1 (Winter 1987/1988): 36.

⁸ Edward W. Kellogg, “Final Installment: History of Sound Motion Pictures,” *Journal of the SMPTE* 64 (August 1955) in Raymond Fielding, ed., *A Technological History of Motion Pictures and Television: An Anthology from the pages of the Journal of the Society of Motion Picture and Television Engineers* (Berkeley: University of California Press, 1967): 213.

⁹ Holman (2000), 12.

¹⁰ John Watkinson, *The Art of Sound Reproduction* (Oxford: Focal Press, 1998): 213.

¹¹ See Kellogg (1955), 212; Harvey Fletcher, “The Stereophonic Sound System—General Theory,” *The Journal of the Acoustical Society of America* 13.2 (October 1941): 89-90.

¹² Fletcher (1941), 89.

¹³ Stephen Julstrom, “A High-Performance Surround Sound Process for Home Video,” *Journal of the Audio Engineering Society* 35.7/8 (July/August 1987): 537.

- ¹⁴ Lastra (2000), 158.
- ¹⁵ Rick Altman, ed., "Sound Space," *Sound Theory/Sound Practice* (New York: Routledge, 1992): 55.
- ¹⁶ Joseph P. Maxfield and H.C. Harrison, "Methods of High Quality Recording and Reproducing Based on Telephone Research," *Bell Systems Technical Journal* 5.3 (July 1926): 494-95.
- ¹⁷ Lastra (2000): 160; see Altman "Sound Space," 50-55.
- ¹⁸ Lastra (2000): 163-64.
- ¹⁹ Kellogg (1955): 213.
- ²⁰ Lastra (2000): 164.
- ²¹ *Ibid.*, 164-65.
- ²² *Ibid.*, 165.
- ²³ *Ibid.*, 166.
- ²⁴ Kellogg (1955): 213.
- ²⁵ Cf. Altman (1992); Altman (1995); and Lastra (2000).
- ²⁶ See Kellogg (1955): 213.
- ²⁷ Michael Z. Wysotsky, *Wide-Screen Cinema and Stereophonic Sound*, Trans. A.E.C. York, ed., Raymond Spotiswoode (New York: Focal Press, 1971): 105.
- ²⁸ Kellogg (1955): 212.
- ²⁹ *Ibid.*, 212.
- ³⁰ Jesse Klapholz, "Innovations in Sound," *Journal of the Audio Engineering Society* 39.1/2 (January/February 1991): 67.
- ³¹ A mono soundtrack was printed on the image track in case the stereo print lost sync or broke during projection. See Kellogg (1955), 213.
- ³² *Ibid.*, 213.
- ³³ Wysotsky (1971): 112.
- ³⁴ John Belton, "1950s Magnetic Sound: The Frozen Revolution," in Rick Altman, ed., *Sound Theory/Sound Practice* (New York: Routledge, 1992): 158.
- ³⁵ Hazard E. Reeves, "The Development of Stereo Magnetic Recording for Film (Part I)," *SMPTE Journal* (October 1982): 949.
- ³⁶ *Ibid.*, 947.
- ³⁷ David Alan Black, "Cinematic Realism and the Phonographic Analogy," *Cinema Journal* 26.2 (Winter 1987): 46.
- ³⁸ Belton (1992): 160-167.
- ³⁹ *Ibid.*, 166.
- ⁴⁰ *Ibid.*, 161.
- ⁴¹ Reeves (1982): 953.
- ⁴² Belton (1992): 162.
- ⁴³ John Frayne, a sound engineer, explains: "...four magnetic tracks were striped on the composite release film, three of them being employed to produce a stereophonic effect and the fourth being used to provide auditorium sound effects...but in most cases the dialogue cannot be classed as stereophonic since it was mainly derived by pan-potting the original single monaural track." See John Frayne, "A Compatible Photographic Stereophonic Sound System," *Journal of the SMPTE* 64.6 (June 1955): 303.
- ⁴⁴ *Ibid.*, 162.
- ⁴⁵ Both are quoted in Belton (1992), 163.
- ⁴⁶ *Ibid.*, 157. Belton notes that Spyros Skouras, president of Fox, commented that the "relatively small number of magnetic equipped theatres contribute 75% to 80% of our income from a picture."
- ⁴⁷ *Ibid.*, 157.
- ⁴⁸ *Ibid.*, 167.
- ⁴⁹ Here, I use Rick Altman's definition of a sound's "spatial signature": "the testimony provided by the very sound as to the spatial circumstances of its production." See, Rick Altman, ed., "Afterward: A Baker's Dozen Terms for Sound Analysis," *Sound Theory/Sound Practice* (New York: Routledge, 1992): 252.
- ⁵⁰ Belton (1992): 165.

- ⁵¹ Up until this point high quality recordings could only be achieved on fragile magnetic tape, which was believed to render a better result but deteriorated after repeated use.
- ⁵² R.E. Uhlig, "The Sound of the Story," *American Cinematographer* 59.8 (August 1978): 782.
- ⁵³ *Ibid.*, 782.
- ⁵⁴ Mark Engebretson and John Eargle, "Cinema Sound Reproduction Systems: Technology Advances and System Design Considerations," *SMPTE Journal* (November 1982): 1047.
- ⁵⁵ See Engebretson and Eargle (1982): 1046; Leslie Schatz, "The Dolby Film Sound Revolution: Looking Back and Forward with Audio Pioneer Ioan Allen," *Motion Picture Editors Guild Magazine* (September/October 2001): generally; Rodger J. Ross, "Sound Recording on Motion Picture Film," *Cinema Canada* 3.27 (April 1976): 16.
- ⁵⁶ Ross (1976): 16.
- ⁵⁷ Mark Engebretson and John Eargle, "Cinema Sound Reproduction Systems: Technology Advances and System Design Considerations," *SMPTE Journal* (November 1982): 1046.
- ⁵⁸ "Dolby Encoded High-Fidelity Stereo Optical Sound Tracks." *American Cinematographer*: Film '75 (September, 1975): 1068-69.
- ⁵⁹ *Callan*, premiering in 1974 at the Cannes Film Festival, represented the first commercial presentation of Dolby noise reduction. See John Aldred, "Fifty Years of Sound," *American Cinematographer* 62.9 (September 1981): 897.
- ⁶⁰ Ioan Allen, "The Production of Wide-Range, Low-Distortion Optical Soundtracks Utilizing the Dolby Noise Reduction System." *Journal of the SMPTE* (September 1975): 723.
- ⁶¹ Leslie Schatz, "The Dolby Film Sound Revolution: Looking Back and Forward with Audio Pioneer Ioan Allen," *Motion Picture Editors Guild Magazine* (September/October 2001), http://www.editorsguild.com/newsletter/SepOct01/ioan_allen_one.html. Accessed 2 March 2005.
- ⁶² R.E. Uhlig, "The Sound of the Story," *American Cinematographer* 59.8 (August 1978): 786.
- ⁶³ Ioan Allen, "The Dolby Sound System for Recording 'Star Wars,'" *American Cinematographer* 58.6 (July, 1977): 748.
- ⁶⁴ See Holman (2000): 14-16.
- ⁶⁵ Mary Ann Doane, "Ideology and the Practice of Sound Editing and Mixing," in Teresa DeLaurentis and Stephen Heath, eds., *The Cinematic Apparatus* (New York: St. Martin's, 1980): 55.
- ⁶⁶ John Belton, "Technology and Aesthetics of Film Sound," in Elizabeth Weis and John Belton, eds., *Film Sound: Theory and Practice* (New York: Columbia University Press, 1985): 66.
- ⁶⁷ Belton (1985): 67, 70.
- ⁶⁸ *Ibid.*, 67.
- ⁶⁹ Lastra (2000): 208.
- ⁷⁰ In the audio industry, Dolby noise reduction increased the general quality of a recording, which helped to establish the company's name as a marker of superior sound.
- ⁷¹ "Dolby makes films sound better." Full-page advertisement. *Variety* (June 8, 1977): 31.
- ⁷² "Dolby Prints with Stereo Sound Called as Cheap as Optical." *Variety* (May 18, 1977): 12.
- ⁷³ *Ibid.*, 12.
- ⁷⁴ Douglas Gomery, *Shared Pleasures: A History of Movie Presentation in the United States* (Madison: Wisconsin UP, 1992): 228; *Variety* (1977): 12.
- ⁷⁵ "Dolby Encoded High-Fidelity Stereo Optical Sound Tracks." *American Cinematographer*: Film '75 (September, 1975): 1069.

Chapter 2

Liberation of the Loudspeaker: Sound Theory in the Age of Dolby

The habits of expecting sound to issue from a point on the screen soon make hearers discount the disparity of sound and image positions. They are discounted in favour of the image: the sound is imagined to be coming from the screen. Experiments both with high-fidelity sound and with directional sound (stereo/quadrasonic) are still at the stage of wondering how far they can free sound from the image and invade the space of the audience who are nevertheless faced by a screen separate from them...¹

The ways in which Dolby sound positions the audience in a representational sound space are quite distinctive. Indeed, Dolby reconfigures the representational demands of the Hollywood soundtrack by allowing the space of the theater to shape the sound space implied by the image. The history of film theory, however, reveals that little attention has been given to the changing notion of sound space. The nature of early experimentations in Dolby, the relationship of diegetic sound space to the multiple-loudspeaker apparatus, and the limitations of subject positioning in a multichannel environment are all consequential factors that inform an understanding of Dolby film sound. In this sense, the period from 1975 to 1980 proved to be transformative in the development and application of Dolby to Hollywood cinema. What remains is for an examination of sound theory to illuminate the arguments and assumptions that help to define the representational form of this emerging sound technology.

In this chapter, I explore the changing relationship between the audience and cinematic sound space, drawing on several key components of sound theory to distinguish Dolby from earlier stereo and monaural sound formats. I am not only interested in how Dolby positions the audience in a multichannel environment, but also in the representational implications of this technology. In effect, I argue that Dolby *folds* the audience into an implied three-dimensional sound space. As such, an array of loudspeakers positioned at various points in the theater immerses the audience in an environment that has come to be known as “surround sound.” Moreover, I contend that classical film sound theory is unable to address the phenomenon of multichannel sound space due to its concern with outmoded monaural standards. In theorizing the representational nature of Dolby sound space we must look to the theories and practices of sound engineers in the 1970s. By drawing on the work of sound engineers during this period, this chapter examines several psychoacoustic principles that inform the enveloping and immersive design of the Dolby apparatus, its capacity to represent a fictional space, and its relationship to the audience.

With this in mind, the aim of this chapter is to unravel the theoretical concepts that have informed our understanding of sound space since the conversion to sound in the 1930s. I investigate not only the principal assumptions of traditional film sound theory, but also broaden the notion of sound space in order to properly understand the theoretical importance and representational characteristics of Dolby. Once the theoretical terrain has been explored, it will become the basis for detailed film analyses in the chapters to follow.

Before considering the representational effects of Dolby, I first explore the notion of sound space in relation to classical sound theory and the classical mode of spatial construction. It is during the conversion to sound period that a relatively standardized representational sound model emerges, which influences the theoretical and aesthetic character of Dolby sound. The second part of this chapter outlines the specific loudspeaker placement of the Dolby apparatus and its psychoacoustic implications. As well, I draw on the technical writings of Dolby sound engineers to further clarify our understanding of multichannel sound space in the 1970s.

The Dissimulation Argument

The theoretical discussion of sound space within cinema studies has been guided, almost obsessively, by two assumptions that remain permanent fixtures in the work of film sound scholars. The first assumes a standard loudspeaker position behind the screen, while the second assumes that the listening subject understands sound to come *from* the image. In other words, though the sound remains dissimulated from its actual source (the loudspeaker), the audience perceives the screen (i.e. the depicted fiction) to be the origin of the sound. Thus defined, these assumptions confirm, as Mary Ann Doane has noted, “that the cinematic apparatus is designed to promote the impression of a homogenous space.”² Similarly, Rick Altman has told us that during Hollywood’s conversion to sound, “loudspeakers were at first split between the now empty orchestra pit and stage ... [then] were eventually firmly established behind the screen ... offering an invisible and as it were unauthored sound source.”³ John Ellis, in the quotation that opens this chapter,

has asserted that in Hollywood cinema, “the sound is imagined to be coming from the screen,” leading auditors to “discount the disparity of sound and image positions.” Elsewhere, he has stated that sound “lacks directionality” and “comes from a single point in relation to the spectator.”⁴ Finally, in his condemnation of stereo sound, John Belton has all but called for a return to monaural practices when he wrote that “stereo sound remains marked by the nature of the system(s) it uses to create the illusion of real space.”⁵ That monaural sound is supposedly less “marked” by the nature of its apparatus simply reaffirms the illusionist qualities of audiovisual dissimulation.

Guided by these two assumptions, the dissimulation argument has, for better or worse, informed nearly half a century of cinema sound theory. Despite technical advances in sound recording and industrial experimentation with stereo in the 1950s and 1970s, scholars routinely apply monaural standards and principles to the theoretical discussion of multichannel sound. In his study of sound space in 1930s Hollywood, Rick Altman has argued that sound localization remains a key technical challenge to contemporary sound engineers, confirming that three approaches characterize sound scale relations:

1. manipulation at the place of exhibition, largely through speaker placement and switching mechanisms (1927-1931);
2. manipulation during production, especially of microphone choice and placement, along with control of sound levels during editing (1929-present);
3. development of multi-channel technology, eventually including stereophonic localization capability (1930-present).⁶

Defining the parameters of his argument, Altman has confessed that the third category falls outside the purview of his research, yet he insists that his theoretical framework concerning the first two approaches “will make it impossible in the future to discuss

Hollywood's standard mode of representation without appropriate consideration of sound space."⁷ Thus, he implies that monaural standards can be applied to the discussion of loudspeaker placement and sound scale relations in a multichannel environment. In yet another account, Altman has asked, "What are the conditions necessary for us to believe that sound comes from the image?" The answer, according to Altman, is contingent on the dissimulation of loudspeakers "behind a sound-transmitting screen." Calling this cinema's "ventriloquism," he has insisted that classical film relies on the "effort to overcome the sound-image gap, to mask the sound's technological origin ... without the fear of discovery."⁸ Consequently, the Dolby apparatus, with its array of loudspeakers at the sides and rear of the auditorium, problematizes Altman's mono-centric paradigm. More fundamentally, we should not assume that sound from one source produces the same representational effects as sound from multiple sources. While certainly influential on multichannel sound space, the dissimulation argument outlined by Altman and his contemporaries is too narrow a concept to accurately reflect the theoretical nature of Dolby sound and its practical applications in Hollywood cinema.

Classical Sound Space

Notionally at least, the dissimulation argument is rooted in one of classical cinema's most enduring and prescriptive characteristics: narrative transparency. In their expansive study of classical Hollywood cinema, Bordwell, Staiger, and Thompson have examined the stylistic patterns of classical cinema as a "structured and structuring framework regulating the boundaries of aesthetic options and decisions." Thus, they have argued that the classical continuity system is governed by an ordered, hierarchical

paradigm of formal elements, resulting in narratives that are conveyed clearly, efficiently, and with little reflexivity. They have also noted that each shot is determined by the “narrational function it is to fulfill.”⁹ Just as image-editing principles of the continuity system prevent the audience from becoming too “aware” of the editing process, the soundtrack is subject to similar codes. One such effect results in loudspeakers being hidden from view, thereby causing the audience to be “more available for reaction to the subject-placement cues provided by the fiction.” The authors have assumed that the impact of synchronized sound on Hollywood cinema was relatively negligible since “sound as sound...was inserted into the already-constituted system of the Classical Hollywood style,” and that “the centrality of speech became a guide for innovation in sound recording.”¹⁰ However, more recent research by James Lastra has shown that the codes and standards of aural representation that were eventually adopted by Hollywood were not the only viable options available to sound engineers at the time. As I argued in the previous chapter, two competing models of sound representation struggled for dominance during the conversion period: the *fidelity* model and the *intelligibility* model.

