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The Dolby Era: Sound in Hollywood Cinema 1970-1995

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Ph.D.

2002

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Abstract

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Historically the understanding and appreciation of cinema have been shaped by a bias towards the image. Consequently, film sound has received little attention: today we know very little about how sound works in the cinema, especially in contemporary terms. My particular concern is to provide a first substantial account of sound in contemporary Hollywood cinema.

Since the arrival of Dolby technologies in the early 1970s, the seismic nature of the changes that have taken place in mainstream cinema are so pervasive as to suggest that we are indeed in a new 'era' of cinema, the Dolby era. This period in the history of cinema has been characterised by a variety of factors such as the emergence of a new generation of filmmakers as well as a new 'kind' of audience.

The thesis investigates these changes and their implications within a historical framework that has its roots in the 1960s, exploded in the 1970s, and matured beyond expectations over the past two decades.

The thesis is structured around an exploration of the central features and figures that have characterised the Dolby era. It includes an examination of the reasons behind the success of Ray Dolby and Dolby Laboratories, as well as an analysis of the impact that technological innovations in film sound have had on filmmaking practices and the industry at large.

The thesis advocates a move towards closer dialogue and integration between the world of academia and that of practitioners by focussing specifically on professional practices through a series of interviews with leading Hollywood practitioners. Finally, the thesis proposes an original approach to some key areas of film studies, namely film audiences, film narrative construction and film analysis.

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Introduction: Sound matters

'It is only shallow people who do not judge by appearances. The mystery of the world is the visible, not the invisible.' (Oscar Wilde)[1]

Sound matters. The simplicity of this brief statement could be deceiving. Few sentences hold as much potential to reveal the inner workings of the cinema industry as this short and apparently obvious assertion. This is true for all facets of cinema: from filmmaking to audience reception, from scholarly research to student learning; all aspects that characterise, shape and structure our understanding of cinema are directly evoked by that simple address, sound matters. Nor has sound mattered more than it does in contemporary cinema: the profound changes that have taken place in mainstream cinema since the arrival of Dolby technologies in the early 1970s are so pervasive as to make it possible to suggest that they ushered in a new 'era' of cinema. This is a time in the history of cinema that has been characterised by a variety of factors such as the development of a new generation of filmmakers and the emergence of a new 'kind' of audience whose understanding of the expressive and sensual power of sound fundamentally changed Hollywood movies and their modes of reception. My study aims at exploring these changes and their implications within what I will call the Dolby era, an era that has its roots in the cultural and political movements of the 1960s, exploded in all its novelty and excitement in the 1970s, and matured beyond expectations over the next two decades.

My particular concern is to provide the first substantial account of sound in contemporary Hollywood cinema. Historically the understanding and appreciation of cinema in all its aspects, including scholarly research, have been shaped by a strong bias towards the image. As a direct consequence of this bias film sound has received comparatively little attention. This has left a substantial void: we know very little about how sound works in the cinema, especially in contemporary terms. Audiences around the world listen to, as well as look at a movie; sound technology impacts on the way films are made and received as much as image technology; the soundtrack is an area of creativity as fertile and exciting as any in filmmaking, yet the majority of scholars and critics have by and large remained impervious

studies of performance, histories of the cinema, issues of representation: these are but a handful of core concepts in film studies that operate from the assumption that film is indeed a visual medium. University courses underwrite this view: a quick survey of film and cinema studies syllabi will reveal a consistent and coherent sharing of themes and concerns most of which are structured around the understanding of film as a visual medium, just as 'visual literacy' is often invoked as a prerequisite for the successful film student. Books that announce themselves as 'an introduction to film' use film's visual ontology as a conceptual 'thread' and their material is arranged accordingly.[2] Film critics also routinely confirm this view by employing expressions such as 'visually arresting', a 'must-see' movie and by focussing their reviews mostly around visual performance. Perhaps the most important confirmation of the veracity of the notion of film as a visual medium comes from the vocabulary that we all use to talk about the movies. We go and 'see' a film, we extol the virtues of 'visionary' directors, and most of our terminology of cinema revolves around the image (one example above all, the choice of terms we have to describe a shot: pan, crane, tracking, point of view, establishing, close-up, long, medium, etc.). Put bluntly, any attempt to study sound in the cinema must deal with the uncomfortable truth that the widely held assumption that film is a visual medium carries a related postulation: sound matters less than the image. In many ways, the urgency and raison d'être of this study is to begin to redress the balance.

In this sense, it might be wise to take nothing for granted and begin by asking some 'basic' questions that are central to this study: what is sound, what is Dolby, and why concentrate on contemporary Hollywood? The latter is perhaps the least problematic question to answer. I have chosen to focus on contemporary Hollywood cinema because it offers a dominant model of filmmaking and has been the cradle of all major developments in sound aesthetics and technology, particularly in the period with which I am concerned. In many

ways, contemporary sound is one of the leading Hollywood exports in technological, aesthetic and financial terms. Since the coming of sound in the late 1920s, the history of film sound has been firmly located within American industry.[3] The greatest beneficiaries in aesthetic and financial terms have been American filmmakers (Spielberg, Coppola, Scorsese, Lucas, Kaufman, etc.), and American companies have established a virtual domination of the world market insofar as sound technology is concerned. Thus there is little doubt that Hollywood ought to be identified as the home of contemporary sound in ways that neither television nor the music industry could ever claim to be. However, where is 'Hollywood' when it comes to sound? Despite the proliferation of dubbing stages across the world, most movies are still mixed in Hollywood.[4] As far as sound is concerned, Hollywood is not just a place in Los Angeles where studios are based and films are made. In geo-filmic sound terms, Hollywood is in Los Angeles, but it is also in New York, just as much as it is in San Francisco. Indeed, unlike film production, sound's largest power base is arguably set around the San Francisco Bay Area, not in Los Angeles. This is a relevant aspect for it links directly the development of new sound in the Dolby era with the generation of filmmakers that I mentioned above who moved to Northern California to 'escape' the traditional modes of production of traditional 'L.A.-Hollywood'. Thus it would be unwise to talk of Hollywood sound as if it were a single entity. Nor would it be wise to assume that the term I have chosen to qualify the era I am about to investigate is in any way easier to dissect. What does the term Dolby refer to? Does it refer to Ray Dolby, founder and developer of the Dolby sound system? Does it refer to the company itself, Dolby Laboratories, one of the most successful technological enterprises of the past thirty years? Does it refer to the sound system itself that Ray Dolby developed and Dolby Labs produced and sold to millions of cinema and home theatres worldwide? In many ways, Dolby is none of the above things I mentioned: it is all of them and more. It does not begin in the 1970 nor are we 'after' it. It is one of the seismic events in the history of cinema, yet it is one of the least studied. It is one of most noticeable factors to have influenced the development of film aesthetics in the last quarter of cinema's first century, yet it is one of the least understood. It is one of the most successful companies in the world of entertainment, yet his founder and major creative force is little known. In short, it is a remarkable story that begs to be told. All stories need boundaries, structures, and questions to solve. Mine have

been chosen to tell the story of Dolby as the fascinating account of how sound took centre stage in Hollywood filmmaking and ushered in a whole host of new creative possibilities for both filmmakers and audiences alike. Indeed, if anything, the problems inherent to the term Dolby itself are a reminder of how wide ranging the impact Dolby has had on the film industry actually is. It is in this inclusive sense of 'era' that the term Dolby is to be understood in this study.

Finally, the most difficult of those 'simple' questions remains how to define sound. Film sound shares the same physical medium as music, that is, sound waves. This 'closeness' has often meant that the main critical vocabulary employed to analyse soundtracks would seem to have begged, borrowed and stolen from its music counterpart. This is particularly evident in the insistence on terms such as timbre, pitch, tone, which though evidently relevant are not flexible enough to articulate the complexity of contemporary soundtracks. Most noticeably, vocabularies of music are concerned with sound 'per se', whereas film sound works in a symbiosis with the image. This problem is emphasised by Rick Altman when he forcefully suggests that: 'While all film sounds have loudness, pitch and timbre, not a single sound in cinema can be adequately described with musical terminology.'[5] Thus, film scholars would seem to have borrowed a rather inadequate vocabulary, able to describe only a limited range of the complexity of a soundtrack. The consequence of this is a rather inadequate understanding of what a soundtrack actually is. Rather than being investigated as a combination of sound elements, the term 'soundtrack' has often come to signify only the film's music track, dialogue being firmly confined to the 'superior' realm of the screenwriter. This is a rather convenient way to arrange film perception and appreciation. By singling out particular elements of a soundtrack, critics have been able to praise individual achievers rather than focus on the much more complex issue of what actually becomes of these 'individual' achievements once they are recorded, mixed and reproduced not as single independent units, but as part of the complex structure that is a soundtrack. However, it is precisely the relationship between these four elements that I regard as the core of what I will address in this study as 'soundtrack': a highly complex combination of four elements, effects, music, dialogue, and silence, whose qualities are inextricably blended together to achieve a creative balance.

To attempt to chart the development of what I term the Dolby era is also to suggest a substantial move towards closer dialogue and integration between the world of academia and that of practitioners. Despite the availability of a rather large amount of interview material with sound men and women, mostly in either 'technical' journals or specialist Internet sites (see Chapter 2: Critical Receptions of Sound for more), traditionally there has been little attempt to integrate critical thinking with the more exquisitely practical aspects of filmmaking. Nevertheless, the potential for cooperation and debate has never been greater than in the period I am investigating. The rise of new figures in Hollywood sound and the increasing impact of sound on contemporary films have not yet won sound the kind of prestige amongst filmmakers that other areas, such as cinematography and directing, have traditionally enjoyed. However, it is precisely because of this that filmmakers working in any of the different sound crafts are some of the most approachable professional figures in Hollywood. The increase of new means of communication over the past few years, the Internet in particular, has facilitated establishing and maintaining contacts with sound makers. In a study such as mine that purports to examine the impact of sound on contemporary Hollywood cinema the issue of whether to establish contacts with the people I am to write about quickly becomes a rhetorical question. In this sense, the contacts that I have developed over the years during my research have been invaluable. Leading sound designers such as Gary Rydstrom (Saving Private Ryan, Titanic, Jurassic Park and Terminator 2), Bruce Stambler (The Fugitive, Batman and Robin, and Clear and Present Danger), Randy Thom (Forrest Gump, Cast Away, Arlington Road,) and Tom Holman (inventor of the THX sound system, and former director of technology at Lucasfilm) are but a few examples of the filmmakers who have helped immensely with this project. Indeed, the degree to which I will be capable of integrating their views and experience in my writing should be a good measure of the success or otherwise of my project. This is mirrored in the way I have chosen to structure my writing around three key sections. The first section will attempt to provide a comprehensive definition of the Dolby era in historical, technological and aesthetic terms. It will also chart the historical development of critical positions with regard to the role and importance that sound has played in the cinema. This is particularly relevant because contemporary scholarly attitudes to sound would appear to be a direct consequence of the work of early film theorists. The second

section will be an investigation of the developments of new creative figures in Hollywood that emerged as a consequence of the changes brought about by the Dolby era. In particular, this section will focus on interviews with leading sound designers whose work has contributed to shaping the Dolby era. Finally, the last section will provide an evaluation of the impact that these changes might have on our understanding of film, and in particular it will offer an analytical framework for the investigation of audiences as listeners, not just viewers, as well as a method for the analysis of how sound works in films today.