The first model “implies that the space and acoustic quality of the *set* are identical with those of the represented world,” thus assuming that “sound recording is a simulation of real human hearing.”¹¹ Adopted by engineers from the music industry, the fidelity or “invisible auditor” model assumed a homogenous sound space that was essentially “captured” in one recording. In this way, the sound recording did not discriminate or hierarchize any acoustic elements, leaving the auditor to manage the space herself. Altman writes, “In calling for a careful matching of sound scale to image scale, early theoreticians clearly assumed that sound cinema needed to match a reality code derived

from daily life, where small-scale people—distant individuals—have small-scale voices, and close-up people have close-up voices.”¹² Put another way, this practice adopted a “concert listener” approach, whereby the listening subject bore witness to the performance. We might say that this model was somewhat advantageous for classical music recording, having the ability to take in “all” of the orchestra and the reverberation of the concert hall, but its place within Hollywood’s classical continuity system was less certain. Lastra has asserted that “this particular version of the theoretically ubiquitous ‘invisible observer,’ which assumed a literally situated relationship to both profilmic performance and finished film was terribly ill-suited to narrative feature films.”¹³

The “intelligibility model,” on the other hand, presumed that sound space was constructed from hierarchized sonic elements. Derived from its use in the telephone and radio industries, sounds were layered according to their relevance for the listener. The obvious advantage of this model in the area of telephony was the dominance of the human voice over other inconsequential sounds—a practice that also informed the majority of radio programs.¹⁴ In the case of the classical continuity system, “relevance” was shaped by narrative importance, whereby narratively significant sounds were foregrounded, while less important sounds were mixed at a lower volume. Representation, therefore, imposed an ordered set of sounds on the audience.

As I have already suggested, the importance of cinematic “realism” as an aesthetic goal of sound representation has shaped the theoretical development of the two competing sound models. As Bordwell and Staiger have argued, realism itself “was rationally adopted as an engineering aim—but wholly within the framework of Hollywood’s conception of ‘realism.’”¹⁵ Indeed, Lastra has written that “the *conflict*

between Hollywood realism (which stressed formal unity and narrative plausibility) and the (perceptual) realism advanced by engineers coming from the phonograph, radio, and telephone industries” had a significant impact on the type of sound representation adopted by Hollywood studios. As a result, the type of sonic realism that was best suited to the classical system was one that placed the needs of the narrative over that of a perceived naturalness: “the integrity, and therefore the idiosyncrasies, of the ‘pro-phonographic’ performance were usually sacrificed in the service of a higher level of rhetorical or narrative continuity.”¹⁶ Rather than adhering to the recording techniques associated with symphonic music, Hollywood sound personnel began “engineering” the soundtrack as one would frame a shot. As A. Lindsley Lane pointed out, the construction of the soundtrack was intended to create the impression “of being at the most vital part of the experience—at the most advantageous point of perception.”¹⁷

As the intelligibility model found favor in 1930s Hollywood, engineers who had otherwise aligned themselves with the fidelity model were required to enhance, alter, and hierarchize the pro-filmic aural scene to suit the demands of the classical narrative paradigm. Therefore, if “a space ‘really’ had acoustics that were deleterious to speech intelligibility, it was deemed acceptable to change the acoustics so that a ‘normal’ recording remained intelligible.”¹⁸ Thus, the untampered sonic event gave way to the intelligible sonic event.

Influencing the sound space of Hollywood films since the 1930s, the intelligibility model constructed an aural environment through the manipulation of multiple tracks of audio: namely dialogue, sound effects, and music. In the hierarchically ordered nature of this schema, the industrial and aesthetic goal of a “realistic” sound space was paramount.

In some instances, narrative intelligibility and sonic naturalness (a leftover trait of the fidelity model) were combined to enhance the realistic flavor of the scene. One sound engineer in 1933 wrote:

The importance of having the dialogue always clearly understandable goes without saying. Great care must be exercised at all times to have the sound effects recorded with the proper level to make the finished picture as realistic as possible. In an effort to create realism, we have used as many as sixteen separate sound tracks, each are carefully controlled as to level, perspective and quality, to make a pleasing composite track.¹⁹

It is important to note this author's insistence that realism be *created* in order to produce a "pleasing" soundtrack. In fact, from as early as 1932, sounds were divided into separate, hierarchically ordered tracks, with dialogue taking a leading role. As Altman stresses, engineers had one goal in mind: "to maintain dialogue intelligibility."²⁰ In most cases, this led sound engineers to abandon "accurate" notions of sound and image scale: a long shot of the protagonist walking away from the camera would often be accompanied by a close-up audio recording of the same character. Therefore, sound space did not represent the "real," but was rather perceived as such through the manipulation of sonic elements. As Lastra has argued, "'real' space, as it is in actuality, is simply not an issue for most images on the screen: their scale and angle are functions of narrative emphasis, not of more or less precise perception."²¹

If we assume, then, that the classical mode of spatial representation emphasized "diegetic, multishot, narrative constructions whose primary compositional values are narrative saliency and intelligibility,"²² then it is possible to apply the intelligibility model to a broader definition of Hollywood sound space. Under the intelligibility model,

the audience received aural information that was constructed in order to *effect* their perception of the narrative. In other words, the three dominant layers of sound (dialogue, sound effects, and music) were repeatedly manipulated to enhance an understanding of the narrative and the perception of the diegetic sound space. Given the continued dominance of this model in classical and post-classical Hollywood, it is my contention that Dolby sound space derives its basic structure from the intelligibility model, albeit in a heightened form.

The importance accorded to the layered nature of monaural soundtracks implies a limitation on the part of the apparatus to create a veritable sound space that is both naturalistic and narratively centered. Such restriction is a result of the limited dynamic range of the soundtrack—preventing multiple sound components at differing volumes from occupying the same aural space—and the confining nature of the Academy Characteristic. As I have already shown, the Academy Characteristic effectively capped or “rolled-off” the volume of Hollywood soundtracks in order to balance the sound levels from various studios. By creating the semblance of an industrial sonic “average,” soundtracks were muted at the very top and bottom of their acoustic range. Even while optical tracks gave way to the use of magnetic stock in the 1950s, the Characteristic prevented the wider sonics from being heard. Consider the following statement from Michel Chion: “Neither was there any question of designing soundtracks of any sensory complexity. The point was to give viewers something clear and distinct.”²³ He goes on to argue that it was not until the arrival of Dolby that sound effects were given a “living corporeal identity.”²⁴

While classical sound space might be characterized as less expansive than multichannel Dolby, it is important to return to the question of subject positioning in a monaural environment. The multiple ways in which the audience is positioned in a diegetic space are too numerous to mention here, so I will limit the discussion to one form of aural positioning. As such, the concept of “suture” informs this brief foray into monaural subject placement. Later in this chapter I will return to the use of cinematic suture theory in the discussion of multichannel subject positioning. In this regard, I use the term “suture” in a very specific sense: the process whereby the audience experiences the audiovisual fiction as a lived reality, immersed in the diegetic scene.²⁵

Given the dissimulated and technically constricted nature of classical sound space, one way in which the listening subject is effectively sutured into the narrative aural environment is through “represented hearing.” In film theory this process has come to be known as “point-of-audition,” an aural model that derives its name from the “point of view” shot. Similarly, point-of-audition places the audience in the aural space of the represented character: “Both the POV shot and POA sound represent spaces that are to be taken as diegetically ‘real,’ and as heard by an embodied perceiver within that space.”²⁶ It thereby transforms the listening subject into a surrogate perceiver, and a participant in the diegetic audiovisual space.

As Altman has maintained, point-of-audition sound “constitutes perfect interpellation” in the sense that the aural space of the fiction becomes the “real” space of the auditor.²⁷ While cinematic suture theory has remained a predominantly visual enterprise, its relevance to the soundtrack, and more specifically to the creation of sound space, is unavoidable. In a certain sense, Kaja Silverman’s assessment of cinematic

suture congeals quite nicely with the notion of point-of-audition sound. Silverman has stated that the “classical cinematic organization depends upon the subject’s willingness to become absent to itself by permitting a fictional character to ‘stand in’ for it, or by allowing a particular point of view to define what it sees.”²⁸ Although traditional suture theory concerns the relationship between the spectator and the image-editing principles of the continuity system, it is useful to consider perspectival sound space as an outgrowth or revision of apparatus theory. By privileging the audience to a particular aural perspective, the sound space implied by the fiction becomes the space of the auditorium.

Theoretically, at least, point-of-audition sound “envelops” the audience member by investing her in the fiction. Eschewing the strict codes of the intelligibility model, the point-of-audition mode uses perspectival sound to open the sound space to the reverberant nature of everyday hearing. Lastra explains: “All of these different characteristics can be assimilated under Altman’s term ‘spatial signature,’ which includes all those indicators of the spatial and temporal specificity of sound production and reception that characterize any recording as unique, and that create an effect of simulated perceptual presence.”²⁹

Contrary to these claims of theory, however, the dissimulation of the loudspeakers and its constricted dynamic range prevent these characteristics from being successfully applied to classical cinematic sound space. Monaural point-of-audition secures a general sense of suture without actually *enveloping* the listener. In this respect, the listening subject is interpellated at a distance with sound being directed *at* her rather than from *around* her. Tomlinson Holman explains this crucial difference:

Envelopment ... applies to the sensation of being surrounded by sound, and thus being incorporated into the space of the recording, and it requires a multichannel sound system to reproduce. Two-channel stereo can produce the sensation of looking into a space beyond the loudspeakers; multichannel stereo can produce the sensation of being there.³⁰

It is interesting to note how Holman calls to mind the notion of “being there” in order to express the perceived “realism” of multichannel sound. As we shall see in the next section, the innovation of Dolby sound resuscitates some of the representational problems and assumptions concerning classical sound theory; such parallels include a renewed discussion of “realism” as a mode of sonic representation.

More fundamentally, however, the preceding pages provide us with a general framework with which we can approach a discussion of Dolby sound theory. While the intelligibility model provides a rich archive at the level of sound theory, my aim is to disconnect the notion of multichannel sound space from its monaural past. Although several classical theoretical issues—namely those associated with the intelligibility model and the goal of narrative transparency—continue to influence our understanding of Dolby sound space, it is important to develop a separate understanding of how this multichannel process positions the listening subject.

The way in which the term “envelopment” has been used to describe monaural sound space does not effectively reflect the immersive nature of Dolby sound space. Mary Ann Doane has observed that in monaural cinema, the theater itself becomes a “metaspace,” which binds together the space of the diegesis and the space of the auditorium. While this theory is generally applicable to the dissimulated nature of monaural sound, it makes more sense in the context of multichannel sound. Therefore,

the fusion of these two spaces, which is a central component of the multichannel process, results in what I will call a “representational metaspace.” By combining the narrative intelligibility requirements of the classical code, I argue that Dolby sound depends on the unification or “blending” of diegetic spaces, resulting in a representational model that presents an illusion of a three-dimensional, architectural sound space.

The Delocalization of Dolby

An appropriate theory of Dolby would begin with the observation that the theater space is transformed into the aural space implied by the image. The specific Dolby format that receives the most attention from sound engineers in the late 1970s is a four-tiered process that includes stereo left and right channels, a center channel, a rear channel, and a low frequency channel—otherwise known as “Dolby Stereo.” If we consider monaural sound as a beam of light pointed at the audience from behind a screen, then Dolby represents a diffused spectrum of light that strikes the audience from the front, sides, and back of the theater. However, certain questions arise out of this description of multichannel film sound. We might ask how the representational character of Dolby differs from 1950s stereo processes such as Cinerama and CinemaScope? What exactly *is* the representational nature of multichannel sound space and its relationship to the image? During the transition to Dolby in the 1970s these questions were addressed by a number of Hollywood sound engineers and aestheticians.

The desire for envelopment is predicated on one concept that informs the bulk of theoretical writing by Dolby technicians. Given the established norm of narrative

transparency that informs the representational nature of classical sound theory, Dolby personnel seek to effectively “delocalize” sound images from their actual sources. Tomlinson Holman’s analysis of multichannel sound technology locates the impetus for delocalization in the configuration of the rear channel. Holman has stressed that rear loudspeakers “should be neither ‘heard’ nor ‘seen,’ and directivity as to be localized by the listener does not promote the end for which they were required in the first place, namely, envelopment of the listeners.”³¹ Since the rear channel of the Dolby apparatus is a U-shaped design that encircles the audience, Holman argues that sound ‘images’ should be minimized in the event that “if one ‘images’ to a surround loudspeaker and looks there, there is no supporting picture to go along with the sound image.”³² Unlike the debated “fourth” channel of CinemaScope and other 1950s stereo processes, Dolby engineers stripped the surround loudspeakers of any image-specific information:

Delocalization is improved by the use of special directivity loudspeakers designed to minimize the direct sound field at the listener and maximize the reverberant field of the listening room. Delocalization is desired in surround loudspeakers since there is no supporting picture, and since many surround effects are meant to be enveloping and thus not localizable by definition.³³

Thus, the soundtrack moves into the space of the audience at the expense of specific, localized sounds that may conflict with the classical mode of narrative transparency.

In this respect, the extensive experimentation in stereo sound by Harvey Fletcher and Bell Laboratories in the 1930s has had a profound influence on the Dolby apparatus. In fact, the frontal configuration of Fletcher’s loudspeakers is nearly identical to that of the Dolby design: dissimulated behind a screen, the center channel is joined by left and right stereo loudspeakers. The Dolby center is created by mixing the feeds from the left

and right stereo channels in order to anchor the sound space. As one engineer wrote in 1974: “The real advantage of the derived center-channel system lie in its ability to correct for image shifts for off-center listeners.”³⁴ Another engineer has noted:

Viewers are distracted whenever a voice seems to originate several feet from the visual image of the person on the screen. The farther the viewer is seated away from the center line of the auditorium, the greater the apparent sound shift.³⁵

Unlike the Cinerama and CinemaScope stereo processes that panned dialogue and frontal effects across the stage, Dolby confines most dialogue and effects to the center channel in order to maintain a “stable sound image.” In one discussion of maintaining ‘control’ in a multichannel environment, technician N.A.F. Cutmore wrote: “There will certainly be sound images that are positioned across the front of the sound stage between the main three loudspeakers, meaning that the front three channels must all be controlled in a gain together, or image shifts will occur.”³⁶

Similarly, the fifth element of the Dolby system known as the “low frequency effects” channel positions the listener in a delocalized space. In theory, the sub-bass channel reproduces low frequency sounds below 350Hz, an area of the frequency spectrum where the ear has greater difficulty localizing the source of the sound. Thus, the tactile nature of this novelty envelops the audience without revealing its spatial location. In a qualifying statement, Holman admits that “the theory that stereo bass is required for envelopment has not been proved.”³⁷ In many ways, this theory can only be worked out at the level of aesthetic practice, which I address in my case studies of *Close Encounters of the Third Kind* and *Apocalypse Now*.

In avoiding spatial literalism, the delocalized nature of Dolby promotes a figurative sound space rather than a literal one. The representational aim of these engineers was in the promotion of a “realistic” sound space. By adhering to the classical mode of spatial construction, Dolby creates an enveloping sound field, spreading sound effects and music across all channels in a balanced fashion, thus avoiding unstable sound images. While sound emanates from multiple loudspeakers in various positions, the assumed effect is one of *immersion*.

As I argue in later chapters, the extent to which the representational metaspace is achieved in a Dolby environment is conditional on the treatment of the soundtrack as an abstract space. Sharing an aesthetic characteristic with the Fantasound system, Dolby does not depend on accurate spatialization or localization, but is predicated on the dramatic function of the narrative. With Fantasound, RCA engineers actively sought to arrange the soundtrack not by spatial means, but by the emotional quality of the scene. In this sense, it might be appropriate to recall Edward W. Kellogg’s assertion that Fantasound treats the soundtrack as an “art rather than a science.”³⁸

It is certainly possible to apply this assessment to the Dolby apparatus as well. Holman and Chion have both observed that Dolby engineers sought to limit the directional selectivity of the format in order to present a wider sound field, unencumbered by the localizing effects of offscreen sound. Chion has written that an “exit effect”

is produced whenever a sound linked to a cause likely to appear onscreen, or which has just exited, lingers in one of the offscreen loudspeakers to one side. At these times we have the feeling, which is disconcerting to our normal sense of spectatorship, that we’ve been encouraged to believe that the audiovisual space is

literally being extended into the theater beyond the borders of the screen...³⁹

Chion further argues that in the age of Dolby “this practice has been dropped. Sounds of entrances and exits are now rendered with greater discretion and subtlety.”⁴⁰ Therefore, the frontality of performance that defines early stereo formats is eschewed in favor of a subtler model. The scientific approach to sound space, which favored greater directionality and sound imaging, gives way to an abstract notion of sound space. As one sound engineer noted in 1987:

surround loudspeakers are generally used for all-around environmental or ambiance effects, with similar information in the front loudspeakers. To avoid localization to more closely positioned surround loudspeakers, the surround track is delayed 1 ½ picture frames (60ms) relative to the front tracks. In particular, if these are important to the movie, they are also mixed at a lower level in the front to guard against the unpredictable nature of surround reproduction in theaters.⁴¹

It is important to note the use of a temporal delay, which directs the audience’s attention to the frontal appearance of sound because it is emitted there first. By confining dialogue to the center channel, the other loudspeakers diffuse atmospheric ambiance and music throughout the theater space. Thus, the role of intelligibility is served by having the dissimulated loudspeaker carry the significant narrative information, leaving the other channels to envelop the listening subject in a decorrelated sound space.

Similar to the invisible auditor approach discussed earlier, Dolby places the audience in the proverbial center of an aural event. As Chion has maintained, the listener is exposed to a reverberant sound field that “vibrates, gushes, trembles, and cracks.”⁴² Although the aural event is constructed in post-production out of multiple tracks of audio,

the perceived *effect* resembles an “invisible” sound space that simulates an “original” space of the pro-filmic event. To illustrate this point, Philip Brophy has argued that Dolby sound is spread through the theater space like a spectrum of light. Unlike early forms of stereo sound, which would “draw attention to itself and break the textural form” of the continuity system, Dolby creates a “fullness of space” with sound behaving like a wave that “crosses and creates spaces, contouring and crafting dramatic action.”⁴³

The perceived effect of immersion coalesces with our earlier discussion of cinematic suture. Chion has illustrated that the space of the film itself is no longer confined to the screen, and takes a position in the three-dimensional environment of the auditorium. The “hidden” nature of the loudspeakers as dissimulated objects or delocalized ones furthers the idea that the audience member is sutured into the aural environment of the film. The delocalized sound field is ideally suited to this concept since the source of the aural fiction is concealed enough that the audience member mistakes the space of the theater for that of the diegesis. She is, in essence, a participant-eavesdropper, privileged to a sonorous event that is constructed in order to bring her into the space of the fiction.

In this respect, the representational nature of Dolby is not completely removed from the classical paradigm. During the transition to Dolby the dissimulation and intelligibility arguments are scrutinized, reshaped, and reapplied to the multichannel format. In fact, the goal of narrative transparency and cinematic “realism” continue to ensnare the theoretical framework of the Dolby model. In effect, Dolby expands cinematic sound space by representing it as a three-dimensional entity. It immerses the audience not only through the position of its loudspeakers, but also by representing a

sound space that conforms to the three-dimensional nature of the narrative depicted on the screen. This is most clearly illustrated with respect to the rear channel and its presentation of off-screen ambient effects. As Stephen Heath has suggested, “the work of classical continuity is not to hide or ignore off-screen space but, on the contrary, to contain it...”⁴⁴

While Heath is referring to implied offscreen visual space, his suggestion is appropriate to this discussion of surround sound effects. In a certain sense, the representational nature of off-screen sound is to provide “accurate” and “realistic” *atmospheres* that coincide with the image on screen. In fact, Doane has argued that the voice-off in classical Hollywood cinema serves the purpose of opening the sound space beyond what is perceived on the screen. She further notes that the voice-off must eventually be revealed on screen or else risk the erasure of narrative transparency and effacement.⁴⁵ However, since Doane considers only monaural cinema, she does not take into account the role of sound effects as guarantors of reality and as markers of a “realistic” sound space.

In my case studies of *Close Encounters* and *Apocalypse Now*, I will explore a variety of aural techniques that enhance and expand the notion of the metaspace. I argue that offscreen sound effects standardize and contain the sound space in a way that offscreen images can only imply. In particular, I examine how acousmatic and ambient sounds further imply the space of the diegesis in the area of the auditorium. Together, acousmatic and ambient sounds contribute to what Chion has called the Dolby *superfield*:

I call a *superfield* the space created, in [multichannel] films, by ambient natural sounds, city noises, music, and all sorts of

rustlings that surround the visual space and that can issue from loudspeakers outside the physical boundaries of the screen. What the superfield of multitrack cinema has done is progressively modify the structure of editing and scene construction. The superfield has logically had the effect of undermining the narrative importance of the long shot. This is because in a more concrete and tangible manner than in traditional monaural films the superfield provides a continuous and constant consciousness of all the space surrounding the dramatic action ...⁴⁶

Sound effects, once the suppressed and often stereotypical component of the soundtrack, emerge as a representational device that enhances the multichannel goal of immersion. While monaural point-of-audition sound immersed the audience in a “naturalistic” environment, Dolby achieves this without having to alter the narrative perspective of a sequence: the superfield provides a “continuous and constant consciousness.”⁴⁷

Conclusion

The relationship between the classical mode of spatial construction and multichannel sound space is extremely complex and can only be separated by examining the theoretical assumptions that have informed the work of Hollywood sound engineers in the classical and modern eras. For the Dolby sound engineer, the rules and codes of the classical paradigm contribute largely to their understanding of sound space and the soundtrack. Notions of realism, naturalness, and a general need for intelligibility that are introduced during the conversion period resurface in the 1970s during the transition to Dolby sound.

In general, the larger goal of immersion structures the basic research of sound engineers during this transitional period. While the dissimulation of the frontal

loudspeakers was preserved by Dolby engineers, the problem of “hiding” the rear loudspeakers became an obstacle in maintaining narrative transparency. That the listening subject experienced the sound space of the diegesis in the space of the theater was perhaps the most fundamental goal of Dolby sound engineers and technicians. Notably, it was at both the levels of theory and practice that these technicians developed a sense of “delocalization” that effectively limited the literal qualities of sound imaging, which hindered earlier stereo surround processes like Cinerama. As a result, Dolby technicians pursued the idea of an abstract soundtrack that implied a sound space without literalizing its effects; that is, by limiting the movement of specific sounds from loudspeaker to loudspeaker.

By corollary, the Dolby model restructured the traditional relationship between the listening subject and the representational effects of the soundtrack. While scholars continue to apply classical spatial and narrative concepts to their discussion of Hollywood sound space, it is important to consider the transition to Dolby as a specific moment that reshapes earlier notions of sound theory. The vague insinuation that monaural standards are directly applicable in stereo space is far too restrictive and narrow to be applicable. As I have argued throughout this chapter, the representational nature of Dolby is explained not only in terms of classical sound theory, but also in terms of the perceived three-dimensionality of the multichannel apparatus.

Immersion, and the goal of a perceived naturalness, dominated not only theoretical arguments during this transition, but also the aesthetic choices of Hollywood sound editors and filmmakers. With the liberation of the loudspeaker, the soundtrack took on a greater role in establishing the space of the diegesis and naturalizing the entirely

unnatural, mechanical process of sound reproduction through the introduction of a representational metaspace: the illusion that the theater space implies the three-dimensional, architectural space of the diegesis.

In the following chapters, I plan to broaden this argument by exploring the practical consequences and aesthetic character of two films that utilize Dolby Stereo. James Lastra stated it best when he wrote, “Ultimately, it is not so much the devices that define the cultural and historical impact of a technology than the practices that regulate, define, and determine it that are of utmost importance.”⁴⁸ Indeed, it is to the aesthetic practice of Dolby sound that I now turn.

NOTES

¹ John Ellis, *Visible Fictions* (London: Routledge and Kegan Paul, 1982): 52.

² Mary Ann Doane, “The Voice in the Cinema: The Articulation of Body and Space,” in Elizabeth Weis and John Belton, eds., *Film Sound: Theory and Practice* (New York: Columbia University Press, 1985): 165.

³ Rick Altman, “Film Sound—All of it,” *Iris* 27 (Spring 1999): 41.

⁴ Ellis: 51.

⁵ John Belton, “Technology and Aesthetics of Film Sound,” in John Belton and Elisabeth Weis, eds., *Film Sound: Theory and Practice* (New York: Columbia UP, 1985): 68.

⁶ Rick Altman, ed., “Sound Space,” *Sound Theory/Sound Practice* (New York: Routledge, 1992): 47.

⁷ *Ibid.*, 64.

⁸ Rick Altman, “Moving Lips: Cinema as Ventriloquism,” *Yale French Studies* 60, *Cinema/Sound* (1980): 77-79.

⁹ James Lastra, *Sound Technology and the American Cinema: Perception, Representation, Modernity* (New York: Columbia UP, 2000): 95.

¹⁰ David Bordwell, Janet Staiger, and Kristen Thompson quoted in Lastra (2000): 93.

¹¹ *Ibid.*, 160.

¹² Altman (1992), *Sound Space*: 59.

¹³ Lastra, 161.

¹⁴ For a detailed examination of aural techniques in radio plays, see Michael Ondaatje, *The Conversations: Walter Murch and the Art of Editing Film* (Toronto: Vintage Canada, 2002): 115; Michael Chanan, *Repeated Takes: A Short History on Recording and Its Effect on Music* (London: Verso, 1995): generally.

¹⁵ Bordwell and Staiger quoted in Lastra: 158.

¹⁶ *Ibid.*, 158, 176.

¹⁷ A. Lindsley Lane, “The Camera’s Omniscient Eye,” *American Cinematographer* (March 1935): 95.

¹⁸ Lastra, 177.

¹⁹ Nathan Levinson quoted in Lastra: 173.

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- ²⁰ Altman quoted in Lastra: 189.
- ²¹ Ibid., 143.
- ²² Ibid., 195.
- ²³ Michel Chion, *Audio-Vision: Sound on Screen* (New York: Columbia University Press, 1994): 148.
- ²⁴ Ibid., 147.
- ²⁵ In this context, I refer to Kaja Silverman's study of cinematic suture in her book *The Subject of Semiotics* (New York: Oxford UP, 1983): 194-236.
- ²⁶ Lastra, 141.
- ²⁷ Altman (1992), *Sound Space*: 61.
- ²⁸ Silverman, 205.
- ²⁹ Lastra, 141.
- ³⁰ Tomlinson Holman, *5.1 Surround Sound: Up and Running* (Boston: Focal Press, 2000): 216.
- ³¹ Tomlinson Holman, "New Factors in Sound for Cinema and Television," *Journal of the Audio Engineering Society* 39.7/8 (July/August 1990): 532.
- ³² Ibid., 532.
- ³³ Ibid., 538.
- ³⁴ Ronald E. Uhlig, "Two- and Three-Channel Stereophonic Photographic Soundtracks for Theaters and Television," *Journal of the SMPTE* 83.9 (September 1974): 730.
- ³⁵ R.E. Uhlig, "The Sound of the Story," *American Cinematographer* 59.8 (August 1978): 786.
- ³⁶ N.A.F. Cutmore, "Dynamic Range Control in a Multichannel Environment," *Journal of the Audio Engineering Society* 46.4 (April 1998): 343.
- ³⁷ Holman (2000): 208.
- ³⁸ Edward W. Kellogg, "Final Installment: History of Sound Motion Pictures," *Journal of the SMPTE* 64 (August 1955) in Raymond Fielding, ed., *A Technological History of Motion Pictures and Television: An Anthology from the pages of the Journal of the Society of Motion Picture and Television Engineers* (Berkeley: University of California Press, 1967): 213.
- ³⁹ Chion, 83-4. Holman (1990) further describes the "exit effect" on page 538.
- ⁴⁰ Ibid., 84.
- ⁴¹ Stephen Julstrom, "A High-Performance Surround Sound Process for Home Video," *Journal of the Audio Engineering Society* 35.7/8 (July/August 1987): 538.
- ⁴² Chion, 149.
- ⁴³ Philip Brophy, "The Architectonic Object: Stereo Sound, Cinema & Colors," in Philip Hayward, ed., *Culture, Technology and Creativity in the Late 20th Century* (London: John Libbey, 1991): 96-7.
- ⁴⁴ Heath quoted in Silverman, 213.
- ⁴⁵ See Doane, "The Voice in the Cinema: The Articulation of Body and Space," in Elizabeth Weis and John Belton, eds., *Film Sound: Theory and Practice* (New York: Columbia University Press, 1985): 162-175.
- ⁴⁶ Chion, 150.
- ⁴⁷ Ibid., 150.
- ⁴⁸ Lastra, 157.

Chapter 3

Sounding Out Dolby Stereo:

Aesthetics, Specialized Listening, and *Close Encounters of the Third Kind*

Dolby will become what we decide to make of it; it is not Dolby which should dictate what we should do with it.¹

Despite the proliferation of commentary on the technical potential of Dolby noise reduction and its multichannel process, the emergence of this sound technology in the 1970s was not simply a matter of industrial discourse and debate. Stressing the importance of aesthetic practice to the definition of multichannel sound space allows us to not only examine the ways in which Dolby Stereo was applied to Hollywood film, but also how it was shaped by the aesthetic decisions of sound editors and filmmakers.

In this respect, Michel Chion's consideration of Dolby's influence on Hollywood, quoted above, constitutes a uniquely aesthetic approach to the study of multichannel sound. Chion recognizes that the creative choices by sound editors and their directors ultimately affect how Dolby sound space is perceived by the audience. This approach echoes the work of Barry Salt whose assessment of film technology throughout cinema's history concerned the "dominance of aesthetic considerations over technical possibilities."² Salt's central thesis privileged the creative capacity of film aestheticians to influence and define the very nature of cinematic technologies. Thus, as Stephen Heath has noted, "technology provides a base for techniques," leaving the aesthetic content to determine the form taken by the technology.³ The methodological upshot of this

theoretical attitude is one that treats the Dolby apparatus as an acquiescent medium, which is directly applicable to the present discussion of the Dolby apparatus and the delocalized metaspace that it facilitates.

If, ultimately, Dolby Stereo was guided by the aesthetic demands of Hollywood aestheticians, then the finished soundtrack provided the level at which multichannel sound theory and practice met. Indeed, the transition from monaural to four-channel Dolby Stereo was realized by the practical experiments of filmmakers who, in retrospect, defined some of the ways in which Dolby multichannel sound was utilized. Many of these decisions were based on narrative demands, which as I have already suggested, occupied a central position in the arrangement of Hollywood soundtracks. With narrative cogency in mind, sound editors in collaboration with sonically-attentive directors created a veritable vocabulary of sonic conventions that related exclusively to the multichannel nature of Dolby Stereo. What interests me most is precisely how a particular interest in the soundtrack has been developed by Hollywood aestheticians, resulting in a number of films that open our understanding to the practical consequences of Dolby Stereo.

Therefore, the aim of these remaining chapters is to examine the way in which the representational metaspace of Dolby Stereo affects and *is affected by* the films that employ this sound technology. Enlarging this argument beyond the level of sound theory, the analyses to follow concentrate on two films whose technical and aesthetic conceptualization of the soundtrack informs my larger claims of Dolby sound space. The two films chosen for study were not the first to carry the Dolby name, but they were among the first to explore the process by which the space of the auditorium implies the multidimensional space of the diegesis. The soundtracks to *Close Encounters of the Third*

Kind and *Apocalypse Now* characterize the experimental attitudes of their creators and have become referential works in the larger history of Dolby Stereo sound.