There is one important aspect that I have purposely left out of my account of sound in contemporary cinema. The contribution that the home cinema dimension has made to the rise of interest in film sound is unquestionable, in terms of literature, technology, and aesthetic awareness. However, it is precisely because of the size and scope of this area of film sound that I have decided not to discuss it other than incidentally. To include home cinema in my study in a meaningful manner would mean detracting attention from the core topic, the theatrical dimension of film sound. More importantly, several discussions with designers have convinced me that, though the two areas of theatrical cinema and home cinema are obviously related, filmmakers still 'make movies' for cinema release, not for home consumption. The scope, detail and intricacy of their films' soundtracks are not concerned with home reproduction. Indeed, several designers and supervising sound editors personally supervise the 'down-mix' of the film's soundtrack for home release.[6] In other words, given the control that audiences have on technical aspects such as volume, speakers placement and overall acoustics, and the actual existence in many cases of two (or more) distinct soundtracks, one for theatrical release and one for home video/DVD/Laserdisc, it is feasible to see the two as separate entities. The ways in which these two sound artefacts relate to each other is a subject undoubtedly worthy of proper investigation, but this is not the aim of my study.

Ultimately, the importance of my study resides less in the awareness that other scholars have constantly neglected sound and more in the realisation that it is important to learn more about sound. One of the major conceptual and intellectual obstacles to the development of a sustained scholarship of film sound can be traced back specifically to this issue: whenever scholars have written and talked about sound they have mostly done so as a reaction to the image bias that is so predominant in most film theory and history. Tom

Levin argues that: 'The history of the development of cinema sound can be tread as an oscillation between its difference (from the image) understood as supplement and its difference understood as a threat'[7].

This is perhaps inevitable, and my study is, at least in part, no exception. However, this is also another way in which sound can be further marginalized with respect to the image: even when we talk about sound we do so as a reaction to what people write about the image rather than as a means to research the wealth of new areas that sound can disclose to the enterprising scholar. In this sense, the investigation of Dolby, the dialogue with creators of sound, and the analytical frameworks I will propose are all part of an attempt to reveal some of the unexplored potential that film sound holds for anyone with a serious interest in the cinema. Sound matters.

Chapter 1: the Dolby phenomenon

'When it comes to film sound, no name is more familiar to audiences than Dolby.'[1]

The term Dolby has mostly been employed in academic writing to refer to a set of technological innovations affecting mostly sound reproduction. It is tempting to follow this approach and study Dolby as a means to investigate said new technologies. However, I would like to suggest that Dolby's achievement goes considerably further than a technological shake-up. In the 1970s and early 1980s, Dolby achieved nothing less than comprehensive industry wide transformation, from studio attitudes to sound, filtering through to filmmakers' creative use of sound and audience expectations. Dolby achieved this whilst creating one of the most successful companies in the history of the entertainment industry. Some figures might help give some measure of the size and success of Dolby. All post-1977 Oscar winners in the Sound categories[2] have used Dolby encoded soundtracks. Dolby licensed products have surpassed the remarkable figure of over 1 billion products sold. There are nearly 70,000 Dolby-equipped cinema screens around the world and more than 12,000 films have sported a Dolby-encoded soundtrack over the past 30 years. Mixing facilities employing Dolby technology are currently available in 43 countries. Dolby Laboratories have been granted 616 patents in 28 countries, and 645 trademark registrations in 95 countries.[3] Figures like the ones above tell a story of success even to the uninitiated eye of such size and scope to support the need for investigating the Dolby phenomenon in ways that go beyond technological prowess. Most remarkably, Dolby Labs have managed to establish themselves as a market leader and have maintained their position over a period of more than 30 years, a feat never matched by any other company dealing with film sound.[4] How has Dolby achieved this and what are the implications of this achievement?

In order to understand the full magnitude and importance of the changes that Dolby has brought to the industry we need to take a few steps back and review the state of play before Dolby entered the frame. Warner Brothers introduced synchronous film sound in the late 1920s. This widely known and reported piece of cinema history has been written about

mostly in relation to the changes that it ushered in, both in terms of its impact on filmmakers and, to a lesser extent, audiences. However, little has been said in relation to what actually did not happen. Indeed, one of the central assumptions common to most writing on the coming of sound has been that sound innovators succeeded spectacularly both in terms of the speed of adoption of sound on film by studios and in terms of the universal acceptance with which the talkies were received by audiences worldwide. Cecil Hepworth expresses this view in touchingly personal terms:

'To me the most remarkable thing about this union (of talking machines and cinematography) is the speed and completeness with which it has been accomplished. Until two or three years ago the high contracting parties were completely aloof from one another, and although from time to time there were rumours of an engagement, it was not until quite recently that the mating took place.'[5]

However, the history of the coming of sound is as much a history of stunted development as it is one of unprecedented growth. As studios were eager to cash in on the novelty of sound (synchronised speech to be more precise) on film, they rapidly moved from a cautious approach to sound to an all-talkies policy within a few years from the release of The Jazz Singer in 1927.[6] Exhibitors worldwide also made sure they would join in on the new sound craze and take full advantage of the new financial horizons that had opened before them.[7] However, almost inevitably, the earlier systems had imperfections and limitations that quickly became obvious to the industry. Although the technology improved quickly, it soon became apparent that there was no desire on the part of exhibitors to replace the sound equipment they had just spent a considerable amount of time and money to install with the new technology, despite the potential improvements in quality. Clearly the relationship between quality and cost was deemed, perhaps understandably, less attractive than it was originally hoped for. This had a de-facto limiting effect on both the early production and reproduction of film sound. In some important way, sound on film had become too successful too quickly.

A telling example of this problem is the failed adoption of improved loudspeaker design developed by several manufacturers in the mid and late thirties. In particular, MGM had

developed what became known as the Shearer Two-Way Horn System (see figure 1). This new loudspeaker was revolutionary in that it improved dramatically the reproduction of both high and low frequencies. This was perceived as a need by studios because the frequency range they were able to use during production had grown wider since the late twenties and allowed them to be much more 'adventurous' with sound, as well as guaranteeing more faithful sound recordings. Remarkably for its time, this two-unit speaker could provide a 40-10,000Hz uniform frequency response (the spectrum audible to humans is 20-20,000Hz). It also helped reduce amplifier background noise. Indeed, the Academy sanctioned the relevance of this innovation by awarding MGM a special Technical Award. It was not long before another manufacturer giant, Western Electric, developed a sound system that had the Shearer System at its core. The 'Mirrophonic' sound System was the next evolutionary step forward for sound reproduction in cinemas, and it was ready as early as 1938. However, despite the Shearer's remarkable success, when Western Electric attempted to market the new system they found that only a handful of exhibitors were willing to re-equip (it was not a matter of a simple upgrade: a new speaker system needed installing and even the projector would require some attention to accommodate the new system). The system never reached a significant number of cinemas.[8]

When, in the late thirties, it finally became clear that there was no scope for the adoption of further technological improvements that involved substantial investment on the part of exhibitors, attention turned to the issue of standardisation. If new sound technology was not going to be adopted by exhibitors then the creation of a universal standard was, for the first time since the inception of sound on film, a distinctive possibility. The attraction of standardisation mainly resided in the need to ensure that all films produced would sound 'acceptable' in virtually any sound-equipped cinema in the world. This was not an unusual enterprise: the pursuit of standardisation of one kind of another had been at the forefront of sound makers since the 18th century, when Joseph Sauveur, a French physicist, proposed that the note C should equal 256Hertz. The drive for standardisation became more acute when instruments for the recording and transmission of sound over distance became more common. In particular, the telephone is an excellent example of how technology 'settled' for a standard that, whilst only covering a minority of the sound spectrum was deemed an acceptable standard for the transmission of the voice.[9] This new found desire for

standardisation ought to be played against the increasing awareness that another kind of standardisation, speechless movies, was now clearly lost forever.[10] The idea of employing a worldwide 'common currency' as far as sound recording and reproduction was concerned was an attractive proposition in the face of the (potential) loss of universal appeal due to the introduction of speech, and thus different languages, in talkies. In 1938, the Academy of Motion Picture Arts and Sciences began studying the possibility of adopting a standard theatre playback response curve (i.e. what films would sound like in an average theatre). After some tests, an agreement was reached and the 'Academy Curve' that was to dominate the understanding of what filmmakers could expect their audiences to hear in cinemas for nearly fifty years was born. The Academy characteristic, as it became known, prescribed a rather limited frequency response (curtailing high frequencies at 7,000Hz), and, even more damagingly for the quality of sound reproduction, it showed little concern with regard to theatre acoustics (see Appendixes – Academy Curve and X Curve comparison). The 'Academy characteristic' did indeed achieve standardisation across the globe but at high price. The developments in sound technology of the late 1930s, 1940s, 1950s, 1960s and early 1970s were only marginally adopted. Although film sound was still in its infancy, its growth was being stunted.