In this chapter, I examine the symbiotic relationship between the representational theory of Dolby Stereo and the chief sonic strategies developed by director Steven Spielberg and sound editor Frank Warner for *Close Encounters*. I suggest ways in which an attunement to the film's soundtrack can reveal a string of aural techniques that function not only in accordance with the narrative, but also with the development of a three-dimensional sound space. In many ways, the importance of sound is central to the film's basic thesis: along with color and light, the film's principal thematic concerns a search for aural communication between humans and interstellar beings. Indeed, Charlene Engel has argued that *Close Encounters* is *about* sound and language, its possibilities and its limitations.⁴ Sound propels the narrative, raises questions, and ultimately provides the tool with which the characters communicate.

In addition to linking the soundtrack's aesthetic properties with the idea of communication, I explore the various ways in which the audience member is sutured into the sound space. In particular, I explore how the audience member's process of listening changes from a general mode to a specialized one based on the film's use of specific aural codes and conventions. As characters yearn to communicate with the mysterious alien visitors, the auditor listens as well, as she attempts to sort through the menagerie of noises, voices, and musical tones that thrive in the sonic space. Therefore, the case study that follows is not simply an exercise in Dolby sound style, but one whose complex treatment of sound shapes a particular understanding of Dolby Stereo in the 1970s. In

what follows, I expand on these hypotheses with reference to specific sequences from the film.

Specialized Listening and Deep Focus Sound

In a certain capacity, film sound positions the audience member as an eavesdropper. This is particularly the case with respect to offscreen sounds. Limited in the capacity to peer around a corner, the audience member is hostage to an acoustic property that tempts her to ask, "Where is that sound coming from?" The answer to this question remains embedded in the dissimulated relationship between the image and the soundtrack. Rick Altman has suggested that the sound film is governed by a "sound hermeneutic," an instance "whereby the sound asks where? and the image responds here!" Dependent on each other in a symbiotic bond, the image requires the soundtrack to enunciate and, therefore, legitimize its own supposed realism. In order to negate the artificiality of the sound-image construct and to preserve the perceived naturalism of sound film (Hollywood film in particular), a shot of a door closing must be accompanied with the synchronized sound of something comparable to a door being closed.⁵

This redundancy in sound-image relations has been expanded in recent years by Michel Chion, who has examined a particular instance of offscreen sound called the *acousmètre*. Theorized by Pierre Schaeffer and adopted by Chion, the term described "sounds one hears without seeing their originating cause."⁶ In a cinematic sense, the *acousmètre* is a bodiless sound, existing solely on soundtrack; it pervades the offscreen sound space like Wolfman Jack in *American Graffiti* (1973), Norman Bates' mother in

Psycho (1960) or the title character in *M* (1931). Chion has explained that “A sound or voice that remains acousmatic creates the mystery of the nature of its source”; that is, until it is *de-acousmatized* or revealed by the image. In most films, the acousmatic entities are eventually localized in the image to fulfill the hermeneutic; however, the acousmètre may be preserved until the climax of the narrative to maximize its dramatic function as in *M*.⁷

These phantom bodies reside in the sound space, between the audience member’s ear and the theater loudspeaker. Chion, however, has limited the acousmètre to a *vocal* identity. Expanding Chion’s definition, I argue that the acousmètre is not limited to offscreen voices but can also include recurrent offscreen sound effects. In this sense, the offscreen *actions* of characters can constitute an acousmatic presence.

In many ways, *Close Encounters* is an ideal case study for acousmatic activity. In the film’s multichannel environment, the acousmètre extends the offscreen sound space to the sides and rear of the auditorium, immersing the audience in an enigmatic metaspace. Furthermore, the film offers a number of audiovisual moments where characters come into contact with an otherwise unseen presence.

Early in the film, four-year-old Barry Guiler (Cary Guffey) is wrestled from his sleep by the sounds of his electronic toys that have mysteriously come to life. Willed out of bed by his curiosity, he descends the stairs and begins to hear an array of noise coming from the kitchen. There is a cut to a close up of an open fridge, where food has been tossed around and half-empty Coke cans drip on the floor. A cut back to Barry reveals that the last shot was from his point of view, as he stares at the mess. As Barry turns his head slightly to observe one of the visitors, he steps back, slightly frightened. The

movement of food containers and aluminum cans continue to be heard offscreen. Then, from the left side of the offscreen space, something moves into Barry's view, causing a noise to be heard in the left channel. Barry looks to the direction of the sound, then back again at the first figure, managing a slight smile.

Throughout this sequence, Barry stares upon something that the audience member cannot see. His own perspective is given only once when he observes the messy fridge and floor, while the remainder of the scene unfolds in one shot, privileging Barry and not the visitors. However, the space of the scene is constructed in such a way that the audience member is not at a viewing disadvantage. In some sense, the visitors are 'imaged' by the soundtrack. Given the directional properties of the sounds, the acousmatic movement is captured sonically, leaving the auditor to construct a mental picture of where the figures are located at any moment during the scene. Spread across the frontal three channels and echoed in the rear, the acousmatic figures necessarily fill the space left vacant by the image.

In a similar sense, Spielberg holds the auditor captive as he concentrates the camera on Barry, who responds to the activities of the visitors with facial expressions. When the second figure emerges, it is not revealed by the image, but by a sound in the left channel, prompting Barry to turn in the direction of the sound. Interestingly, the unseen figures are sonically located by the kitchen objects that they toss, not by any biological noises such as breathing.

The importance of this short sequence is twofold. Narratively, the scene builds the necessary curiosity with the alien visitors by not revealing them. As well, the busy

soundtrack with its spatialized movement establishes the film's wide sound stage, and acclimatizes the audience member to the deep sound stage of the diegesis.

At issue here, then, is a specific treatment of offscreen sound that encourages the audience member to *listen* attentively to what is presented beyond the visual frame. Throughout the film, Spielberg and Warner tempt and taunt the auditor with narrative information that is presented exclusively on the soundtrack, engendering a type of localized listening. In certain cases, Spielberg and Warner remove the redundancy of sound-image synchronization altogether and allow the soundtrack to establish narrative space. Chion has maintained that acousmatic sound essentially “draws our attention to sound traits normally hidden from us by the simultaneous sight of the causes—hidden because this sight reinforces the perception of certain elements of the sound and obscures others.”⁸ The acousmatic encourages a more precise type of listening that is intensified when sound is not accompanied by its visual counterpart.

In his study of auditory culture in the early twentieth-century, Jonathan Sterne outlined a variety of listening modes that were, in some ways, tied to the notion of the acousmètre. He argues that listening modes were significantly altered in the late nineteenth-century, with what he calls audile technique “defining the modern set of practical orientations toward listening.”⁹ Most fundamentally, Sterne separated the passive notion of casual *hearing* from the aural activities emerging in this period in the scientific, medical, and cultural fields:

Concurrent with the separation of hearing from the other senses is a reconstruction of the shape of acoustic space. Audile technique was not simply a representation of acoustic space; it aimed actively to transform acoustic space. The space occupied

by sounds becomes something to be formed, molded, oriented,
and made useful for the purposes of listening techniques ...
Acoustic space becomes a kind of bourgeois private space.¹⁰

Using the term “audile technique” to convey the cultural, scientific, and medical process of listening attentively, Sterne acknowledged the subjective and sometimes private relationship between the listener and the sonorous object.¹¹ With the stethoscope and sound reproduction media such as radio, the phonograph, and cinema, the dominant mode of listening at the turn of the century became specialized and audile technique assumed a leading role in deciphering, defining, and managing acoustic space.

While the cinematic auditor remains bound in an audiovisual setting, she relies on a form of audile technique to interpret and define the sonic metaspace that surrounds her. For the present argument I extrapolate Sterne’s conceptual definition of audile technique to further clarify the mode of listening in a multichannel environment. The notion that Dolby sound space is internalized as a kind of private aural space represents one approach to my present study of *Close Encounters*. This approach also concretizes the degree to which the auditor is immersed in the narrative (in the classical sense) without being made aware of the artifice. In this sense, acousmatic activity is defined less by its literal ‘imaging’ than by the auditor’s specialized listening. In fact, Sterne stressed that specialized *listening* “references conditions under which hearing is the privileged sense for knowing or experiencing.”¹²

As Sterne demonstrated throughout his analysis, specialized listening was neither limited to nor specific to the cinema. However, when applied to Dolby cinema and acousmatic phenomena in *Close Encounters*, the concept of “audile technique” not only encourages specialized listening, but demands it. Likewise, Michael Bull has argued that

“sound is essentially non spatial in character, or rather sound engulfs the spatial, thus making the relation between subject and object problematic.”¹³ Given the representational complexity of Dolby sound space, the auditor *listens* in order to shape the contours of the metaspace and sort through the density of the multichannel soundtrack.

Thus, Spielberg and Warner facilitate specialized listening by having the diegetic *characters* listen to their own environments. This provides visual anchor to the complex process of listening that I have just described; the auditor is compelled to listen to the acousmatic activities that have captured the attention of the characters. To be more precise, for example, an early sequence where Roy Neary (Richard Dreyfuss) experiences a close encounter is constructed in a way to emphasize the degree to which he and the auditor *listen* to the sound space. When Neary stops his truck and searches a map for his location, the offscreen sounds of cars, crickets, and dog barks swell on the soundtrack in all four channels. A car then approaches from the rear, its lights shining into the camera, and Neary waves it on. Then, another set of lights approaches like the first, and he waves them on as well. Rather than passing him to the side like the previous car, these lights rise vertically above the truck.

Following this, the ambient sounds dissipate, and Neary is left in an eerie silence. He realizes this and points his flashlight into the night, observing a row of mailboxes shuffling back and forth as if they were being pulled by a magnetic force. His flashlight goes out and he is left in silence and darkness. A pause, then a heavy, bass tone spreads through the sound space—enhanced by the low frequency bass channel—and a brilliant light floods Neary’s cab. Peering out the window, Neary locates the source of the

disturbance as a monolithic spacecraft that hangs above him. At this point, the light disappears and the reverberant bass ceases as the scene is left in silence and darkness once again. Frightened, Neary listens intently for any further disturbances, then startles himself when his flashlight lights up.

In turn, the auditor is positioned as a fellow participant in the action: the guttural bass tone, the cessation of ambient noise, and the resulting silence all fill the metaspace. As a result, a certain specialized listening is required to hear through the silence to the potential cause of this event—giving the arrival of the bass tone a dramatic impact. Indeed, the entire sequence essentially pulls the auditor into the sound space to investigate it, and then pushes her from it with the resounding *sump-sump-sump* of the spacecraft.

The aural construction of this sequence typifies the use of the four-channel dynamic to elicit an increased listening on the part of the auditor. Frank Warner explains the sound editing principles that inform this sequence:

in [this] sequence just prior to the arrival of the UFOs ... that presence would be expressed simply as silence—or more accurately, a cessation of normal ambient night exterior sounds—crickets, birds, etc. When an accustomed sound stopped, it became a signal that something big was about to happen. Then, when the shattering experience was all over and everything had become visually peaceful again, we'd start the sound up very subtly. Maybe just one cricket at first, then two, then a distant dog barking. Then soon there would be the chorus of individual sounds, just as before.¹⁴

The process of filling and emptying the sound field becomes a virtual sonic signature of the aliens, which in turn alerts the audience member to their presence. Even though Spielberg fulfills the hermeneutic by visualizing the alien craft and the intense light that it

emits, the sequence begins and ends on the soundtrack. Put another way, the audience member is cued to listen to the acousmatic sounds before and after the alien disturbance is 'imaged'. As a signature of sorts, this aural process is repeated later during Barry's abduction and when Roy observes a number of spacecrafts on a deserted expressway. The perceived result of this repetition is amusingly recounted by Warner: "You only had to do it once, twice maybe. Then throughout the picture, when things would go quiet, in your mind you'd go, 'Uh oh, something's going to happen,' because it's done that before."¹⁵

In another sequence from early in the film, an air traffic controller monitors the flight path of an unidentified flying object. He receives information on the size of the object, its luminescence, and its speed from two airline pilots whose voices are heard over his headset. The pilots' descriptions of the spacecraft are barely audible through the crackling nature of the radio transmission. The controller listens carefully to the ongoing dialogue, having little else to go on except for a rudimentary graphic display in front of him. Spielberg repeatedly cuts to the display when the pilots are heard on the soundtrack, thus fulfilling the hermeneutic and giving a certain visualized "presence" to the acousmatic airmen. The dialogue between the controller and the pilots becomes more distressed and hurried, and, as a result, more difficult to decipher. As the scene progresses and an air collision seems imminent, the soundtrack intensifies with activity. Other controllers begin communicating with various pilots in an attempt to locate and identify the UFO. A dense array of speech is spread across the front three channels, which is matched visually by a claustrophobic shot of the controllers, huddled together, and speaking independently of one another. Returning to the first controller, he asks both

pilots if they would like to report an unidentified flying object. The noise dispels as each controller focuses on the anticipated reply:

Supervisor: Ask them if they want to report officially.

Air Traffic Controller: TWA 517, do you want to report a UFO? Over. [No response]

TWA 517, do you want to report a UFO? Over.

TWA Pilot: Negative. We don't want to report.

Air Traffic Controller: AirEast 31, do you wish to report a UFO? Over.

AirEast Pilot: Negative. We don't want to report one of those either.

Air Traffic Controller: AirEast 31, do you wish to file a report of any kind to us?

AirEast Pilot: I wouldn't know what kind of report to file, Center.

Air Traffic Controller: AirEast 31, me neither. I'll try to track traffic and destination, over.

Thus, the acousmètre, first applied to the alien visitors, is given further treatment by the airmen's radio dialogue. Since the description of the unfolding event is given a simplified graphic representation in the form of the controller's computer monitor, it leaves both the auditor and the controllers at the mercy of their listening capacities.

These two sequences, taken together, constitute an exercise in acousmatic sound that informs the degree to which the sound space extends the visual space beyond the surface of the screen. However, the relationship between the image and the soundtrack is further complicated by Spielberg's multiplanar compositions. Throughout the film, the central characters are often framed in deep focus, surrounded by activity in the foreground, middleground, and background of the frame. In turn, the visual density is matched by a sonic density; what might be called *deep focus sound*. As a result, the role of specialized listening takes on a greater role as the audience member and characters attempt to concentrate on one sound while being inundated by others.

The use of deep focus sound is not a new concept in cinema. Indeed, during the 1970s a veritable rediscovery of multiplanar sound occurred with Robert Altman's

experiments in multitrack dialogue with *California Split* (1974) and *Nashville* (1975), which owe a great deal to Jean Renoir's direct-sound films from the 1930s such as *La Chienne* (1931) and Orson Welles' use of this technique in *Citizen Kane* (1941). Elisabeth Weis has noted that "Renoir and Altman use sound more 'democratically,' in the sense that André Bazin applied the word to visual deep focus, which does not emphasize any element at the expense of any other simultaneously presented."¹⁶ The aural cacophony of these films layers sound on sound without a clear narrative purpose; although perhaps the aural confusion *is* the narrative purpose.

By contrast, Spielberg's use of aural deep focus appears to be closer to Alfred Hitchcock's use of it in *Rear Window* (1954), which foregrounds narratively pertinent elements by reducing the volume of background sounds. For example, Hitchcock begins each morning scene in *Rear Window* with a multiplanar soundtrack that mirrors the activities of the apartment dwellers. As the scenes move into L.B. Jeffries' (James Stewart) apartment, the background sounds dissipate. However, in the multichannel environment of *Close Encounters*, multiplanar sound is spread more evenly across the frontal channels and into the rear. While narratively significant dialogue remains anchored in the center channel, the middle- and background aural planes fill the left, right and rear channels. In other words, less sound is removed, which heightens the sense of a truly multiplanar sound stage. Thus, the film presents a far more "democratic" use of aural deep focus than *Rear Window*, while still adhering to that film's notion of narrative-dominated sound.