It would be difficult to overestimate the problems caused by this early decision. The frequency range and quality of sound in most cinemas was not much better than that of telephones and continued to remain so until the mid-1970s, until, that is, the arrival of Dolby.[11] There had been, as I mentioned earlier, several attempts at improving sound reproduction, but the inconsistency in availability of both films and properly equipped theatres meant that filmmakers could never confidently employ anything other than monophonic sound, a limited frequency range, and inadequate loudspeakers in cinemas whose architecture was still a reminder of the vaudeville days. As John Belton points out: 'The magnetic revolution proved to be more of an in-house shake-up than an industry-wide transformation'.[12] Cinema architecture also suffered and remained firmly rooted either in the Grand Picture Palace tradition or in the small local cinema variety.[13]

It is not possible to gauge fully the extent to which this early drowning of the infant actually affected the development of sound aesthetics, and coloured the work of film scholars (see Chapter Two: Critical Receptions of Sound for more). However, one

undisputable fact remains: poor quality sound had been the industry standard worldwide for nearly forty years by the time Dolby Laboratories set out to rectify this. In short, Dolby's project was ambitious in ways that went beyond the simple technological dimension. What was at stake was less a matter of introducing new technologies and more a question of changing attitudes towards film sound amongst filmmakers, industry executives and, ultimately, and most importantly, exhibitors. Indeed, the awareness of this complex task was at the forefront of Dolby's thinking, as these words from a Dolby Labs produced pamphlet emphasise by mirroring Belton's remarks:

'Dolby's new film format required significant changes throughout the film sound recording/producing chain, and thus throughout the film industry.' [14]

The question here becomes who is Ray Dolby and how has he achieved this change?

The man behind the wheel: Ray Dolby

Although I do not wish to fall into the 'trap' of the Great Man Theory, there is no doubt that the company at the centre of this study, Dolby Laboratories, owes much to his founder. Many collaborators have played a key role over the years as in the famous case of Ioan Allen, the British engineer responsible for most of the Dolby Stereo program. Indeed, the term Dolby here mostly stands for the company rather than Ray Dolby. The actual name Dolby comes from its creator, American engineer and physicist Ray Dolby. Born and raised in the West Coast of America (Portland, Oregon), that is, the area that was to become the hotbed of film sound, Dolby joined multimedia giant Ampex when he was only fifteen. His time at Ampex was significant because it provided Dolby with an opportunity to witness the former's involvement with Todd-AO, the 70mm widescreen stereophonic process that enjoyed its greatest success in the 1950s and 1960s.[15] In particular, Ampex developed in 1954 the first magnetic theatre sound system, manufactured for Todd-AO and Cinemascope. Ampex manufactured the magnetic strip that the 4-track (Cinemascope) and 6-track sound channels (Todd-AO) were recorded on before being married to the 70mm filmstrip. Dolby never directly worked on film sound technology whilst with Ampex (he was part of the team that produced in 1956 the first 'practical' videotape recorder, the Ampex VRX1000 or Mark IV). However, he was clearly in the right place to learn about magnetic sound recording (hence stereophonic film sound) and the two famous problems

that plagued it: the cost of prints and reproductive equipment (magnetic sound prints could cost up to ten times that of conventional mono optical prints), and the limited life of the magnetic tracks (which deteriorated far more quickly than in the case of optical mono prints because of the friction with the 'reading' head). In this sense it is important to note that 3M, the company responsible for the development of the first production line of magnetic tape for sound recordings, was also behind Ampex's attempt at recording video as well as audio on magnetic tape. Bob Hern, an engineer with 3M, proposed as early as 1948 the idea of audio-visual recording on magnetic tape. Indeed, 3M manufactured the tape and Ampex provided the hardware for the first ever demonstration that took place at the 31st annual convention of the National Association of Radio & Television Broadcasters (NAB) on April 15th 1956 in Chicago. In short, Dolby had been at the epicentre of a historical and technological development by two leading companies in the field of sound recording. In light of these early experiences, Ray Dolby's decision to turn his attention to finding a solution to the problems of noise reduction and limited frequency range when he created Dolby Laboratories in the mid-1960s is hardly surprising. Dolby identified the music industry as the best-suited field of application for his new operations. This choice owes most of its appeal to the developments that had taken place in the music market over the sixties. The development in Europe (by Dutch giant Philips) of a closed-tape recorder in the late sixties Dolby had impressed Dolby. Background hiss and frequency range had proven, once again, its main limitations, and Dolby knew he had the answer to both. In particular, Dolby Labs produced two noise reduction systems. One, Dolby 'A' was destined for professional products only, the other, Dolby 'B' for consumer products (see below for further discussion of the technology involved and its implications). The success of the Dolby Noise Reduction System was apparent almost immediately: since the first appearance of the Dolby 'B' noise reduction system on a tape player built by Nakamigi in Japan the name Dolby and noise reduction have become inseparable.[16]

Ray Dolby had shown a remarkable sense of timing in investing in the music industry at a time of profound change. Dolby Laboratories had seen the light of day in England (although the company was registered as an American interest) in 1965. That is to say, Ray Dolby's company was formed in the middle of one of the most revolutionary decades as far as sound recording, reproduction, and consumption are concerned. During the post-war

period, cinema sound had maintained a substantial lead in the field of sound reproduction with respect to other forms of entertainment. In the case of home record players, for example, the technology was still rather rudimentary: speakers had a very limited frequency range, as well as substantial background hiss. Although most cinemas were suffering from similar problems, by the mid-1950s it was possible for cinemagoers, especially those living in large cities, to experience stereophonic sound coupled with widescreen formats. Twentieth Century Fox's insistence on producing 4-track magnetic soundtracks for all its Cinemascope releases (a policy directly enforced by Fox's head Spyros Skouras) meant that a high quality sound reproduction system was available to the general public, despite the relatively limited availability of both prints and cinemas able to reproduce stereophonic sound. Indeed, together with widescreen processes, the availability of stereophonic sound was a key 'weapon' in the war Hollywood was waging against the new threat that television posed.[17]

The introduction of new wide screen formats, such as Todd-AO and similar 70mm systems (most of which employed 6-track magnetic stereo) meant that an increasing number of films were available to the public that could rely on good sound quality and stereophony (the meaning of the word 'stereo' will be discussed later). However, as it was in the case of their main predecessor, Cinerama, the cost of both prints and cinema installation drastically limited the overall impact on audiences and filmmakers, as we shall shortly see in detail. Thus, when Dolby entered the music scene, cinema sound was showing clear signs of regress (the number of stereophonic films and stereo-equipped cinemas peaked in the mid-fifties and eroded quickly after that until a virtually complete regression to mono sound in the late sixties and early seventies).[18] At the same time, the music industry was enjoying a period of unprecedented change through the explosion of rock and roll music and the development of home hi-fi systems. In a reversal of what had been true in the fifties and early sixties, the quality of sound reproduction in the home now easily surpassed, in principle at least, the average movie theatre in terms of sound quality as the latter were still stuck with desperately antiquated technology. Moreover, the popularity of large live rock concerts tipped the balance of sound quality firmly in favour of other forms of entertainment (and other entertainment 'spaces') other than the cinema. It is therefore not surprising that many innovators working in or around the field of sound recording and

reproduction began to explore these new possibilities. Indeed, Dolby was not the only one to have spotted the potential. Two giants of entertainment such as Kodak and RCA were also working at the same time on a stereophonic sound system for movies that would retain the quality of aforementioned magnetic systems but at a substantially lower cost to both studios and exhibitors. In this sense, Dolby was in an almost ideal position to make the move from music to cinema sound. He had successfully developed and implemented a solution to one of the longest standing problems plaguing sound recording and reproduction. He had knowledge of the music industry. He was an American who had lived in England (where he completed a PhD in Physics at the University of Cambridge) and he had been exposed to some of the most influential cultural movements that were shaping new generation of consumers. In many ways, he was the proverbial man in the right place at the right time. [19]

Dolby Labs set out in the late 1960s to develop their 'Dolby A' system for cinema application.[20] Building on the 'Dolby A' professional system for the music industry, Dolby Labs began to develop a similar system for movies. It would work on the same principle as 'Dolby A', namely to reduce background hiss, hence allowing soundtracks to extend their frequency range without incurring into excessive amount of hiss and distortion. This was a particularly acute problem in movies: although post-mixing technology had improved substantially over the years, post-mixing of multiple tracks without any major loss of quality still remained the exclusive domain of magnetic soundtracks. This was a time when movie theatres were stuck in a time warp. They either continued to employ the same monophonic equipment that had been installed decades earlier, or were unable to make use of their magnetic stereo equipment simply because there were no magnetic stereo prints available any longer.

In this climate, the application of 'Dolby A' noise reduction to movies was a logical step forward. Crudely, the building blocks of Dolby's noise reduction technology are the same in all of its many applications. The most important aspect is the choice to limit background noise before this is recorded with whatever other material is being recorded on whatever medium. In other words, instead of attempting to remove noise once it has been recorded (a much more complex and compromising process) Dolby noise reduction technology acts on it at the source. It does so by boosting the 'quieter' parts during recording in order to limit

the amount of hiss that would inevitably be recorded with them.[21] Later, during reproduction, it does exactly the opposite by lowering the quieter moments to their 'natural' level, in this manner also reducing the amount of audible background hiss. As background noise is inherent to the instrumentation, not the recording, the lowering of the levels of recorded sound can be an effective way of reducing background hiss.[22] The addition of an equaliser specifically designed to enhance the response of existing theatre speakers would complement the aforementioned noise reduction process when applied to movies, and the two formed Dolby's new 'sound system'.

The birth of an era: the origins of the Dolby Stereo system

As early as 1970 Dolby had proven that the 'Dolby A' noise reduction system, soon to become known as Dolby System in its cinema incarnation, could be successfully applied to movie optical soundtracks with excellent results. Dolby, like all technological innovators before him, knew that developing the right wares and proving that they work is only the first step. He now needed to lobby with the film industry to convince them of the advantages of his new system. His strategy was clear: taking a leaf from his experience in the music industry, where 'Dolby B' encoded cassette retained an acceptable sound quality even when played back in non-Dolby players, Dolby argued with the industry that only one Dolby-encoded print would be necessary for general release. In other words, he quashed fears that adopting his system would mean having to produce two prints, one for Dolby-equipped theatres and one for those without, hence incurring in precisely the kind of additional costs that had ultimately wrecked previous sound innovations. At this stage, Dolby was aware that he needed to find a vehicle to showcase his wares to the studios. The opportunity came in 1971 when he linked up with another American living in England, Stanley Kubrick. A director with a strong reputation for technical prowess and a keen interest in movie technology, Kubrick agreed to employ Dolby's new system during the recording and mixing stages of the filming of A Clockwork Orange. Although the actual term Dolby System was not used until the first movie that employed Dolby System during reproduction, Callan, the wheels had been set in motion.

Success for Dolby's film sound system proved to be more elusive than expected. The 'simple' improvement of sound quality on mono prints that Dolby had achieved impressed filmmakers and studio executives but did little in terms of convincing exhibitors that the

improvement was worth the expense required to upgrade film theatres (as well as studio recording and mixing technology). In many ways, Dolby had hit the same brick wall that previous innovators had met since the coming of sound: modest, though technologically significant, improvements in sound technology could not shift industry-wide attitudes. Ironically, it was this initial failure (one that Dolby's literature refers to as 'a very slow start') that proved to be the catalyst for the revolutionary contribution that Dolby Labs were to make to the cinema industry. Dolby decided that in order to achieve real change he had to aim bigger and higher. If studios, exhibitors and the general public were to be won over, it would be necessary to provide them with nothing less than the missing link in film sound, something that had eluded all of his predecessors: an economically viable, universally available optical stereophonic system married to conventional 35mm prints. The time of Dolby Stereo had finally arrived, although the task was daunting, encompassing virtually all aspects of the industry, from cost to software availability, and from manufacturing to marketing.

The key problem Dolby needed to address from a strictly technological perspective was how to accommodate more than two channels onto an optical track running parallel to the image frame on a conventional 35mm print. The problem was one of space: only two optical analog tracks could physically fit next to the image track. Hence the question: how is it possible to turn two channels (i.e. two optical tracks) into four channels? Dolby Stereo works on the principle of four channels: front left, front right, front centre and rear surround channel. The solution Dolby found to the '4 into 2' question was to matrix two channels (front centre and surround) from the left and right channels. In other words, two discrete channels (each occupying a distinct optical sound track) carried the left and right channel information as well as the centre and surround channels, the latter being 'matrixed' (i.e. created) by the Dolby processor whose job was to extract the two extra channels through electronics. This way two optical sound tracks lying next to the image track on a conventional 35mm filmstrip could carry sound information for four channels, hence resolving the key problem of having all the necessary information on an optical 35mm print. Dolby encoded prints could also be shown in cinemas without stereo, hence ensuring another cardinal principle of the Dolby strategy, namely that of being a universal system whereby 'one print fits all'. The choice of four channels, a legacy of the 4-track magnetic

soundtracks employed in Cinemascope releases (i.e. the only successful 35mm stereo format, the others using a 70mm strip), responded also to the need of ensuring compatibility between existing stereo equipment and Dolby's new system. Dolby crucially understood that in order to be successful his system would have to be compatible with existing sound installations, and thus be relatively easy to install. This translated into cheaper installation than any other previous stereo sound systems: the cost of Dolby conversions, less than $5,000, was as Michael Arick emphasises: 'easily within the reach of most first-run houses'.[23] The financial feasibility of Dolby Stereo is particularly evident if one considers that the price tag for Cinemascope 4-track magnetic sound in the 1950s was around $25,000, and that Disney's Fantasound in the 1940s cost over $45,000 to install. Dolby's choice was based on a choice of strategy informed more by market necessities than technological and aesthetic considerations. It is important to note this because, in many ways, we have come to accept that the meaning of the word stereo in the cinema is what Dolby Stereo (in all its many incarnations) 'says' it is. Interestingly, the question of what stereo should sound like had also been at the forefront of debates when stereophonic sound was introduced in the 1950s. During a presentation by John Hilliard, one of the key figures in the development of cinema sound engineering, about Altec Lansing's speakers and amplifiers for magnetic stereo reproduction in cinemas, a delegate from the Westrex Corporation (Dr. J.G. Frayne) asked the speaker: 'If he would like to define what is meant by true stereophonic sound.'[24] Mr Hilliard's reply testifies to the vagueness of the term 'stereo' in the cinema: 'I do not have any simple answer to the question. I think we will all have to struggle through this thing until we finally find an ultimate position which gives good stereophonic reproduction'.[25] However, he also stated in the same presentation that it was Altec Lansing's view that widescreen processes required 'a minimum of three-channel stereo sound'.[26] Dolby Stereo is also based on this principle, which I would like to call the 'one-wall' narrative principle. It follows an established loudspeaker placement pattern, whereby images on screen have three sound sources/channels behind the screen (left, right and centre) with a fourth channel, (surround) employing an array of speakers emanating non-directional sound from around the auditorium (see Fig. 2).

This design follows the principle that audiences should be offered directional sound (i.e. sound whose direction could easily be identifiable) only from one wall of the auditorium,

namely that where the screen is placed. The notion at the core of this thinking is that sound emanating from somewhere other than an onscreen source would cause the audience to get distracted in an attempt to locate the origin of that sound, hence disrupting the narrative flow. Thus, the implied suggestion is that the surround channel be employed only in a diffuse, non-directional manner so as not to 'disturb' the narrative.[27] Despite implicitly suggesting that primary information ought to originate from the screen, the one-wall principle did away with the need to deal with complicated alternatives, like additional surround channels, that would have meant a serious rethink of the meaning of stereo in the cinema.

Dolby was now in a position to go back to the industry with his truly remarkable breakthrough and hope for a better response than it had been in the case of Dolby System noise reduction. However, as this extract from Dolby's own literature clearly emphasises, once again technology was not going to be enough to win the day:

> 'Whereas Dolby noise reduction for professional tape recording was a relatively straightforward add-on and could be marketed as such, Dolby's new film format required significant changes throughout the film sound record/reproduce chain, and thus throughout the film industry. Dolby's ultimate goal seemed simple enough: to profit from the manufacture and sales of a new range of theatre sound-processing equipment. However, for that to happen, film producers had to be educated in the benefits of the new format. Sound mixers had to be brought on stream with new techniques. Distributors had to be reassured that stereo release prints were compatible with mono theatres. Theatre equipment suppliers had to be educated in system requirements and installation procedures. In addition, theatre owners had to be convinced that investing in the new equipment would pay off at the box office. As a result, it was necessary to implement and staff a film sound program to reach out to all these disparate segments of the film industry.'[28]

The winning formula: Dolby's licensing and marketing policy

Although the developments outlined above might help explain how Dolby identified what 'kind' of technology was most likely to succeed, it still does not explain entirely why he was so successful at it, and how it has managed to remain the most widely used cinema

sound technology over the past thirty years. Perhaps the strongest clue in this sense is to be found in the company's approach to licensing and marketing.[29]

Dolby's licensing strategy is organised around some cardinal points from which the company has never deviated. Developed very early on, suggesting careful planning and acute business sense, Dolby's licensing program revolves around what could be summarised in four key points: I) relationship with manufacturers, II) royalty structure, III) quality control, and VI) penetration in the Far East markets.

I) Relationship with manufacturers.

Dolby's early decision to manufacture exclusively professional products signalled the intention to establish a very active licensing relationship with existing manufacturers of consumer products. Although cautious at first (Dolby exclusively licensed the use of 'Dolby B' for open reel recorders to one company alone, KLH between 1968 and 1970), Dolby quickly moved on to a more 'aggressive' stance establishing relationships with a variety of players, and the choice of not relying solely on the quality of their product proved to be an inspired choice. The cautionary tale of Sony's Betamax disaster, which saw Sony lose out to its competitors in the burgeoning VCR market because it stubbornly refused to license widely in the mistaken belief that technical quality only would win the day, further testifies to Dolby's savvy attitude. Most importantly, the policy adopted of not competing with licensees of Dolby technologies, unlike the majority of cases in the consumer electronics market, provided Dolby with an aura of commercial and intellectual independence.[30] Over the years, this feature has proven very useful in retaining its market leader position. Indeed, Dolby capitalises on this aspect in the company's publicity material when it emphasises that: 'Dolby Laboratories is an independent company with no special ties to any particular film studio. Sound is our only business, as it has been for more than 30 years'.[31]

II) Royalty structure.

If the kind of relationship with manufacturers that Dolby pursued was to withstand the test of time, it needed cementing with similarly 'friendly' financial arrangements. Dolby achieved this by introducing a royalty structure that has been kept at remarkably affordable levels over the years. This aspect of Dolby's licensing program clearly aims at ensuring that manufacturers continue using Dolby technologies rather than looking elsewhere for cheaper

alternatives. Once again, refusing to rely exclusively on the quality of his products, Dolby let the money do the talking. Licensing fees for most applications employing Dolby Digital or Pro Logic surround sound systems are around $10,000 and royalties are also considerably cheaper than one might otherwise expect, making it a little easier to understand how Dolby has been successful at maintaining its position at the top of film sound ladder.

III) Quality control.

However important financial and business considerations might be, Dolby's success has also been carefully protected by strict quality controls. These were created to ensure that quality standards were maintained in the face of proliferation of products incorporating Dolby technology manufactured across the globe by hundreds of different companies. This is a particularly important aspect, because Dolby's choice not to manufacture consumer products inevitably complicates the issue of quality control. Any manufacturer of software or hardware wishing to incorporate Dolby technology in their product needs to undergo a specific process of planning and testing. At any point during this process, Dolby laboratories have the right to stop the process on grounds of quality. Indeed, Dolby licenses are only issued if these strict quality controls are met satisfactorily (see Dolby Quality Assessment diagram in Appendix). It is important to note that such quality controls refer in equal measure to financial stability and technical ability.

IV) Penetration of Far East markets.

During his time at Ampex, Dolby must have realised the importance of having an early foothold in the Far East markets, a key insight that was to shape his future choices. Ampex had established strong ties with the Far East in an illuminated attempt at counteracting the rather common practice in Japan of 'copying' patented inventions and then flooding the market where that product originally appeared with cheaper, similar products in an attempt to push the competition out of the market. The creation of licensing offices in Japan entitled Ampex (a US firm) to greater 'protection' from such practice than if they had solely operated from within the US. It is therefore no surprise that Dolby opened licensing liaison offices in the Far East very early on in the life of his company. Today Dolby has offices in Tokyo, Shanghai and Beijing.[32]

What is the overall picture that comes out of these considerations? Dolby's process of identifying the most lucrative market for his applications, eventually setting his sights on cinema sound, helped to shape the kind of technology Dolby Labs would eventually develop as well as the kind of market dynamics they would have to deal with. Dolby's financial and marketing strategy was achieved through the creation of a continuing relationship with customers rather than in a one-off purchase of Dolby products and licenses. The relatively modest royalty rate still in vigour today remains the most obvious example of this strategy.