The type of clarity and separation that is achieved with deep focus sound is primarily the result of Dolby Stereo, which has "changed the balance of sounds" by

offering a certain “presentness” to the soundtrack.¹⁷ It has been suggested that in pre-Dolby cinema, multiplane sounds were restricted in depth and volume as in *Rear Window*, and when used in a more “democratic” sense, as with Altman, the multiplanar sound field often resulted in a garbled cacophony with little separation or clarity. Chion has stated, “Not until the arrival of Dolby sound did films receive a wide sound strip and a substantial number of tracks, permitting one to hear well-defined noises simultaneous with dialogue.”¹⁸ With monaural cinema, “sound could not be mixed together too much, for fear of losing their intelligibility; second, when the soundtrack did require superimposed sounds, one sound had to be featured clearly above the others.”¹⁹

The principal function of Spielberg and Warner’s deep focus sound is to complicate the degree to which characters can communicate with each other. Neary is frequently placed in a crowded audiovisual situation. In an early scene at his suburban home, his attempts to communicate with his family are unsuccessful due to the confusion of audiovisual activity around him. Framed in a long shot, Spielberg’s camera captures Neary centrally positioned in the middleground, while his wife, Ronnie, carries on a conversation with herself in the foreground, and his children alternately watch television and destroy toys in the background. On the soundtrack, each plane is represented equally in the frontal three channels with delocalized reverberation emitting from the rear. As the audience member makes sense of this commotion, Spielberg and Warner have placed Neary in the center of the image and the soundtrack, thereby easing the audiovisual tension. However, the detailed nature of the audiovisual scene encourages the auditor to listen to (and view) each ‘plane’ of action separately.

Similarly, the government officials and scientists that populate the narrative are often aurally coded by the presence of verbal chaos. Since the film's representation of the government and military is occasionally comical, then it is no surprise that their acoustic coding is associated with confusion and disorder. Officials frequently speak over one another and create a sound field that effectively debunks the notion of orderly conduct. In one scene, Claude Lacombe (François Truffaut)—the film's only sympathetic figure of authority—attempts to get the attention of his colleagues by instructing them to listen to what he has found; the droning cloud of speech continues as he fails to command their attention.

Here, the aural deep focus is initially matched by a wide shot of the crowd of scientists. Slowly, however, the camera moves closer to Lacombe as he listens to the electronic pulses over his headset. The multiple planes of sound are still audible, but Lacombe has overtaken the visual space, providing an anchor for the auditor. In other words, while the soundtrack billows with the sound of verbose chatter, the image narrows its focus to Lacombe. It is important to note that unlike multichannel sound from the 1950s, the *Close Encounters* soundtrack positions narratively pertinent information in the frontal three channels, leaving the rear channel to emanate delocalized, reverberant textures of the diegetic space(s).

Invariably, deep focus sound enunciates the inherent lack of organized, linear communication between characters and their environments. In her study of dialogue in classical cinema, Sarah Kozloff has argued that the 1970s brought an awareness of documentary realism to Hollywood, resulting in the adoption of what she calls “verbal wallpaper.” Characteristic of urban dramas such as *Alice Doesn't Live Here Anymore*

(1974), Kozloff explains that under the rubric of “realism,” these films seek to duplicate the sonic richness of a bustling city street or a crowded dining room on their soundtracks. She notes that “a proportion of dialogue in every film serves primarily as a representation of ordinary conversational activities.”²⁰ By corollary, the aural realism that Kozloff attributes to urban dramas can also be heard in *Close Encounters*. In fact, it is important to note that in her remarks on the 1970s, Kozloff did not mention Dolby Stereo or the offscreen effects of her aural concept. With respect to Spielberg’s film, the concept of “verbal wallpaper” is indeed used as a marker of realism, but more significantly as a type of sonic *excess*: a conflation of sounds that fill the three-dimensional sound space with conversational chaos and technical jargon.

In the film’s many domestic scenes, Neary is surrounded by a sonic excess that prevents him from investigating the meaning of his telepathic visions. The constant on- and offscreen noise that permeates the space of the home is used by Spielberg and Warner to connote the marital tension between Neary and Ronnie, which ultimately results in Ronnie leaving the home with the children in tow. When she leaves, the aural deep focus virtually collapses as Neary is left in a relatively quiet environment. It is first time that he is not surrounded by the excess noise of children, television, or the voice of Ronnie trying to rationalize his behavior. It is important to note that when the sonic excess dissipates, Neary begins to understand the meaning of his vision, and goes on to build a physical representation of it in his living room.

In a pivotal sequence, Neary is apprehended by the military and later interrogated by the French scientist Lacombe in a small holding cell. Visually, the scene is rather uneventful as a simple shot-reverse-shot pattern is used. But sonically, the scene reveals a

barrier that verbal language poses on the characters' ability to effectively communicate with each other. A belligerent Neary insistently asks, "Who are you people?" while Lacombe calmly asks him a variety of questions in French. Laughlin (Bob Balaban), who interprets for Lacombe, speaks over him when translating the French to English, leaving Neary and the audience in a puzzling and dense sound space, unsure as to what is actually being said. Moreover, when Lacombe pauses to discuss the matter with Laughlin in French, no subtitles are provided. Rather, Neary and the audience member are effectively isolated from the conversation. In this manner, Neary and the auditor must focus on the *sound* of the language, the tone of their voices, their body language, but not the meaning. Thus, the use of sonic excess reflects not only the auditor's perception of the sound space, but also that of the diegetic characters, once again suturing the audience to the diegesis.

Since acousmatic sound resists clarity and the multiplanar approach yields a surfeit of sonic excess, the film suggests that communication itself can only be achieved by overcoming the demands of linguistic or verbal logic. Engel has suggested that

Close Encounters is about language: verbal, electronic, and musical—communication and its limitations, language and its possibilities; and it is about the ineffable things which are beyond speech or imaging—things having to do with emotion and yearning, things touching upon the spiritual and the supernatural.²¹

She goes further by suggesting that the aliens have come to Earth not to inhabit the planet or simply assert their existence, but rather "to see if humans are capable of rapidly learning to communicate in an abstract language of light and sound."²² Similarly, Vivian Sobchack has suggested that Neary and Lacombe both seek refuge from a world "with

material abundance and 'noisy' with communicative complexity. In their search they encounter the empty, underdetermined, and undeveloped spaces of sky and western landscape, and 'noise' and 'jargon' are drowned out by the universal and 'simple' communication of music."²³

To be more precise, the film's use of music is twofold. There is the non-diegetic score functioning in a "classical" Hollywood sense, and the diegetic musical figure that is thematically tied to the alien visitors.²⁴ While not necessarily a full melody, the five-note motif connotes the immediacy of a doorbell chime, suggesting, as John Williams has stated, "we're here."²⁵ In turn, the phrase is presented in various forms throughout the film; it is sung by a chorus of Indian villagers; it is played on a child's xylophone by Barry; and it is interpreted numerically from a set of mathematical data intercepted by Lacombe and his crew of scientists. As a musical motif, the phrase is mixed into the background of several scenes, but never gains dramatic or narrative importance until the final act. In many ways, it is stifled by the complex integration of multiplanar sound and acousmatic activity.

As I have suggested, the film presents an aural duality by having aural deep focus and acousmatic sounds affect both the audience and the diegetic characters. As such, Neary and Lacombe and even Barry's mother Jillian (Melinda Dillon) are prevented from interpreting the meaning of the musical phrase because of the dense sound space that surrounds them. When Lacombe attempts to notify his colleagues of the five note phrase, they cannot hear him through the density of verbal speech. Interestingly, he only gains their attention when the musical pattern is transformed into a visualized pattern through the use of Zoltan Kodály's musical sign language system for children. The phrase is

literally transformed in front of a group of scientists as it is first heard on a synthesizer and then visualized by Lacombe who performs the hand gestures in synch with the music.

However, in the transformative “conversation” sequence at the end of the film, the musical phrase represents the only means by which the scientists can successfully communicate with the aliens. One technician even remarks, “It’s the first day of school, boys,” suggesting that their propensity for verbose language is of no use during this purely musical exchange. At the same time, the multiplanar and acousmatic excess evaporates into the ether, and the musical conversation overtakes the sound field. Immersing the auditor as well as Roy, Lacombe, and Jillian in a spectrum of electronic music, the soundtrack finally enunciates the primary meaning of the alien visitation, reflecting what Engel has suggested is a lesson in sonic communication.

The film’s coda also suggests an exercise in the textural qualities of Dolby Stereo. In some sense, the plausibility and general realism of the scene is dependant on the defining qualities of the soundtrack. For example, before the Mothership is even seen, the guttural bass tone from earlier in the film returns and fills the soundtrack with an ominous hum; dubbed “the sound of Detroit,” by the filmmakers, its reverberant droning does not resemble any one sound, but rather a conflation of low-end industrial tones.²⁶ As the characters look to the sky in anticipation of its arrival, the audience is surrounded by its sound, coming from nowhere in particular, but filling the entirety of the (delocalized) metaspace. When the ship is revealed high in the night sky, its mysterious presence is given material solidity on the soundtrack that concretizes its supposed realism. The weight of ship is felt by the audience and the characters, spread throughout the diegetic space and the metaspace. Chion has called this process “rendering,” whereby sound

constitutes a “microcosm of the whole event.”²⁷ While the weight of the spacecraft was hinted at earlier in the narrative, this sequence explores the Mothership’s sonic relationship to its surroundings. As it moves throughout the visual space, the sound of the ship changes to reflect its position in space, becoming heavier as it approaches the characters. Before the musical conversation takes place, the multiplanar excess reaches a crescendo: the deep focus chatter of the characters is slowly overtaken by the weightier hum of the ship, effectively silencing the sound space.

Conclusion

My purpose in this chapter has been to set out some of the aesthetic functions of Dolby Stereo. To concentrate solely on the theoretical paradigm developed by Dolby technicians at the expense of the device itself risks underestimating the role of filmmakers and sound personnel in the actual use of this sound technology. Only from this perspective can the aesthetic implementation of Dolby sound be studied in order to gain a greater understanding of this technology and the films that ultimately define its use.

Indeed, I have concentrated this discussion on the soundtrack to *Close Encounters* because it represents an ideal case study for an aesthetic analysis of Dolby Stereo and its facilitation of an immersive sound field. The subject of sound is an integral component to the film’s narrative, resulting in a variety of aural techniques that bind the audience member to the diegesis. The film’s principal thematic concerns the communication

between humans and aliens in a sonic environment. However, sound not only functions to provide the means to communicate, but it also prevents communication from occurring.

In effect, the audience member is immersed into the narrative through the use of two sonic properties that receive extended treatment in *Close Encounters*: acousmatic and deep focus sound. The density of offscreen and multiplanar sounds gives added depth to the soundtrack while enhancing the theme of sonic chaos. At the same time, the audience member must listen through the sounds to shape the sound space and piece together what is actually being said. The film builds on this perception of sound space, prompting the auditor to become what Sterne has called a “specialized” listener. Focusing on the minutia of sonic details, the auditor interprets Spielberg’s images by listening for what is not visualized.

More than anything else, this chapter has attempted to show how Dolby Stereo can be applied in a practical sense. Building on the theoretical grammar established in earlier chapters, my aim has been to explore not only how Dolby enhances the three-dimensional nature of multichannel sound, but also how the aesthetic demands of particular filmmakers can shape the use of this technology. The narrative integration of multichannel sound in this film is only one example, but represents a significant moment in the history of Dolby film sound.

NOTES

¹ Michel Chion, “Silence in the Loudspeakers: Or—why, with Dolby Sound in films, it is the film which is listening to us,” *Framework: The Journal of Cinema and Media* 40.1, (Spring 1999): <http://www.frameworkonline.com/40mc.htm>. Accessed: 24 May 2005.

- ² Barry Salt quoted in Stephen Heath, "The Cinematic Apparatus: Technology as Historical and Cultural Form," in Teresa de Lauretis and Stephen Heath, eds., *The Cinematic Apparatus* (New York: St. Martin's Press, 1980): 9.
- ³ Stephen Heath, "The Cinematic Apparatus: Technology as Historical and Cultural Form," in Teresa de Lauretis and Stephen Heath, eds., *The Cinematic Apparatus* (New York: St. Martin's Press, 1980): 11.
- ⁴ Charlene Engel, "Language and Music of the Spheres: Steven Spielberg's *Close Encounters of the Third Kind*," *Literature/Film Quarterly* 24.4 (October 1996): 376.
- ⁵ Rick Altman, "Moving Lips: Cinema as Ventriloquism," *Yale French Studies* 60, *Cinema/Sound* (1980): 67-79.
- ⁶ Michel Chion, *Audio-Vision: Sound on Screen* (New York: Columbia UP, 1994): 71.
- ⁷ *Ibid.*, 72.
- ⁸ Chion (1994): 71-75.
- ⁹ Jonathan Sterne, *The Audible Past: Cultural Origins of Sound Reproduction* (Durham: Duke UP, 2003): 96.
- ¹⁰ *Ibid.*, 93.
- ¹¹ Sterne used the "audile" to connote a specialized practice of listening, such as the use of stethoscopes in the medical community. The use of the word "technique" is derived from Marcel Mauss' notion of "techniques of the body," which was extrapolated by Sterne to include sensory investigations of hearing. See Sterne, 90-93.
- ¹² *Ibid.*, 93.
- ¹³ Michael Bull, *Sounding out the City: Personal Stereos and the Management of Everyday Life* (Oxford: Berg, 2000): 2.
- ¹⁴ Frank Warner, "The Sounds of Silence and Things That Go 'Flash' in the Night," *American Cinematographer* 59.1 (January 1978): 44.
- ¹⁵ Vincent LoBrutto, *Sound-on-Film: Interviews with Creators of Film Sound* (Westport: Praeger, 1994): 32.
- ¹⁶ Elisabeth Weis, *The Silent Scream: Alfred Hitchcock's Sound Track* (Rutherford: Fairleigh Dickinson UP, 1982): 112-113.
- ¹⁷ Chion (1994): 149.
- ¹⁸ *Ibid.*, 147.
- ¹⁹ *Ibid.*, 148.
- ²⁰ Sarah Kozloff, *Overhearing Film Dialogue* (Berkeley: University of California Press, 2000): 47.
- ²¹ Engel, 376.
- ²² *Ibid.*, 381.
- ²³ Vivian Sobchack, "Child/Alien/Father: Patriarchal Crisis and Generic Exchange," in Constance Penley, Elisabeth Lyon, Lynn Spiegel, and Janet Bergstrom, eds., *Close Encounters: Film, Feminism, and Science Fiction* (Minneapolis: University of Minnesota Press, 1991): 16.
- ²⁴ Cf. Claudia Gorbman, *Unheard Melodies* (Bloomington: Indiana UP: 1987): 20-43.
- ²⁵ John Williams quoted in Thomas Durwood, ed., *Close Encounters of the Third Kind: A Document of the Film* (New York: Ariel/Ballantine, 1977): 63.
- ²⁶ Warner, 93.
- ²⁷ Chion (1994): 110-111.

Chapter 4

The Architecture of Sound: Sound Design, “Room Tone,” and *Apocalypse Now*

Every room has a tone.¹

In 1971, Francis Ford Coppola prophetically declared *sound* to be the next subject of interest among a new generation of American filmmakers.² In the wake of *Star Wars* and *Close Encounters*, Coppola’s 1979 film *Apocalypse Now* constitutes an important link in the historical and theoretical evolution of Dolby Stereo. For *Apocalypse Now*, as with *Star Wars* and *Close Encounters* before it, the Dolby apparatus was reconfigured in order to satisfy the aesthetic demands of director Coppola and sound editor Walter Murch. Adding a second rear channel to the final mix, the “surround” loudspeakers were—for the first time—capable of stereo reproduction. By integrating this sixth channel to the mix, Coppola and Murch devised an intricate soundtrack that built on Spielberg’s use of offscreen sound by developing an audiovisual environment in which the sound space was molded by atmospheric or ambient sound.