Awaiting a champion: the need for 'the right film'

By the mid-1970s, everything was in place, from technology to manufacturing to ensure Dolby's success. However, despite having solved all technological obstacles and having overcome initial resistance on the part of exhibitors, the rate of adoption of Dolby Stereo system remained frustratingly slow. Only a handful of theatres worldwide had converted to the new system. The problem was a common one to new technological standards: in order for the hardware to be successful, it is crucial to have the software that can be played on it. Although there had been a few titles released in Dolby Stereo, such as Tommy, and A Star is Born, Dolby was still in search of the perfect vehicle for his wares. Logically perhaps, studios had shown an interest in Dolby's technology as a way to enhance the impact of musicals. This policy clearly echoed the situation of the 1920s, when it was musicals such as Don Juan and The Jazz Singer that had sported sound technology at first. However, generic aural conventions of musicals, with their emphasis on front channels for the majority of aural material and their use of rear channels mostly for music only, limited severely the overall impression that surround sound could have on audiences. In many ways, the sound dynamics of musicals were too similar to those of the records that audiences could play in their homes. In short, Dolby needed a 'special' kind of movie, a champion for its wares, which differed substantially from the kind of movies that had used its technology until then. More importantly perhaps, Dolby needed a new kind of filmmakers, someone who understood technology and its potential and was not afraid of using it. The time was ripe for one of the most momentous cooperation in the history of cinema to happen. Enter George Lucas.

A match made in heaven: Star Wars and Dolby

By the mid-1970s, it became legitimate to wonder whether the creative opportunities that Dolby's developments had engendered would be matched by a change of similar magnitude in aesthetic terms. George Lucas's 1977 Twentieth-Century Fox space epic Star Wars was the film that, more than any other, answered Dolby's 'challenge'.[33] The film's soundtrack went further into exploring the potential of the newly available technology than any other film that had preceded it. Crucially in terms of the development of the Dolby era, the film represented the most successful example of the collaboration between a new generation of sound technicians and sound-conscious directors whose formation was deeply rooted in the 1960s rock (and aural) revolution. Indeed, Lucas has often emphasised the fact that the average age of filmmakers involved in the production of Star Wars was mid-twenties. The result of that collaboration was nothing less than a breakthrough in both sound production and exhibition. From sound architecture to spatial awareness, from sound texture to detail, from mixing to editing, from voice characterization to physical sound, the film introduced a concept of sound that was finally willing to abandon its traditional shyness and move forward to claim a the primary role.

Although the success of Star Wars is not directly imputable to one single element, a combination of economic and institutional factors can help us understand why it can be regarded as the real turning point in the history of contemporary sound, hence the Dolby era. The technological developments I described earlier took place at a time when filmmaking practices were undergoing significant changes in Hollywood. Lucas himself was in the mould of a new emerging figure of filmmaker, one that, though floating adrift of Hollywood in a geographical and political sense, still kept those shores firmly in sight. As Steve Neale has observed, this somewhat paradoxical figure was in fact 'dedicated to the aesthetics and values of the studio based, classical Hollywood movie, dedicated to narrative, action, spectacle, identification and genre'.[34] The aim of the so-called movie brats generation of filmmakers was not to replace existing Hollywood production patterns but to explore their boundaries, often in the light of recent technological developments. Sound was one of those boundaries. In the case at hand, Lucas and his producer Gary Kurtz demonstrated this new attitude by approaching film sound not at a post-production stage, as

it was customary (and to a certain extent continues to be today), but as an integral part of the creative process from the very beginning.

Dolby, Lucas and Kurtz begun discussions about the film's philosophy towards sound as early as 1975. This move signalled the filmmakers' intention to consider sound both in terms of production and exhibition, the latter in particular remaining the weak link in the sound chain. Dolby quickly realised the potential that the specific film genre, science fiction, offered, especially in view of the fact that previous efforts had mainly concentrated on musicals. As vice-president of Dolby Laboratories (and one of the key figures in the development of the Dolby Stereo program), Ioan Allen comments: 'From Dolby's point of view the subject matter would allow them to show their wares in a way more demonstrative than was common'.[35] This 'synergy' allowed Lucas to employ confidently both 35 mm and 70 mm prints for the new technology would be available in both formats (70 mm prints were to employ a new type of encoding designed to emphasize sub-bass response). Dolby engineers also visited the sets of Star Wars before shooting began in an attempt to optimise results in the production stage (once again, both of these decisions were unprecedented). Lucas understood that, despite the importance of the technical and organisational relationship with Dolby's team, Star Wars needed not just a new sound system, but a whole new 'world' of sound. In an inspired and crucial move for the development of today's sound aesthetics, Lucas hired Ben Burtt, the man who was to become the key figure in the creation of the new sound universe that both Dolby and Lucas hoped for and relied on for the success of the movie. He did so virtually at the same time that he was negotiating with Dolby, a further indication of the overall 'plan of action' Lucas and his collaborators had devised. As Burtt himself remembers: 'They (Lucas and Kurtz) just gave me a Nagra recorder and I worked out of my apartment near U.S.C. for a year, just going out and collecting sound that might be useful'.[36] Because of the unprecedented amount of time Burtt was allowed in 'designing' the sound for the movie (he is perhaps the first sound maker to have been allowed that level of independence and freedom) Burtt created a new range of recorded sounds rather than simply employing existing sound libraries, as we shall shortly see, that played a vital role in the success of the movie.[37] Finally, and perhaps most importantly, the key factor in the relationship between Lucas and Dolby was their belief that here was a unique opportunity to change sound exhibition radically. There is clear

evidence of this in their decisions during both production and distribution. In the former case, all stages of sound recording (including Foley, effects, dailies, and ADR) were Dolby encoded, and sound recordists were asked not to boost high frequencies (a practice usually employed to improve dialogue intelligibility but at the expense of dynamic range) to improve distortion levels during play back in Dolby equipped theatres that employed wider dynamic ranges than standard theatres. As for distribution, Star Wars was to be released in the Dolby Stereo format, either in its 35mm version or 70mm version, in over fifty percent of theatres during its first release wave. That is to say, Lucas intended audiences to hear what had been so carefully planned and orchestrated during production so that 'For the first time ever, the sound heard in the theatre should to all intents be identical to that heard by the director during the mix'.[38] These innovative practices and attitudes were light-years from the classic Hollywood approach to sound, despite the film's adherence to classical Hollywood narrative conventions. As Neale has pointed out, speaking of Raiders of the Lost Ark, for which Ben Burtt won another Academy Award: 'It uses an idea (the signs) of classical Hollywood in order to promote, integrate and display modern effects, techniques and production values in order to attract a modern audience'.[39] In this sense, Lucas's break with studio practices, though only partial, is significant, particularly because it had a positive effect in creating fertile ground for other filmmakers to depart from institutionalised practices when creating sound tracks, especially by employing new technologies.[40]

The rise of the 'New Hollywood'

Hollywood as an industry was also being reshaped. New technologies apart from sound, such as cable television, satellites, pay TV, and videos had provided Hollywood and other major entertainment industries with the possibility of forming new alliances, thus opening up new avenues for revenue. In sound terms, Star Wars contributed to the change mainly by boosting the diffusion of the Dolby Sound System. Indeed, Dolby's sales, already significant in the music industry, where its noise reduction system was rapidly becoming a standard, were to skyrocket from hereon to the point where Dolby Stereo became a standard in the film industry. A further measure of the formidable power of the alliance between the film industry and Dolby can be found in its institutionalisation by the

Academy of Motion Picture Arts and Sciences: since Star Wars in 1977, all Academy Award winners in the two sound categories have been Dolby encoded sound tracks.
The increase in film production costs represented a further significant change at this time.[41] These were significantly on the rise (the average cost increased from $2 million to $10 million during the 1970s), thus delineating a clear need to maximize profit and attract new audiences. Most crucial, in this sense, was the realisation by Lucas and his collaborators that the possibility of breaking with the low-fidelity monophonic sound tracks that had become the industry's standard during the late 1960s and early 1970s could have an impact not only on production techniques but also on audiences. The affordable Dolby stereophonic system, available to the vast majority of theatres through a relatively simple and economical installation, resuscitated the meaning of the word stereo for cinema audiences by dissociating it from very expensive, road show 70 mm prints, mostly affordable only by large film theatres in major city centres. Dolby and Lucas were now in a position to target effectively the hi-fi generation emerging from the late sixties and early seventies and bank on and consolidate Hollywood's young, under-30 audience that had replaced the formerly dominant family audience.

A sound architecture of change: the new world of sound in Star Wars

'The awesome yellow planet of Tatooine emerges from a total eclipse, her two moons glowing against the darkness. A tiny silver spacecraft, a Rebel Blockade Runner firing lasers from the back of the ship, races through space. It is pursued by a giant Imperial Stardestroyer. Hundreds of deadly laser bolts streak from the Imperial Stardestroyer, causing the main solar fin of the Rebel craft to disintegrate.'[42]

The few lines above describe the opening sequence of Star Wars. The information given is overwhelmingly visual. Indeed, no word is directly related to sound: There is no 'deafening sound,' no 'roaring engines,' or 'squeaky metal noises.' This should not surprise us too much: in a book on screenwriting, Robert Berman identifies screenplay terminology as follows:

> 'Fade in, fade out, angle on, another angle on, wide angle, close on, insert of, back to scene, point-of-view, reverse shot, dissolve to, cut to, tight angle on, pull back to,

reveal, off camera, off screen, voice over, slow pan to, in the foreground, in the background, reaction.'[43]

Thus, an early consideration, as obvious as it is revealing, is that sound people and sound literate directors often have little or no direct indication as to what the film should 'sound like'. The process of visualisation, intended here as the translation of a screenplay's stage instructions and dialogue into images, is undoubtedly aided, if not guided, in the screenplay's passage quoted above. However, writers do not directly address the equivalent process for sound, which I will call 'audilisation'. As the opening titles of Star Wars disappear into the background at the top of the screen, the music score does not simply fade out to allow the effects in; it is, rather literally, blasted away by an explosion (the only sound clearly indicated in the screenplay): desperately fleeing the Imperial destroyer, the rebel ship squeaks, alarm sirens fill the air, and violins are drowned in a flood of laser bolts. The music is dwarfed by the power and exceptional quality of the effects. It is forced to relinquish some of its traditional primacy and become 'simply' one of the elements of a soundtrack. In terms of sound architecture, the spatial revolution is also defined immediately: one hears starships flying overhead; ships move from right to left; and blasts are heard around the auditorium. Star Wars explores a universe of sound where there is not only a loud and soft, but also an up and below, a right and left, a behind and in front, and all this in little more than four minutes. This awareness of issues such as the three-dimensional nature of sound and its directionality goes beyond a mere understanding of technical qualities: it demonstrates a confidence in the creative use of sound not witnessed before. This confident approach to sound is one of the key features of sound aesthetics in the Dolby era, and the filmmakers working on Star Wars were the first to display it fully. Unlike previous sound innovations, Dolby and Lucas sensed that this was no 'freak' experiment. This was not a film whose soundtrack employed technology unavailable to other filmmakers; nor was the technology going to be available only to a handful of first-run, major theatres. It was quite clear that Dolby's compatibility with existing reproduction apparatuses would give it a decisive head start in the competitive arena it had just entered. In creative terms, Lucas's confidence is constantly emphasized through a series of choices that can be summarized in a few brief considerations. The first point, as we have already seen, is that both music and dialogue are challenged by sound effects from the very first

moments of the film, demonstrating the filmmakers' willingness to explore the full potential of a sound track by questioning the well-established hierarchy that gives preference to dialogue and music over effects and silence. The possibility of employing a wider frequency range than ever before for optical tracks, thanks to Dolby's noise reduction system, aided this decision. Following this first departure from convention, a starship is distinctly heard flying overhead (itself a novelty), while another one, of a different sound signature, follows immediately afterward. This constituted too clear a departure from conventions not to be noticed by critics. Although in a symptomatically inadequate fashion, Jane Morgan's review of Star Wars states, 'Heraldic music accompanies the roar of a spaceship zooming onto the screen pursued by another dwarfing the first, frightening and thrilling'.[44] Indeed, Lucas's use of the surround channel, as demonstrated in the example above, is most certainly the first noticeable step toward today's aesthetics of surround, where surround sound has become a 'new frontier' for filmmakers willing to explore its potential rather than simply a means to provide music and some ambiance effects.[45]
The deep and rumbling sound that the huge Imperial craft produces, achieved through an active use of sub-frequencies, is also a sign of the understanding that audiences can be 'reached' by sound and made to participate not only visually or orally but also physically, in a literal sense. Although this 'physical sound' was hardly news to Hollywood, Lucas and his collaborators show once again a degree of awareness uncommon to filmmakers, as exemplified in the opening sequence by the (literally) earth-rattling Imperial ship. The film also redefines the issue of 'designed sounds' (for a more in-depth discussion of this issue see Chapter 8: Tackling Sound: Suggestions for Sound Analysis) through an amazing array of various sound blasts and laser bolts, the sounds of which are significantly different from one another. Speaking on Burtt's achievements in Raiders of the Lost Ark, Marc Mancini identifies the impact that Burtt's work was to have in the years to come by emphasizing that 'His insistence on completely original or refurbished classic sounds counters the numbness we all have to recordings heard a thousand times, hence, his new sound creations can become 'fresh events'.[46] Burtt's work has left a permanent legacy, clearly visible in many later films, from the submarine pings in The Hunt for Red October to the amazing array of different sounds of rain in Forrest Gump (see more on this in the case study on Forrest Gump in Chapter 8).

Dolby's surround technology meant that Lucas could also explore what had become an almost forgotten creative possibility: directionality. The choice of having the rebel craft sound as if it were flying from screen right to front left to rear left emphasizes the filmmakers' awareness that it was now possible to employ multi-channel technology 'on the drawing board,' knowing that it would not be confined to a handful of theatres. In Star Wars sound expands the film narrative into off screen space, not only to the sides of the screen, but also toward the auditorium and the audience. Audiences are immersed in a sound universe they are not accustomed to, and their established mode of listening to a movie is challenged in unexpected ways. Indeed, in the years that followed Star Wars this trend consolidated: from sound tied to the screen image to sound free to 'fly' across the auditorium. As Michel Chion humorously emphasizes, this multifaceted approach to sound has also had important consequences on the relationship between sound and the image. In his view, today: 'sound operates on two, three, four layers of equal presence, and the image is nothing but another layer, not anymore the principal one. In this vast sonic aquarium, the image comes floating, a poor small fish'.[47]

Dolby consolidates and expands

The huge box office success of Close Encounters of the Third Kind immediately followed that of Star Wars in 1977. That is to say, by the late seventies the name Dolby became associated not just with good sound, but also with huge popular appeal. Despite the lack of audience surveys linking directly sound and box-office appeal, an increasingly larger number of filmmakers and studios adopted the new system.[48] In particular, Dolby's visibility was greatly aided by the decision of advertising the now famous 'double-D' logo on film posters worldwide with the words 'In Selected Theaters' emphasising the presence of Dolby as a mark of distinction (see Appendix 3 – The Look of Dolby for more). More importantly, filmmakers were beginning to single out sound as an element of distinction. Steven Spielberg, the director of Close Encounters of the Third Kind, remarked after the release of the film that: 'It is of paramount importance to realise the acoustic dimension of movies. To experience Close Encounters of the Third Kind in 70mm 6-track stereo is totally different from seeing it in mono'.[49] In this sense, Dolby's contribution to the development of new sound aesthetics went beyond simple technological prowess. The

creation of the figure of the 'Dolby Consultant', one of the many new figures that have characterised the Dolby era (see more in Section 2), was intended as a step towards ensuring that filmmakers understood the technology and how to use it. However, since Dolby consultants witnessed first-hand the development of the new aesthetics of sound that the technology they supported had made possible, they became a sort of 'conduit' for ideas amongst different filmmakers. As Ioan Allen, one of the fathers of the Dolby Stereo programme, emphasises: 'We were able to bring from movie A to movie B some new tricks and techniques they (sound people) had not thought of before'.[50] In other words, the advantage of employing Dolby technology for filmmakers did not stop at the level of wares: the exchange of ideas and practice amongst filmmakers highlighted the blurring of the traditional distinction between technicians and artists, at least as far as sound people were concerned (see more on this point in Section 2).

This new found popularity of Dolby amongst both filmmakers and the public was mirrored by the film industry's official recognition of the importance of Dolby's development: since Star Wars won the Oscar for best sound in 1978, all Sound Oscar winning films have been Dolby-encoded.[51] The result of such exposure was an immediate increase in the number of exhibitors willing to upgrade their theatres to Dolby standards. Star Wars opened in 46 Dolby-equipped theatres in the US. Only two years later, Superman opened in over 200 theatres with Dolby Stereo sound and by 1981, over 2,000 theatres in the US were equipped with the new technology (see Appendixes – Dolby Chronology for a full timeline of developments). When the Academy finally adopted Dolby's 'X Curve' as a standard for sound reproduction in cinemas to replace the old 'Academy Curve', it became clear that Dolby was no 'passing craze' (see Appendix 4 – Academy Curve and X Curve Comparison).[52]

Safe in the knowledge that a foothold had been firmly established, Dolby Labs went back to the drawing board. Despite the evident success of Dolby Stereo, filmmakers were demanding greater dynamic range in order to explore fully the potential that Dolby had unlocked. Dolby Labs had already tested a new system, Dolby SR, which had been developed for the music industry. Once again, the move was to apply this tried and tested technology to movies. In the summer of 1987 two films, Innerspace and Robocop, employed the new system. The improvement was drastic (increasing performance

especially in terms of dynamic range), but despite initial success Dolby soon faced renewed demands by filmmakers for greater range and flexibility. The first wailing of digital technology had grown loud enough by this stage to be heard. In particular, Kodak had worked on a new system, CDS (Cinema Digital Sound) to provide digital sound capability to conventional 35mm prints, and Dick Tracy and Terminator 2 became the first films to use CDS and thus optical digital sound. In so doing, Kodak had wrong-footed all competitors, including Dolby, but at a price. The digital track on Kodak's CDS replaced the analogue track, making digital prints incompatible with conventional analogue projectors and sound systems. Unsurprisingly, this choice effectively killed off CDS, but not before the potential that digital sound offered was sampled. Indeed, by this stage of the Dolby era sound had become a lucrative business and several companies and studios had joined the race for digital sound. By the early 1990s, Dolby and two major studio-owning companies, Sony and Matshushita, were developing their own digital sound systems.[53] The Dolby era had entered into the digital stage.

Digital Sound in the Dolby Era

The arrival of digital sound in the early 1990s was significant both in creative and institutional terms and ushered in the present stage of the Dolby era. Three systems, Dolby Digital, DTS (Digital Theatre Sound) and SDDS (Sony Dynamic Digital Sound) appeared almost simultaneously on the scene.[54] Dolby Digital premiered in 1992 with Batman Returns; the following year Sony introduced SDDS with Last Action Hero, and MCA introduced DTS with Jurassic Park. In technological terms, there are substantial differences between the three systems. Dolby has opted for an optical system that provides six discrete channels of sound: three front channels, two rear surround channels and one 'extra' channel for subwoofer frequencies. This configuration is also commonly known as a 5.1 system (see Fig. 2 Speakers set-up for Dolby Digital). MCA/Matshushita has chosen a similar channel distribution (3+2+1) but opted for a sound-on-disc format whereby the soundtrack is delivered by means of two CDs played back by a special reader that is kept in synch with the projector through an optical track on the filmstrip (see Fig. 5: Sound-on-Film for a diagram of how different formats use the filmstrip as a means of delivery). Sony's SDDS represents perhaps the greatest departure from convention in that it provides, in its full