To a large extent, the initial use of Dolby Stereo in the late 1970s had a profound impact on Hollywood sound editors and their conceptualization of the soundtrack. With the expansion of offscreen sound space, sound editors like Murch and Frank Warner began investigating the representational functions of multichannel sound, which consequently necessitated a reassessment of their role in Hollywood. It became clear that the level of detail required to fill a Dolby soundtrack meant that the sound mix had to be

planned and shaped as part of a film's overall production design. Thus, the sheer size and scope of multichannel mixes heightened not only the responsibilities of sound personnel, but also established them as instrumental figures within the general production of a film.

A variety of credits emerged during this period that reflected the creative work of sound editors, none more prominent than "sound designer." While sound editors had been shaping Hollywood soundtracks since the conversion to sound period, the degree to which their creative decisions shaped a film's narrative fiber was virtually unprecedented. This imperative was realized by Murch, who, throughout the 1970s, experimented with the dimensional and psychological capabilities of sound in monaural mixes like *THX: 1138* (1971), *American Graffiti*, and *The Conversation* (1974). With *THX: 1138*, Murch was credited with both editing the picture and providing the film's "sound montage." While working in Dolby Stereo for *Apocalypse Now*, Murch credited himself as—and coined the term—"sound designer" to indicate the level of narrative and aesthetic importance that sound contributed to the film. As Mark Mancini has stated, "sound designers are what cinematographers are to lighting and visual composition, what production designers are to set construction and prop display."³ As well, Murch has emphasized that sound design is akin to interior design in that the sound editor is given a three-dimensional architectural space to fill with aural objects.⁴ Thus, the treatment of sound as a physical space that is "decorated," reveals another level of sound practice that informed the understanding of Dolby Stereo in the 1970s.

With this in mind, my purpose in this chapter is twofold. To begin, I briefly trace the evolution of ambient sound in Hollywood film and explore how specific aesthetic issues in monaural sound theory are no longer applicable in the age of Dolby. By

corollary, I will examine the sound editing language of Walter Murch and the manner in which he described and organized his aural palette for *Apocalypse Now*. The metaphor, slang, and conceptual principles that he used constitute a theoretical vocabulary of sound that fundamentally shaped how ambiences, dialogue, and music were applied in this film. What interests me most for the present argument is Murch's philosophy of sound, and how it contributes to the definition of a representational metaspace.

Second, and equally important, this chapter will also explore how the architectural consideration of Dolby sound space applies to *Apocalypse Now*. As a detailed analysis of the soundtrack reveals, the definition of offscreen space extends beyond my previous consideration of the acousmètre and aural deep focus to include two forms of ambiences. The first constitutes what Murch has called "room tone," which forms the contours of the metaspace through atmospheric details. The second form involves *silence* as a kind of "suspension," which gives an added presence to sound by taking it away completely or focusing on a singular sonic event. Through Murch's aesthetic manipulation of the loudspeaker apparatus, I argue that these ambiences effectively shape the metaspace of the diegesis/auditorium.

In many ways, the larger goal of this chapter is to explore how ambient sound not only informs the sound space of *Apocalypse Now*, but how it also emerges as an important aural technique in the Dolby era. I am particularly interested in examining Murch's conceptual design of the soundtrack in relation to his use of ambient sound within the six-channel environment. In a broader sense, my intention throughout this analysis is to provide a means by which one can study the representational effects of multichannel Dolby sound space.

Through the Prism of Sound

Ambient sound has been a part of Hollywood soundtracks since the classical era, providing a backdrop of barely audible sound to exterior scenes or crowded interiors. In his discussion of classical Hollywood sound, James Lastra has noted that “the background’s main purpose is to situate the characters, objects, or actions, offering just enough detail to provide ‘landmarks’ that assure us that no spatial realignment has occurred while simultaneously providing spatiotemporal continuity and realism.”⁵ The hierarchical structure of classical monaural sound space positions ambient sound effects below causal sound effects and the narrative saliency of the human voice. Mary Ann Doane has written that dialogue anchors the sound space, while ambiences are characteristically shaped *around* the voice.⁶

Technically limited in its dynamic range, monaural sound rarely presented narratively pertinent dialogue at the same level as ambient sound effects for fear of losing intelligibility. Only when a character actively listened to the aural environment were ambiences permitted to take a central position on the soundtrack, as in *The Conversation* (1974). As Doane has stated, the voice represents a narrative anchor, steering and defining the audiovisual space by providing information through dialogue, thereby “validating both what the screen reveals of the diegesis and what it conceals.”⁷ According to Doane, monaural offscreen sound space was shaped by the presence of a “voice-off,” an acousmatic figure that exists beyond the frame. Concealed by the limits of the frame,

the voice-off established a film's offscreen sound space, but was necessarily revealed, thus fulfilling Rick Altman's notion of the sound hermeneutic:

The voice-off is always 'submitted to the destiny of the body' because it *belongs* to a character who is confined to the space of the diegesis, if not the visible space of the screen. Its efficacy rests on the knowledge that the character can easily be made visible by a slight reframing which would reunite the voice and its source.⁸

While Doane's analysis was limited to monaural sound practices, she neglected to account for the effectiveness of sound effects to establish, maintain, and define sound space in a multichannel environment. Working together, speech and sound effects can co-exist more fluidly in Dolby space because of the availability of multiple loudspeaker channels. Therefore, Doane's concept of the voice-off is limited in its theoretical capacity to represent the offscreen conflation of sounds in a Dolbyized environment.

In multichannel sound, the *superfield*—or, the space created by the density of ambient sounds—replaces the voice-off as the guarantor of reality and architect of offscreen space.⁹ As my analysis of *Apocalypse Now* will suggest, certain ambient sounds—unlike the acousmètre or even aural deep focus—are not confined to the hermeneutic rule. In other words, some ambiances are *never* revealed in the visual space; they exist only to provide evidence of a scene's realism. These are normally sounds that are not attended to consciously: they remain the atmospheric sounds of the everyday environment—birds, wind, insects, water—that become “listening habits despite themselves.”¹⁰ Thus, while the voice-off is not necessarily replaced in Dolby cinema, it is nevertheless partnered with a superfield of sound that is diffused throughout the

auditorium in an attempt to define the atmospheric space of the scene as a three-dimensional presence.

The use of ambient sound in Hollywood is not limited to Dolby films. Indeed, as far back as the early 1930s, sound engineers were experimenting with continuous 'background' ambiences. Rick Altman has noted that the "atmospheric effects like those in *Back Street* [1932] envelop the audience in a generalized sound ambience, with the sound seemingly coming from all around, thus sonically 'enrolling' the spectator in the film's space."¹¹ However, as I have argued in chapter two, the sense of envelopment that Altman referred to was strictly limited in its practical efficacy: monaural sound can only hint at envelopment, as it does not offer a spatialized or multichannel apparatus with which to position the sounds of the diegesis. While the sense of offscreen sound space was achieved in monaural sound practice, it was restricted by the one-channel apparatus in its ability to fully represent the three-dimensionality of the diegetic space. More important, the detail of ambiences in monaural mixes was limited by the narrow dynamic range of the sound track. Michel Chion has suggested that Dolby enlivens sound space, providing it with a weighted *presentness* that is otherwise unavailable in monaural mixes.¹²

Consequently, the heightened activity of ambient sound in early Dolby mixes had a great effect on the use of studio library sound effects. Since the 1930s, Hollywood studios relied on library effects to provide the sounds of footsteps, rain, traffic, and a host of other non-specific ambiences. Frank Spotnitz wrote:

Until the '70s, audiences had been listening to the same gunshots, wind noise, and face slaps for decades. The Paramount

face slap, for instance, has been a standard in the industry since it was recorded for, but apparently not used in, the Marx Brothers film *Monkey Business* (1931). Creepy, whistling 'yellow wind' has been used countless times since it first was heard in *Frankenstein* (1931).¹³

As a result, these sound effects lacked an inherent uniqueness, with sound engineers routinely applying the same recordings to various films. One sound engineer from the 1930s stated that "This studio [Paramount] has a record of a thunder storm which has stood in good stead in the dubbing of several pictures."¹⁴

Spotnitz also noted that when these stock effects were applied to Dolby soundtracks in the early 1970s, they sounded remarkably flat and tired; the lack of detail, tonal color, and depth of these sounds were certainly exposed by the multichannel process. It became clear that new sounds needed to be recorded in full stereo sound. As well, sound editors were confronted with the idea of having to fill four, five, and even six channels with high-fidelity sound. How could these new sounds be organized in order to avoid a loss in narrative intelligibility? What sounds could be placed in the rear channels?

One way to approach the sound design of *Apocalypse Now* is to examine Walter Murch's methodological consideration of the soundtrack. While production designers and directors of photography utilize a visually-based language to describe their work, sound design lacks a specific vocabulary in which to illustrate conceptual ideas. More broadly, sonic experience does not contain what Jonathan Sterne has called a "metalanguage" by which to manage auditory phenomena:

most of the language used to describe elements of auditory phenomena is metaphoric: aside from specialized language in musicology, sound engineering, acoustics, and general descriptors such as loud or quiet, there are very few abstract

words in common English for describing timbre, rhythm, texture, density, amplitude, or spatiality of sounds.¹⁵

Notwithstanding the auditory engineering principles that inform sound design, the work of Murch and his peers—namely, Ben Burt, Frank Warner, Alan Splet, and Frank Serafine—was based on the aesthetics of sound.¹⁶ In other words, these designers treated the soundtrack as an expressive component that not only informed the image, but also enhanced it with textural detail. In many ways, the visual language of production designers became the metaphoric lynchpin in these sound designers' vocabularies. The abstract terminology that describes color, shape, texture, and direction was adopted particularly by Murch.

In designing the soundtrack to *Apocalypse Now*, which contains over one hundred tracks of sounds in some scenes, Murch developed a veritable language system by which to organize the film's six-channel environment.¹⁷ His vocabulary was based, in part, on the metaphoric use of color to differentiate the tonal characteristics of dialogue, sound effects, and music. The soundtrack

was too big to take in with a single audio 'glance.' So we did what painters do when creating a mural: develop a grid of smaller-sized elements of a whole, like a mosaic, so that when working up close on one of the grids, we would have a guide of what that section should sound like, and how it fits into the whole...¹⁸

The grid metaphor emphasized the abstract language that was used by Murch to describe the construction of this soundtrack. Like a mural painter, he filled his architectural space with various sounds that complemented each other, and when taken as a whole, depicted an aural scene. He went on to argue that

It's very much like light. One of the fascinating things for me in mixing is that what we do with the palette of sound—what sounds we choose to emphasize, how we put a spatial ambience around those sounds, what we choose to eliminate—is very much equivalent to what a director of photography does with light ... directing the eye, *in a painterly way*, emphasizing certain things, de-emphasizing certain others.¹⁹

Murch further developed the grid metaphor beyond the mural example to describe how sounds were organized and patterned in *Apocalypse Now*. He envisioned the entirety of the soundtrack as a white sound that was shone through a prism to reveal its individual sonic layers. He then theorized that these layers, represented by a rainbow of colors, could be combined in specific ways to create an architecture of sound that surrounded the audience. At one end of the color spectrum was human speech, represented by violet; at the other end was music, represented by the color red. In Murch's terminology, the former referred to an *encoded* sound, while the latter was an *embodied* sound:

The meaning of what I'm saying is 'encoded' in the words I am using. Sound, in this case is acting simply as a vehicle with which to deliver the code. Music, however, is completely different: it is sound *experienced directly*, without any code intervening between you and it.²⁰

On the other hand, sound effects were “understood as codes, not as pure as music, but universally recognized unlike language.” For example, a footstep could have been “significant,” and therefore be encoded with a certain meaning, or it could have simply been a footstep. In this way, sound effects were spread throughout the color spectrum as encoded or embodied sounds.²¹

In addition to linking the structure of sound to color-based metaphors, Murch employed the terms “warm” and “cool” to designate channel placement on the

soundtrack. A “warm” sound such as most music was treated to a wider implementation on the soundtrack, while a “cool” sound such as speech was necessarily limited to the center channel. Here, Murch explains his rationale:

I believe it has something to do with the way we decode language, and that when our brains are busy with Encoded sound, we willingly abandon any question of its origin to the visual, allowing the image to ‘steer’ the source of the sound. When the sound is Embodied, however, and little linguistic decoding is going on, the location of the sound in space becomes increasingly important the less linguistic it is.²²

In this respect, Murch structured the use of the six-channel apparatus based on the desire for narrative intelligibility. With this in mind, he was able to place “red” music and other non-specific ambiences in the four corners of the auditorium, while localized (i.e. visualized) “violet” effects were confined to the dissimulated loudspeakers behind the screen.

In a broader sense, Murch’s use of metaphor reveals an attitude towards the soundtrack that informs the demarcation of sound space in *Apocalypse Now*. In Murch’s view, the construction of a soundtrack is less about capturing an unauthored realism than presenting the subjective *impression* of a sound space. In the film, the audience frequently experiences the audiovisual spaces through the eyes and ears of Captain Willard (Martin Sheen), whose own physical and mental constitution is questioned by other characters. As a result, the sound space becomes, to a large degree, the interior space of Willard. Thus, the soundtrack oscillates between representing the visual space and capturing the interior or “metaphoric” space of characters. In this way, the subjective aural space essentially frees the sound space from having to represent an objective

“realism”; instead, sound can be used to enhance, accentuate, and even sharpen otherwise background aural events.²³

The use of interior sound has a long history in Hollywood cinema; perhaps the most famous example comes from Alfred Hitchcock’s first sound film *Blackmail* (1930), where the word “knife” is distorted as a result of the heroine’s agitated mental state. There are numerous other instances from the films of Orson Welles and Andrei Tarkovsky where the interior emotion of a character affects and manipulates the structure of the soundtrack: for example, Charles Foster Kane’s reverberant call for “Rosebud” in *Citizen Kane* and the ghostly disembodied voices from *Solaris* (1972). However, these uses of interiority focus mostly on the manipulation of diegetic speech. On the other hand, the use of ambient sound to reflect subjectivity constituted a fairly uncommon practice in monaural soundtracks.²⁴

In Murch’s early monaural mixes such as *THX: 1138* and *American Graffiti*, atmospheric tones and diegetic music are the principal sonic features that are distorted and subjected to interiority. In *THX: 1138*, the empty visual space of the prison—a limitless white landscape—is treated with the aural equivalent of “white” noise: a persistent metallic tone that pervades the prison space that is seemingly benign, yet its ever-presence began to corrode the sanity of the prisoners.

Significantly, the heightened prison sound is perceived through the ears of the main characters. This is most clearly observed at the film’s climax when a trio of prisoners, led by the title character, successfully escapes the prison’s perimeter. Upon revealing the bustling society that thrives just beyond the prison doors, the soundtrack shift from the metallic tone of the prison to one resembling the sound of a thousand

vacuums: heavy, thick, and non-distinct. It is not the actual sound of what is visually depicted, but the subjective impression experienced by the characters. Interestingly, Murch attempts to sonify the experience one has when entering a loud environment from a quiet one: sheer cacophony.