version, eight discrete channels of sound. Its full configuration (5+2+1) resembles closely the golden era of magnetic sound with Cinerama and Todd-AO whilst retaining the ease of distribution and flexibility typical of an optical system. However, current mixing practices, whereby films are made available in all three formats to avoid compatibility problems, has virtually killed off the 8-channel version of SDDS that is now used much more frequently in its scaled-down 6-channel version (employing the traditional 3+2+1 configuration). Crucially, unlike CDS, all systems have a fail-safe mechanism whereby conventional optical analogue ensures continuity should the digital system fail in order to avoid any disruption in the presentation.[55] However, despite these technical differences, in creative terms the three systems offer similar options. Indeed, the 3+2+1 configuration has now virtually become a standard for digital presentation, just as it had been the case for optical analogue with the introduction of Dolby Stereo in the seventies. Put crudely, the advantages for filmmakers are comparable to those the film industry enjoyed with the introduction of digital recording/mixing and the CD: increased dynamic range, virtually no hiss, faultless copies of original, improved frequency response and stereophonic surround (the latter had been, until the advent of digital sound, the exclusive realm of 70mm 6-track magnetic sound only). The consequences for audiences are unquestionable, particularly in terms of exhibition. As we have seen, when Star Wars was first released in 1977 it was available in two different versions: a 35 mm (2+1+1 channels) optical copy and a 70 mm, 6-track magnetic copy. The latter, as we have seen, was largely available only to a few first-run theatres located in big cities. Consequently, only a comparatively small number of people had access to the subtleties of sound that had gone into the making of the film's sound track, despite the improvements that the Dolby Stereo system had brought in. Today, the availability of a single 35 mm, 6-channel digital copy in any one of the three main digital formats (Dolby Digital, DTS and SDDS) allows most spectators around the world to access the same sound quality that was once restricted to the few lucky ones who had access to the 70 mm copy.[56] In terms of commercial success, Dolby Digital and DTS have conquered the lion's share of the market, with SDDS lagging behind considerably (see Fig. 6 – Digital sound systems share of the market). This is probably explained by the fact that, once again, the market seems to have weighted cost, ease of use and maintenance, and software availability against technological prowess. Although SDDS (especially in its 8-channel

configuration) is a more sophisticated system, the other two systems are easier to install and maintain, and were initially available on a greater number of movies. Once studios begun moving to an all-digital policy (Fox, Paramount and Warner went all digital in 1995) the common practice of releasing a film in all three formats meant also an increase in the number of prints available in SDDS, but by this time market positions had been established and Sony's system, though better, remains the least successful of the three.[57]

What appears evident is that all major competitors in the race to digital have chosen to adhere to existing notions of what 'cinema stereo' ought to be. Both the configuration of speakers and channels, and the way film sound information is communicated to audiences have not changed and the 'one-wall narrative' principle continues to be applied by most filmmakers and underwritten by technology. There are, however, signs that we might be about to enter a new stage of the Dolby era. That the new Star Wars trilogy should introduce, yet again, the latest development by Dolby Labs, Dolby EX, is confirmation of both the unique relationship that Dolby and Lucas have enjoyed over thirty years, and the fundamental role that these two companies have had in shaping the Dolby era. More importantly, however, this is the first new development to have originated directly from the demands of sound people. Gary Rydstrom (see my interview with Rydstrom in Chapter 3) suggested the new development as a response to a frustration he had perceived in terms of creative possibilities. More specifically, Rydstrom argued that present systems did not allow enough flexibility to filmmakers who might want to make greater, and more innovative, use of surround. To this effect, Lucasfilm and Dolby Laboratories designed an improvement to the existing Dolby Digital that now allows a new configuration, known as 6.1, whereby there is an equal number of three front and three rear channels (see Fig. 4: Speakers set-up for Dolby Digital EX). It is too early to assess whether we are on the eve of reassessment of the relationship between screen sound and surround sound, but the indications are that this might be the case, especially in light of other developments that are still at the design stage. In particular, the move towards the digitalisation of movies has spurred some to design new systems that might deliver an increased number of channels, this time making use of 'top channels' (i.e. speakers mounted on cinema ceilings) as well as front and rear.[58]

Chapter 2: Critical receptions of sound

'It is difficult to imagine how the auditory dimension of cinema might at this late stage be reinstated.' (Rick Altman)[1]

Two bodies of knowledge

Sound has traditionally inhabited the peripheries of film scholarship, apart from two extremely busy periods. The first concentrated around issues concerning the coming of sound in the late 20s and 30s. The other, of which this study is an example, has mostly been the product of interest generated from the mid-seventies onwards during the Dolby era, a period Charles Schreger intelligently referred to as 'the second coming of sound'.[2] Although there has been some interesting critical writing on film sound in the forty years between those two key moments, the split exists nonetheless. These two main 'splinters' of sound literature are less independent of each other than the time difference might suggest. Indeed, the quantity and kind of critical attention that the coming of sound has received over the decades, from early theorists like Eisenstein, Kracauer, Arnheim, and Bazin to the present day has had a profound influence on the way film sound has been researched, written on and taught until now. This 'time rift' is not the only peculiarity that any survey of film sound scholarship will reveal. There would seem to be a further, revealing split in the way attention to sound in the cinema has been documented. On the one hand, substantial accounts of film sound from traditional academic sources, be it in historical or aesthetic terms, are relatively scarce. This is especially true when playing this scarcity of material against the wealth of books on cinema currently available (a quick survey with Amazon, the world's largest bookseller, reveals that there are over 9,000 volumes with the words cinema or film in the title in the entertainment section alone).[3] On the other hand, in recent years the rise of the Internet as a means to showcase views and 'histories' of film sound has proved a formidable force in liberating all those voices that had previously existed only in the underground of scholarly attention due to their 'lack' of proper academic credentials (see Web Sources in the Bibliography). It is possible to index summarily the typologies of literature these two main groupings have produced:

Traditional accounts of sound (mostly generated by academics writing within the context of research publications for universities and colleges):

i) Books and articles which have sound as their raison d'être. (e.g. Rick Altman's Sound Theory, Sound Practice, and John Belton and Elisabeth Weis's Film Sound: Theory and Practice)

ii) Books where sound figures prominently (e.g. Steve Neale's Sound, Color, Image

iii) Introductory books to film/cinema studies (e.g. Jill Nelmes's An Introduction to Film Studies, and Pamela Church Gibson and John Hill's Oxford Guide to Film Studies)

iv) Filmmaking manuals (the 'How to...' kind of book)

v) Histories of cinema

vi) Books on individual filmmakers

vii) Film reviews (both in journals such as Sight & Sound, and in newspapers and magazines)

Novel accounts of sound (mostly the product of sound enthusiasts from a variety of backgrounds including, significantly, a large number of practitioners):

i) Interviews with sound men and women (available through technical journals, such as Mix and American Cinematographer, on the Internet, and in other formats, such as the BBC Radio 4 recent four-part series on film sound, *Dancing Shadows*)

ii) Accounts of the use of sound in individual films (both on production and post-production, available in a variety of formats including the Internet, publicity material and, increasingly, on Laserdisc and DVD as extra material – see Toy Story or Titanic for good examples)

iii) Historical accounts of film (mostly on the Internet on dedicated sites to the history of sound and cinema reproduction, such as www.widescreenmuseum.com)

iv) Online articles on sound and sound journals (the best example of the former remains www.filmsound.org/ and www.ibuzz.com/cas/archive; a good example

of the latter is the Sound Journal run by the University of Kent at www.ukc.ac.uk/sdfva/sound-journal/index.html)

v) Reviews of movies for home video magazines (video/DVD/Laserdisc)

On the one hand, despite a recent 'flurry' of books and articles on sound, the effects of decades of marginalizing sound in academic contexts and discourses can still be deeply felt. The names involved (and invoked) are usually those of academics who have established their reputation in other, better appreciated areas of film studies and have shown an honest attention to sound, mostly as a 'secondary' phenomenon (Bordwell and Thompson's efforts in this sense are perhaps the most obvious example). The exceptions, though noticeable (Altman and Chion) have often had to paddle upstream against the seemingly unstoppable current of thought that has championed the image as the true nature of cinema. Altman's heartfelt quote I mentioned at the beginning of this chapter is, in this sense, rather evocative. On the other hand, the sheer amount of writings on and around film sound that has appeared over the Internet and in 'technical' magazines is quite overwhelming. From countless accounts of aesthetic and technological contribution of individual filmmakers to a staggering drive for historical accounts of film sound in all its facets, this enthusiastic, at times crusade-like attitude of all those involved has developed a remarkable resource for scholars of sound and can now count on a steady readership.[4] Indeed, the rise of this 'novel' literature of sound is a further qualifying feature of the Dolby era for it highlights the political drive that some of Hollywood's leading designers have shown to leave the underbelly of film appreciation and establish themselves as 'artists' worthy of scholarly attention. Clearly, to attempt even a superficial account of all literature on sound would be as unfeasible and unwise a project as a similar enterprise on the image would be. I have therefore chosen to focus on some key aspects that emerge from existing sound scholarship both in relation to the way sound has been written about per se, and in terms of the 'place' that it has been assigned within film theory. In this sense, the most revealing place from which to begin is the influence that literature written nearly seventy years ago still plays on film studies.

The sins of the fathers: the place of sound in film studies

Writing a foreword to the second edition of his book Film as Art, Rudolf Arnheim unequivocally states that: 'Speech, wisely subordinated, supplements, explains and deepens the image; but the image continues to rule the screen, and to explore its properties remains a topical task'.[5] This is a reiteration of what he had written thirty years earlier, when he stated that: 'No one who went unprejudiced to watch a silent film missed the noises which would have been heard if the same events had taken in real life'.[6] Arnheim's distrust of sound comes from his difficulty in accepting that film as an audio-visual art form can function at all. He suggests that sound movies (he actually uses the expression 'talking' movies as he is mostly concerned with speech) give him a sense of uneasiness: 'It is a feeling that something is not right there: that we are dealing with productions which because of intrinsic contradictions of principle are incapable of true existence'.[7] In other words, Arnheim seems unable to accommodate the notion of two 'distinct media', as he sees them, working together effectively. His view of sound as a fundamental problem to the very existence and effectiveness of film as an art form is but one famous illustration of some of the prejudices that early theorists helped form and that subsequently hardened in film scholarship, partly because there simply was very little scholarship to speak of on sound to begin with. In this sense, the position of most Russian formalists, like Pudovkin and Eisenstein helped reinforce a sense of distrust in sound. Their objection was one that revolved around the need, which they perceived as crucial to Soviet cinema, to go 'beyond' reality to reveal the real nature of the world. This could be achieved in a variety of manners. Montage, a practice that the formalist school intended as a way of combining images to produce or at least emphasise a 'message', was the key means for expressing the aesthetics of Soviet cinema. They argued that sound reinstated an element of reality that potentially threatened their aesthetic and political project (the two being inextricably linked). Although not all Formalists adhered to this view, Vertov being one of the most famous examples, and despite Eisenstein's acknowledgement of the potential of sound, provided that this could be used in an asynchronous and contra punctual manner, the Russian school reinforced the notion of sound as being a hindrance to the image, indeed, a threat to filmmaking aesthetics.[8]