In *American Graffiti*, music serves as the point of departure for experiments in interiority. In virtually every scene of the film, the sound of Wolfman Jack's radio program can be aurally located somewhere in the sound space. Indeed, Murch filtered the radio show through three ambiences that he called "worldizing."²⁵ The first is a clean, presumably non-diegetic, presentation of the radio show; the second is a slightly *worldized* version of the program that emanates from car radios or nearby sources; and the third was a diffused version that is fully atmospheric and emanates from nowhere in particular. Adding an ethereal quality to the film, these ambiences are nonetheless motivated by the narrative. In one pivotal scene, as two characters fall out of love, the music from the school dance begins diegetically without any added reverberation. Soon, as the couple takes to the dance floor, the song mutates into a diffused cloud that surrounds them. As they begin to argue, the song—like their relationship—becomes less clear and threatens to evaporate into the air. While the dialogue remains sharp and clear during this sequence, the backgrounded music mutates and becomes more reverberant as they dance and argue.

Murch has argued that "the more you get into the emotional end of things, the more you draw upon the metaphoric use of sound. Reality can only go so far and then you have to go beyond reality, beyond the frame."²⁶ It is precisely by going "beyond the frame" and into the space of the theater that aural interiority allows. However, the

aforementioned cases were all mixed and reproduced in mono, thereby limiting the ability for the soundtrack to occupy a space beyond the frame, since loudspeakers would have been placed behind the screen. As a result, the layered complexity of these mixes had to conform to monaural standards, leaving environmental (or musical) ambiances subjugated by dialogue or other more narratively important aural elements. To be more precise, if the ambient tones in *THX: 1138* or *American Graffiti* were stretched any further and were to compete with dialogue, it would no doubt result in a completely unintelligible sound space. In turn, Murch tread a fine line between maintaining narrative intelligibility and creating an ambient environment.

However, in the multichannel environment of *Apocalypse Now*, these ambiances were organized in a way that shaped the sound space of the diegesis without submitting completely to the hierarchical system of Hollywood sound established in the 1930s. While dialogue and other localized effects remained focused in the frontal channels (left, center, right), ambiances were placed in the two rear channels, along the auditor's audiovisual periphery. In this way, the interiority of sound, which heightens the sensitivity to music, sound effects, and even speech, contributes to the sensation of immersion by rendering the diegetic space as an expression of one character's aural experience. The study of the film's use of rear sound provides a useful way of analyzing two types of interior ambiances: room tone and localized diegetic sound.

Doane has suggested that the use of room tone in classical Hollywood was influenced by the desire for a perceived aural reality. She goes on to suggest that a "concern for room tone, reverberation characteristics, and sound perspective" propels the desire for realism.²⁷ Of course, room tone is a minor aural convention compared to the

more dominant matter of vocal presence. In other words, it exists as a subordinate to the voice, leading one to conclude that ambiences such as wind, rain, or background chatter have little significance if they remain offscreen.²⁸ Similarly, in his discussion of the classical soundtrack's faithful reproduction of reality, Alan Williams lamented the repeated practice of using sound effects "only during 'dead' spots in the dialogue."²⁹ In a sense, these *dead* spots constituted monaural film sound's attempts to create an ambient environment; but, as we have seen, technical limitation to the monaural track precluded a more "realistic" and layered sound field. By contrast, in the Dolbyized *Apocalypse Now*, room tone fulfills its function by sonifying the visual space. For the most part, room tone constitutes a delocalized sound field, whereby the two rear channels emit an array of ambiences that do not contain localizable events. Michael DiCosimo has noted that the rears essentially diffuse the sound around the auditorium, where if they were to be deactivated, the soundtrack would shrink back to its position behind the screen.³⁰

In one of the film's opening scenes, the ambient textures from Willard's hotel room fill the rear sound space even though the audience can only see parts of the room. The aural detail of the room tone essentially shapes the visual space of the scene. Michel Chion suggests that Dolbyized ambiences eliminate the need for a visual establishing shot, for the spatializing features are presented sonically.³¹ Indeed, many of the scene's shots are close-ups of Willard, leaving the background slightly out of focus: he lies on his bed, contemplating suicide, and hallucinates about being back in Saigon.

More important, the audiovisual construction of this scene emphasizes Willard's interior state of mind. Images of fire and smoke are superimposed over Willard's face, while the rhythmic sound of helicopter blades moves in and out of the aural space. At one

point, as Willard stares up at his ceiling fan, the helicopter sound replaces the sound of the fan, thereby giving the auditor access to Willard's audiovisual hallucination. In this way, diegetic sounds are distorted by Willard's displaced-diegetic (sonic) memories of Vietnam.

Later, when the elusive Colonel Kurtz (Marlon Brando) is finally revealed in the film's third act, he is covered by shadows. His shiny, shaved scalp is visible, as is his mouth and portions of his face; but he is not whole. The sound space provides the necessary information to identify the size of Kurtz's room, its climate, and the number of people in it. Murch *paints* the sound of Kurtz's lair around the audience using the rear channels. The dripping of water and movement of insects establish the sound space without drawing undue attention to itself; Kurtz's reverberant breathing and speech stem from the center channel, but fills out the rest of the sound space, as if he were speaking in a great hall. Even the diminutive buzz from a fly whips around the rear space, thereby attesting to the size of the unseen area. Recalling the pioneering sound work of Pierre Schaeffer and Pierre Henry—two leading figures of the *musique concrète* movement—non-diegetic music complements the scene's aural tone with synthesized strains resembling rain water. Each layer of sound thus contributes to the scene's overall sonic architecture. Although the auditor perceives very little visually, she is immersed in a 'living' sound space that reacts to changes in vocal pitch, timbre, density, and spatiality. Again, the sequence unfolds from Willard's general perspective, whose heightened sensitivity to the cavernous environment informs the way in which the sound space is presented.

The second use of the rear loudspeakers depends on a more rigid localization of diegetic sound. This feature is used sparingly in the final mix, and is reserved primarily for the movement of helicopters across the sound space. In the famous “Ride of the Valkyries” sequence, Coppola and Murch interrupt the charging Air Calvary attack with a relatively quiet scene of the targeted village. The abrupt shift in aural perspective—from the roaring Calvary to the tranquil village—takes place in the rear, where ambient sounds of insects, birds, children singing are audible until the Wagner recording enters, faintly; the music slowly builds in the rear until it is the only thing that can be heard. At this point, there is a cut to the oncoming helicopters, which shifts the aural perspective back to the Calvary and the screaming diegetic music, which overtakes the front and rear channels. This is an example of the rears anticipating a diegetic event by providing a primer for the auditor on what will eventually become frontal sound. Unlike the ambient room tones of earlier examples, the localized nature of the helicopters realize the sound space in another way: it extends the screen beyond its two-dimensions by allowing tangible objects (helicopters) to leave the screen and still exist beside, behind, and in front of it.

Perhaps the most cogent example of this occurs when Willard and his crew come across a USO-type show staged by a trio of Playboy Bunnies. The beginning of the sequence unfolds strictly in the three frontal channels: the raucous behavior of the soldiers shape the left-center-right dynamic, accompanied by the slightly ‘worldized’ sound of reverberant diegetic music. As two helicopters depart the screen space at differing angles (one to the left, the other to the right) their sonic presence continues in the surround channels where it finally decays. Once the helicopters depart the sound

space, the crowd noise saturates the rear channels. Indeed, this “fly by” sensation opens the theater space from three channels to five, with the helicopters’ exit triggering the activation of the surrounds. Therefore, in these two sequences, the rear channels reveal the space of the scene without having to provide an establishing shot of the event.

By virtue of their nature, the rear channels perform an oscillating role in *Apocalypse Now*. In one way, they provide delocalized ambiences that shape the sound space (as in Kurtz’s lair), while also presenting more localized sounds. The latter function, as Murch observes, can force a “Brechtian” moment of self-awareness, “reminding [the auditor] that they are in a theater watching a motion picture.”³² Murch goes on to argue:

You have to be very careful what sounds you put behind the audience. They can distract attention away from the screen. We had a whole list of do’s and don’t: sounds that were permissible in the back and sounds that were not permissible in the back. Sounds that have great definition we kept in the front.³³

Maintaining the centrality of sounds with great “definition” including dialogue refers back to Murch’s conceptual color system of embodied and encoded sound. As encoded sound, dialogue and other localized sound effects may contribute to a sense of distanciation if they receive treatment in the rear channels. On the other hand, the non-specific ambiences of the village or Kurtz’s lair do not necessarily call attention to themselves as localizable event. However, this does not explain the repeated use of spatialized helicopter movement in the front and rear channels. Would not this type of sound localization prompt an auditor to register the sound as a distraction from the world of the diegesis?³⁴

One way to approach this apparent fissure in multichannel practice is to examine the film's opening sequence, which begins in total blackness and silence. Within the first ten seconds, a reverberant *whomp-whomp-whomp* sound begins to attack from the right-rear channel then moves swiftly to the left rear. Then, an extreme close shot of densely crowded trees fades in on the screen. The same rhythmic sound continues its attack into the front left channel where it becomes louder and more defined: the rhythmic pattern begins to sound more like the thrashing blades of a helicopter. As the sound moves to the center channel, the presumed helicopter is denoted visually, where it continues its lateral (left to right) movement across the screen. The sound begins its decay after it exits the screen and the right channel.

Significantly, the movement of sound throughout the loudspeaker apparatus illustrates the instructional nature of this sequence. The spatialization of sound is addressed while the screen is still black, leaving the auditor to become aware of the sound space. In effect, Murch engenders the auditor to become a specialized listener, whereby she is conditioned to accept the dimensional nature of the soundtrack. In a certain sense, the instructional movement of the helicopter prepares the auditor for the subsequent use of the multichannel apparatus. In order to flatten the "Brechtian" nature of this demonstration, Murch relied on a specific technique that draws attention back to the screen space: the rears perform in a way that they "could be pulled over the theater like a blanket, and then they could melt away like snow."³⁵ Avoiding the jarring effects of 1950s uses of the reviled "fourth" channel, Murch expanded the sound space to the rear of the theater by "fading" the sound up or down, as if it was *always* there.

As I have already suggested, the notion of interior sound attempts to transform the diegetic sound space into the subjective space of a specific character. In turn, the auditor essentially experiences what that character hears. Beyond the use of the rear channels to sonify this experience, the film also uses the front three channels to pull the auditor into this metaphoric space. Since diegetic dialogue is exclusively heard in the center channel, Murch placed Willard's recurring voice-over across the three frontal channels. In doing so, not only is the voice-over separated from other types of speech, but it also represents another instance whereby Willard's interior thoughts are projected in the sound space. The proximity to Willard's voice connotes a private conversation with the auditor: she hears him as if he speaks against her ear. The heavy, coarseness of Willard's tone becomes both encoded with meaning, but embodied with dark textures. The delocalized nature of Willard's commentary can be partly attributed to the reverberant texture of his voice, which gives the impression that he cannot be located in one area of the sound space. In this respect, he is an acousmatic presence that speaks from a displaced-diegetic position. The immersive sensation of the voice-over is further enhanced by the use of the low frequency bass channel.

Indeed, R. Murray Schafer has argued that "Hearing and touch meet where the lower frequencies of audible sound pass over to tactile vibrations (at about 20 hertz). Hearing is a way of touching at a distance."³⁶ The use of bass extension in this film allows for the phenomenon of touching or *being touched* by sound to exist: "localization of the sound source is more difficult with low-frequency sounds ... Instead of facing the sound source the listener seems immersed in it."³⁷ Whereas high frequency sounds are localizable in the sound field, low frequencies contain little or no trace of their own

source; it is *everywhere* in the theater space. The low frequency effect gives added presence to Willard's narration by reaching out to the auditor with the portent of his voice. As well, when Willard's crew hears a B-52 drop its "pay load," the sound of the explosion is not registered in any of the five main loudspeakers, but instead solely exists in the bass extension channel. In the sequence, hearing meets touch when the aftershock of the explosion reaches the PT boat and the Chief (Albert Hall) asks, "Hey, what's that?" The camera shows the crewmembers staring at something offscreen, while the auditor and characters *feel* the impact of the delocalized and acousmatic bomb explosion. In one sense, the effect of the explosion is heightened by Willard's fear of the blast. The crew is uniformly shaken by the disruption, leading Murch to characterize the sound as perhaps more intense than it would be in reality. By heightening the sensation of the bomb blast, Murch achieves a certain sonic interiority that is not limited to loud passages.

Silent Space

As in the case of the bomb blast discussed above, the use of aural silence in *Apocalypse Now* extends Murch's notion of interiority and, in some ways, defines how silence can be utilized in a Dolby environment. In some ways, a silent passage in a sound film is rarely presented without any sound. Instead, as Chion has acknowledged, silence is primarily used as a metaphor for the presence of a singular sonic event or the rarefaction of sound to its dramatic nucleus. This usage can be understood as "the silence of the orchestra around the single flute."³⁸ Doane and Williams have both argued that in monaural films, the presence of room tone often ensured that "dead air" was avoided in

order to maintain narrative transparency. However, Dolby sound space differs slightly from monaural space in the way it nurtures and deploys silence. In what follows, I examine how *Apocalypse Now* employs three types of silence, which I identify as locational, psychological, and prescriptive.

Locational silence is directly related to the sonic world of the diegesis. In reality, the existence of a natural absence of sound is hardly plausible; in fact, the reverberant ambiences of the natural world ensure that as humans we are constantly surrounded by the presence of sound, leading Schafer to insist that total silence is “the rejection of the human personality.”³⁹ Similarly, the locational silences devised for *Apocalypse Now* are based on the “quieting” of the soundtrack relative to sonic events that precede or follow the sound in question. In the “Valkyries” sequence, discussed previously, there is a cut from the sonic chaos of the charging Air Cavalry to the tranquil village square. The sudden shift in loudness from the helicopter armada to the village forces the soundtrack to essentially drop off, leaving the loudspeakers “empty” by comparison. This sequence constitutes a type of silence that is produced by the juxtaposition of two different sound spaces; it does not hinge on the rejection of all sound, but rather on the shift from a dense sonic environment to a sparse one. Murch noted that “It feels [completely] silent, but it isn’t.”⁴⁰

Psychological silence is best understood as an extension of interiority, leading the auditor to experience the sound space through a character’s point of view. Interestingly, the nature of this type of hearing invites the auditor to participate in situations where even Willard is unsure of what he is experiencing. As he and Chef (Frederic Forrest) enter the jungle in search of mangos, the ambient textures of insects and birds engulf the

metaspace of the diegesis/auditorium. As they move further into the jungle, the ambiences become louder; soon, however, Willard senses that someone is in the jungle with them. Gradually, the ambiences decay and the low frequency channel emits a rhythmic *thump-thump* effect. Not registering anywhere in the diegetic space, the repetitive thumping signals that the auditor has entered Willard's mind and is witness to his heartbeat. Murch writes, "[the silence] makes you participate in the psychological state of the characters on screen, who are listening more and more intently to a precise point in space..."⁴¹ In this way, the diegetic sound is filtered through Willard's perspective, which allows Murch to accentuate the loudness of the insects and driving rhythm of the heartbeat.

Later in the film, Willard and his crew travel into an area that is being monitored by a Viet Cong sniper. An American platoon is entrenched at a nearby bridge and is slowly attempting to eliminate the sniper, but cannot see him. Willard observes that the sniper is taunting the soldiers by calling out from an unknown position in the dense jungle landscape. His voice reverberates in the front and rears, taunting Willard and, by corollary, the auditor with his omnipresence in the metaspace. In a point of view shot from Willard's perspective, another soldier loads a grenade launcher and tells him that "he's real close." At this point, the soundtrack diminishes completely, except for the distant call of the sniper who continues to taunt the auditor with his presence until the American's grenade is fired into the trees and explodes in the front and rear channels. Trading aural perspectives, the "silence" around the sniper's cackle is achieved by entering the mind of the American soldier who listens for the sniper and aurally maps his location in the sound space. This act of "specialized listening" requires a level of

concentration that eliminates all other sound and focuses solely on the sniper's voice. Interestingly, the sniper cannot be located in one particular loudspeaker; instead, his voice is faintly audible in all five channels. Once the sniper is killed offscreen by the grenade explosion, the soundtrack fills again with the ambient sound of the jungle, implying that the auditor has either returned to Willard's aural perspective or an omniscient one.

Alternatively, the manipulation of the representational metaspace is most acutely experienced with prescriptive silences. As I have shown, the suspension of the natural sound field is achieved through a variety of methods that conform to the diegetic events of the film. If locational silence is predicated on the literal shift in diegetic events, and psychological silence on the shift from objective sound space to subjective interiority, then prescriptive silence denotes a manipulation of the loudspeaker apparatus. This is perhaps one of the most innovative aesthetic features of the multichannel soundtrack, and one that is realized in *Apocalypse Now*.

Throughout the film, Murch prescribes the way in which the various loudspeakers participate in the unfolding narrative. Indeed, the architecture of the loudspeakers results in the development of a theatrical metaspace that facilitates three-dimensional sound. Since the Dolby apparatus for *Apocalypse Now* is constructed through the use of six independent channels of sound, there is the possibility for a greater manipulation of loudspeaker volume and activity. For instance, during Willard's briefing of the Kurtz mission, the rear channels are not active, and thus remain "silent." However, in other sequences, Murch manipulates the activity of the loudspeakers in order to focus a sound

in one or two of the speakers, leaving the unused channels to act as the “silence around the single instrument.”

The manipulation of the metaspace occurs during the napalm drop sequence. When the napalm strike becomes audible, the sound space erupts with a thunderous harmony, providing aural, visual, and tactile sensations through the use of the six loudspeakers. But as Kilgore (Robert Duvall) approaches his men and kneels down to speak to them, the sound subtly dissipates from the rear channels, followed by the left and right front channels, until his voice and a thin veil of ambience is audible in the center loudspeaker. As a “sonic zoom,” the soundtrack is reduced to just one channel, essentially collapsing the sound space to mono. Traces of ambient noise slowly melt away as Kilgore kneels and speaks to his soldiers. By the time Kilgore mentions that the smell of napalm reminds him of “victory,” his words are the only clear sounds that are presented on the soundtrack. In fact, the word “victory” is spotlighted from the rest of his speech because it is not accompanied by any competing sound.⁴² As soon as he stands again, the sound space is reintroduced in the other loudspeakers, fading up with an array of ambient textures including wind, gun fire, and distant chatter.

Conclusion

In this chapter, I have explored, in a rather broad fashion, the architectural structure of Dolby sound. Given the representational complexity of Dolby Stereo, the practical art of sound design emerged in the late 1970s in order to better deal with the aesthetic capabilities of the multichannel process. Treating the soundtrack as an

architectural space allowed Walter Murch to essentially construct the three-dimensional sound space of *Apocalypse Now*. Indeed, as I have argued throughout this project, the aesthetic and narrative demands of filmmakers during this transitional period fundamentally affects the implementation of this technology. Indeed, Murch has stated that during the production of *Apocalypse Now*, he “wanted to achieve more than the equipment would allow ... but the urge was already there; it was not elicited by the new technology.”⁴³

Significantly, the conceptual language used by Murch to describe the process of building a soundtrack is important in two ways. First, the metaphoric vocabulary and architectural overtones provide one way to approach the study of Dolby sound. In a functional sense, encoded and embodied sounds presume an orthodoxy that effectively limits sound placement in the six-channel format. It remains to be seen how this sonic “metalanguage” has been adopted, expanded, and even challenged by other sound editors in the film industry.

Second, and perhaps more important, Murch’s language concretizes the notion of the Dolby metaspace. The structured use of ambiences and the conscious manipulation of the loudspeaker apparatus certainly render the theater space as an extension of the diegesis. Interiority and the subjective placement of sound further enhance the auditor’s experience of the narrative by situating her not only in the middle of the action, but also in the emotional realm of a character. In a broader sense, the principal aural techniques that I have outlined in this chapter take on an added significance when applied to the multichannel apparatus. Even though atmospheric ambiences and silences have been used in Hollywood cinema since the 1930s, the Dolby apparatus, in partnership with

innovative aesthetic design, effectively liberate these techniques from their existence behind the screen.

NOTES

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- ¹ Walter Murch from *THX: 1138* DVD Audio Commentary (Lucasfilm/Warner Bros., 2004).
- ² Charles Schreger, "Altman, Dolby, and the Second Sound Revolution," in Elizabeth Weis and John Belton, eds., *Film Sound: Theory and Practice* (New York: Columbia University Press, 1985): 353.
- ³ Marc Mancini, "The Sound Designer," in Elizabeth Weis and John Belton, eds., *Film Sound: Theory and Practice* (New York: Columbia University Press, 1985): 361.
- ⁴ Michael Jarrett, "Sound Doctrine: An Interview with Walter Murch," <http://www.yk.psu.edu/~jnj3/murchfq.htm>. Accessed: 5 September 2004; Vincent LoBrutto, ed., *Sound-on-Film: Interviews with Creators of Film Sound* (Westport: Praeger, 1994): 91.
- ⁵ James Lastra, *Sound Technology and the American Cinema: Perception, Representation, Modernity* (New York: Columbia UP, 2000): 202.
- ⁶ Mary Ann Doane, "The Voice in the Cinema: The Articulation of Body and Space," in Elizabeth Weis and John Belton, eds., *Film Sound: Theory and Practice* (New York: Columbia University Press, 1985): 165.
- ⁷ *Ibid.*, 165.
- ⁸ *Ibid.*, 167.
- ⁹ Michel Chion, *Audio-Vision: Sound on Screen* (New York: Columbia University Press, 1994): 150.
- ¹⁰ R. Murray Schafer, *The Soundscape: Our Sonic Environment and the Tuning of the World* (Rochester: Destiny Books, 1994): 10.
- ¹¹ Rick Altman with McGraw Jones and Sonia Tatroe in James Buhler, Caryl Flinn, and David Neumeyer, eds., *Music and Cinema* (Hanover: Wesleyan University Press, 2000): 352.
- ¹² Chion (1994): 148.
- ¹³ Frank Spotnitz, "Stick it in your Ear," *American Film* 25.1 (October 1989): 43.
- ¹⁴ Lastra, 207.
- ¹⁵ Jonathan Sterne, *The Audible Past: Cultural Origins of Sound Reproduction* (Durham: Duke UP, 2003): 94.
- ¹⁶ Spotnitz, 40-45.
- ¹⁷ Murch claims that "at a certain point, there were 160 tracks for *Apocalypse*." See Frank Paine, "Sound Mixing and *Apocalypse Now*: An Interview with Walter Murch," in Elizabeth Weis and John Belton, eds., *Film Sound: Theory and Practice* (New York: Columbia University Press, 1985): 359.
- ¹⁸ Walter Murch, "Touch of Silence," in Diane Freeman, Jerry Sider, and Larry Sider, eds., *Soundscape* (London: Wallflower Press, 2003): 93.
- ¹⁹ Michael Ondaatje, *The Conversations: Walter Murch and the Art of Editing Film* (Toronto: Vintage Canada Edition, 2002): 116.
- ²⁰ Walter Murch, "Dense Clarity – Clear Density," *Volume: Bed of Sound—P.S.1 MoMA*, <http://www.ps1.org/cut/volume/murch.html>. Accessed: 12 October, 2004.
- ²¹ *Ibid.*
- ²² *Ibid.*
- ²³ For a detailed description of Murch's use of interior sound, see Ondaatje: 114-119.
- ²⁴ Again, perhaps Hitchcock's *Blackmail* provides the most famous "classical" example of distorted ambiances when the heroine is plagued by the constant chirping of birds outside her bedroom window.
- ²⁵ Ondaatje, 119; LoBrutto, 87-8.
- ²⁶ Ondaatje, 117.
- ²⁷ Doane, 164.

²⁸ Rick Altman argues that room tone comes into practice in the early 1930s, led by *Back Street* in 1932. He echoes Doane's claim that "room tone...guarantees that even moments of 'silence' will bear (just) audible witness to diegetic reality." See Altman with McGraw Jones and Sonia Tatroe (2000), fn8, 358.

²⁹ Alan Williams, "Is Sound Recording Like a Language," *Yale French Studies* 60 *Cinema/Sound* (1980): 63.

³⁰ LoBrutto, 134.

³¹ Michel Chion, "Quiet Revolution... And Rigid Stagnation," *October* 58 *Rendering the Real* (Autumn, 1991): 72.

³² Murch (2003): 97.

³³ Jarrett.

³⁴ As I have already suggested in chapter one, the multichannel experiments from the 1950s have been criticized by sound engineers and, later, by film academics for moving dialogue and sound effects around the auditorium. See John Belton, "1950s Magnetic Sound: The Frozen Revolution," in Rick Altman, ed., *Sound Theory/Sound Practice* (New York: Routledge, 1992).

³⁵ Murch (2003): 98.

³⁶ Schafer (1994), 10.

³⁷ *Ibid.*, 116.

³⁸ Murch (2003): 96. It should also be noted that this is the first instance where Murch has used a decidedly musical metaphor rather than a visual one to describe his philosophy of sound design.

³⁹ *Ibid.*, 256.

⁴⁰ Murch (2003), 96.

⁴¹ *Ibid.*, 96.

⁴² Interestingly, this effect is greatly diminished when viewing the sequence in simple stereo sound. Rather than sounding as if his words were the only thing present, the speech is accompanied by some faint ambient textures.

⁴³ Walter Murch, "25 Years of Film Sound: Making Movies in the Digital Era," *Mix Magazine*, http://mixonline.com/mag/audio_years_film_sound/. Accessed: 22 June 2005.

Conclusion

Since the late 1970s, Hollywood soundtracks have undergone a seismic change at the levels of production and exhibition. The emergence of Dolby multichannel sound essentially redefined the way in which filmmakers and sound editors constructed a soundtrack. Indeed, Dolby not only sharpened the quality of optical soundtracks through its noise reduction process, but it also reconfigured the concept of cinematic sound space through its multichannel apparatus. Filmmakers such as Steven Spielberg and Francis Ford Coppola in conjunction with their sound editors, Frank Warner and Walter Murch, emphasized particular features of the soundtrack that were not only developed with the aid of Dolby technology, but also shaped the implementation of the technology itself. Whether it was Spielberg and Warner's use of the low frequency bass channel or Coppola and Murch's addition of a stereo rear channel, I have shown that the transition to Dolby was marked by intense aesthetic experimentation, the results of which continue to influence contemporary soundtracks.

Undoubtedly, the innovative techniques from this period, including the use of ambient sound, deep focus sound, and the penetrating silence of the loudspeakers, left a legacy that was later imitated and even furthered by other filmmakers. During the transition period of the late 1970s, films such as *Days of Heaven* (1978), *Invasion of the Body Snatchers* (1978), *Alien* (1979), and *Raging Bull* (1980) utilized these techniques in their own way and towards their own dramatic function.

By 1979, Dolby Stereo had in fact reached a zenith of experimentation that culminated in the creation of what I have called the "representational metaspace" of

multichannel sound. In defining the essence of the “metaspace,” I have suggested that this transitional period was guided by two formal characteristics that have informed much of the technical writing on the multichannel film. First, the goal of “realism” propelled sound engineers during the conversion era of the 1930s, and later during the industry’s experimentation with stereo in the 1950s, to negotiate a boundary between narrative function (intelligibility) and perceptual fidelity. Dolby, in short, strove to maintain narrative cogency without losing the multi-directionality of its loudspeaker apparatus by essentially delocalizing offscreen sound, thus keeping the audience from becoming distracted.

Second, and perhaps more importantly, I have suggested that the multidirectional nature of Dolby Stereo *folds* the audience into an implied three-dimensional sound space. This was most clearly achieved with the use of “room tone,” environmental ambiences, and other discrete sound effects that essentially create an architecture of sound around the audience. Therefore, the metaspace of Dolby uses the space of the auditorium to “paint” the sound of the film on its walls in order to further the illusion of spatial displacement.

Throughout this thesis, I have attempted to trace the major historical threads that inform our understanding of Dolby and its relationship to notions of cinematic sound space. Unfortunately, for the sake of space and concision, I have left out a number of issues that demand further investigation. While several topics spring to mind, I will focus on three areas that contribute heavily to the form and function of multichannel sound space.

First, although my argument concerns the effects of Dolby sound during its transitional period in the 1970s, it is important to recognize the thirty years that have

passed since its adoption into the Hollywood film industry. Since its inception, Dolby Labs have modified the sound system twice. In the 1980s, Dolby Spectral Recording (SR) replaced Dolby Stereo as the company's principal multichannel format, further increasing the dynamic range of the sound strip. In 1992, Dolby introduced its digital system (Dolby Digital) which incorporated a binary-encoded soundtrack on the side of the film strip. Expanding the dynamic range once again and allowing filmmakers to include more sonic information on the soundtrack, Dolby Digital has also standardized the loudspeaker design that was initially used by Walter Murch on *Apocalypse Now*. What is now called "5.1 Digital Surround Sound" can be considered a digital version of the original Dolby Stereo loudspeaker apparatus, which includes center, front left, front right, rear left, and rear right loudspeakers with an additional low frequency bass channel.

Walter Murch has suggested that the Dolby apparatus has gone through little change over the last two decades:

A whole era has passed, and what has changed? Well, technically, many things, but remarkably *not* a significant increase in audio quality when you compare any of the major studio releases this summer to what was heard when *Apocalypse Now* premiered at the Cinerama Dome in Los Angeles in 1979—virtually the same frequency response, dynamic range, noise threshold and channel array.¹

However, at the level of aesthetic practice, filmmakers and sound editors continue to utilize the immersive qualities of this sound format to add depth, texture, and meaning to their soundtracks. Just listen to the layered and dimensional soundtracks to the films of David Fincher, David Lynch, Quentin Tarantino, and Robert Zemeckis to appreciate the complexity of multichannel sound. While Murch has argued that the technical evolution

of Dolby has largely been in standardizing the 5.1 format, the aesthetic techniques of filmmakers must not go unnoticed.² In this way, we can further understand the effects of the Dolby apparatus through the innovative sound designs of contemporary filmmakers.

A second area that calls for further investigation exists at the level of exhibition. The introduction of the THX Sound System in 1983 was originally designed to ensure that Dolbyized films sounded the same in theaters as they did in the mixing studio. Dismayed that exhibitors were using antiquated loudspeakers, George Lucas' company Lucasfilm developed a rigorous set of criteria for exhibitors to meet in order to show Lucasfilm productions such as *Return of the Jedi* (1983) and *Indiana Jones and the Temple of Doom* (1984). The resultant investigation took into account loudspeaker placement, cabinetry, wiring, and psychoacoustic properties of human hearing. In this sense, a study of THX and its impact on exhibition might reconfigure our understanding of the multichannel "experience."

The third area of further research concerns the diffusion of Dolby multichannel sound into the home. Beginning with its noise reduction technology, Dolby first entered the domestic sphere in the 1960s, but it was not until the late 1980s that the company introduced its "Dolby Surround" brand for home consumption. Since then, with Dolby Digital becoming standard on most digital cable systems and DVDs, the growth of the home video market has enabled consumers to replicate a theater environment in their own home. Yet, this interplay between sound technology and domestic consumption has been largely overlooked in film studies. Through the application of various critical approaches, the notion of "home theater" can significantly enhance and potentially challenge the definition of Dolby sound space.

By situating contemporary issues of sound space and sound technology within a critical framework, we can begin to investigate the historical and theoretical implications of these phenomena. While the notion of a “representational metaspace” offers one way in which to locate the significance of the Dolby sound film, it represents only one aspect of this subject. To ignite critical interest in this area, it is important for film scholars to recognize Dolby’s place in cinema. Only then will multichannel sound be heard in all its dimensions.

NOTES

¹ Walter Murch, “25 Years of Film Sound: Making Movies in the Digital Era,” *Mix Magazine*, http://mixonline.com/mag/audio_years_film_sound/. Accessed: 22 June 2005.

² *Ibid.*

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