Andre Bazin would appear to have a different view of sound than other early theorists. The fundamental reasons for this difference is not so much a particular interest in sound but rather a realisation that i) the cause of realism is better served by the sound film and that ii) unlike Arnheim, Eisenstein and others, he believed that: 'By 1928 the silent film had reached its peak'.[9] However, the problem Bazin runs into is not too dissimilar to Arnheim's: he eventually finds it difficult to overcome the separation of sound and the image as two separate entities. Although in a less virulent manner than Arnheim's, this inevitably gives rise to an impossible dichotomy whereby if it is not in film's nature to be an art form where sound and image work together harmoniously, then that true nature must be found either in the image or in the sound. Considering Bazin's emphasis on the importance of the photographic reproduction, this choice is really a false choice. Bela Balasz offers a rather complex view of sound in his Theory of the Film.[10] On the one hand, he is adamant about the possibilities that sound might hold for the cinema. In a view that is in many ways diametrically opposite to Bazin's he claims that:

> 'The demand is that the sound film should not merely contribute sound to the silent film and thus make it more like nature, but that it should approach the reality of life from a totally different angle and open up a new treasure-house of human experience.'[11]

He goes on to assert that 'The asynchronous use of sound is the most effective device of the sound film'.[12] However, he still sees these only as possible future developments, whilst the certainty in his view is that sound killed silent cinema and in doing so reverted film to the much-dreaded 'filmed theatre':

> 'When the technique of the sound film struck the first blow at the art of the silent film, I said that it would destroy the already highly developed culture of the silent film (...) I said that what had happened was a catastrophe, the like of which had never occurred before in the history of any other art (...) On the whole the film has reverted again to a speaking photographed theatre.'[13]

What appears unequivocally from these very influential early views of sound is that, despite their sometimes diametrically opposite understanding of what film is and what it could and should achieve, theorists of the early sound era saw the subordination of sound to the image as a necessity. Their inability to overcome the 'shock' of sound is nowhere more

evident than in their discomfort at having to reconcile sound and the image. Ultimately, their choice to emphasise the separation of image and sound paved the way to half a century of image-biased film theory: for if sound and image cannot be reconciled in film, who would pick the former over the latter?

The introductory book syndrome: sound as an afterthought

In many ways, this false and damaging dichotomy is pervasive even in contemporary film literature. Perhaps the most revealing typology of the kind of dismissive attitude scholars have displayed about sound can be found in the 'introductory' type book. These books present themselves as a means for the uninitiated student and film enthusiast to begin their journey into greater appreciation of movies in all their complexity and are thus a good indication of the 'status' of film sound amongst film scholars. A brief look at some of the most popular books of this kind is in this sense revealing. In An Introduction to Film Studies, edited by Jill Nelmes, sound is evoked in a couple of chapters. Chapter 4, 'Film Form and Narrative', written by Allan Rowe, deals with the aforementioned central issues of form and narrative. The heading with which he begins his chapter, 'Introduction: the act of viewing' is rather exemplary of the kind of bias at work here. Rowe eventually mentions sound, but he opens his account thus: 'The final element in constructing the 'image' of a film is the soundtrack'.[14] In doing so he chooses to subordinate sound to the image from the word go. This is typical of the book as a whole. Overall, sound is present in little over 3% of the total wordage. In Susan Hayward's Cinema Studies – The Key Concepts, the entry for sound/soundtrack occupies four pages (whereas, more logically, there is no such attempt to condense such a vast area in a single entry for the image).[15] The content of the 'sound' entry is a brief description of the historical evolution of film sound, mostly in technological terms. Sound occupies 1% of the book's total wordage. In The Oxford Guide to Film Studies, edited by John Hill and Pamela Church Gibson, there is a chapter on film music by Claudia Gorbman, one of the most active scholars in the field of sound.[16] Gorbman deals with ease and competency about the topic, but there is no mention of sound as a relationship of components, only music. Here one may argue that in an important sense sound actually does not figure at all in the book, but even considering Gorbman's piece, sound cover just over 1% of the total wordage. In Pam Cook's The Cinema Book, sound

enters the frame in Cook's 'History of the Cinema' section.[17] Typically, sound is discussed under the heading of 'technology'. There is a total of two pages dedicated directly to sound, less than 1% of the total wordage. Warren Buckland's Teach Yourself Film Studies presents us with another rather striking example of scholarly attitude towards sound. Although Buckland actually deals with sound in the chapter called 'Film Aesthetics', he continues to approach image and sound as two separate entities. Indeed, he waits until the last few pages of his chapter to proclaim that: 'Before we move on (...) we can briefly look at sound'.[18] He then goes on to mention the concepts of diegetic and non-diegetic sound, as they were originally enunciated by Bordwell and Thompson (see below).

Within the 'surveying' or introductory book category there are examples of scholars who have tried a more serious analysis of the role of sound, or that have at least shown awareness of the 'sound issue'. There is an unusually interesting tension at work in James Monaco's How to Read a Film.[19] Despite following the usual pattern in dealing with sound as a technological issue in a section entitled 'Technology: Image and Sound', Monaco often warns against the risk of underestimating sound. He suggests that 'Ideally, the sound of a film should be equal in importance with the image'[20] and that 'Noise and effects are poor labels indeed for a worthy art'.[21] Although he never actually develops his 'doubts' into a proper argument for the reintroduction of sound in the way we learn about how movies function, Monaco shows a curiosity about sound that is often missing from introductory books. William H. Phillips's Film: An Introduction fares a little better.[22] Phillips dedicates a chapter to sound and seriously attempts to discuss, if briefly, all component of a film's soundtrack. Most importantly, however, he employs extracts from interviews with some practitioners in one of the rare attempts of this kind to bring in the element of practice. The obvious limitation in this sense is that Phillips does this only with music composers.

Victor Perkins's Film as Film presents us with a much more sophisticated and complex understanding of sound.[23] In particular, Perkins approaches sound as a further tool for the filmmaker, and one that cannot be separated by an understanding of its relationship with the image: 'Again, we are dealing with interaction: the image encourages us to accept the reality of the sound; the sound alerts our perception to particular aspects of the image'.[24] In considering images and sounds as inextricably linked, Perkins chooses to reject the dominant view that the relationship between sound and image is mostly a conflicting one.

In his view, the 'definition of the image and the soundtrack as distinct formal elements was the source of the theorists' formal difficulty'.[25] However, within this acceptance of sound and image as tools for the filmmakers rather than separate entities constantly at war with each other, Perkins still appears to firmly adhere to a view of movies as dominated by images. Sound, because of its difficulty in being immediately recognised without its visual source needs the image to provide audiences with 'an interpretation' of it. Conversely, sound's role is that of directing our attention to specific aspects of the image. This notion is perfectly coherent within the theoretical framework Perkins adopts: film is as much about selection as it is about exclusion. Indeed, one act presupposes the other. In the understanding of this process lies the key to the interpretation of a filmmaker's work. Perkins's choice of sentence structure, as attentive as ever, reveals his attitude more than the sentence itself. Sound's role is clearly defined in subordination to that of the image. One might very well suggest the reverse of what Perkins suggests: sound encourages us to accept the reality of the image; the image alerts our perception to particular aspects of the soundtrack.

Undoubtedly, the account of sound in introductory books that has received the larger amount of appreciation and is most often referred to remains Bordwell and Thompson's in Film Art: An Introduction.[26] The chapter dedicated to sound, 'Sound in the Cinema', is an interesting and at times insightful attempt at grasping the basics of film sound. Their account remains mostly concerned with the production of meaning in movies and they analyse sound accordingly. To illustrate their point about how 'sound can actively shape how we perceive and interpret the image' they use an extract from Chris Marker's Letter from Siberia.[27] In it, Marker chooses to play back three times the same sequence of Soviet workers working during the harsh winter on some public work project in the city of Yakutsk. Each time a different commentary is laid over the image, each time 'producing' a different meaning. Bordwell and Thompson's analysis goes well beyond that, borrowing some key concepts from existing work on sound (the notes at the end of the chapter provide an excellent insight into the background to their analysis of the role of sound). There appears to be a serious attempt at creating some kind of vocabulary of key concepts. As well as the much-quoted concepts of diegetic and non-diegetic sound (the usefulness of which is actually rather limited due to their ambiguous meaning), Bordwell and Thompson

discuss issues of 'creative choice' (with terms such as selection, alteration and combination) as well as film sound dynamics (exploring concepts such as rhythm and space).

However, when they move to their final section of their book that deals with sample analysis of some films, they seem curiously unwilling to incorporate sound in their account. One of the films they discuss is Raging Bull. Widely considered as one of the best examples of creative sound in Hollywood cinema, Raging Bull is primarily the work of the collaboration between one of the most highly respected sound designer Frank Warner and director Martin Scorsese. The non-literal approach to sound in the movie, especially during the fight sequences, has a dramatic effect on the overall feel of the movie and the way it impacts on audiences. In particular, Warner and Scorsese's choice of designing the breathing of boxers as a combination of animal sounds played back at different speeds and mixed with natural sounds such as wind, conveys an eerie, unsettling quality to the fight scenes. The mixing of those sounds with the aggressive sounds of the camera flashes documenting the fights creates a very effective contrasts between the very personal world the boxers inhabit when in the ring and the outside world's sadistic desire to witness their public humiliation. This latter point is reinforced by Warner and Scorsese' s use of radio and TV adverts menially informing the public that somehow, in the midst of such personal moral and physical destruction the 'spectator' should be made aware of the fact that there is a new toothpaste in town. The sound orchestration in Raging Bull is as daring as it is inventive and effective. Yet, when describing the same fight sequences I have just summarily described, Bordwell and Thompson seem to focus solely on the visuals. Their account is worth quoting in full:

> 'Apart from the narrative structure, Scorsese puts Jake's violence in context by means of film techniques. In general, by appealing to conventions of realism, the film's style makes the violence in Raging Bull disturbing. Many of the fights are filmed with the camera on a Steadicam mount, which yields ominous tracking movements or close shots which emphasize grimaces. Back lighting, motivated by the spotlights around the ring, highlights droplets of sweat or blood that spray off the boxers as they are struck. Rapid editing, often with ellipses, and loud, stinging

cracks intensify the physical force of the punches. Special makeup creates effects of blood vessels in the boxers' face spurting grotesquely.'[28]

Aside from a rather non-descriptive reference to 'loud, stinging cracks', sound is never mentioned. The question here is: why? After all, as we have seen, Bordwell and Thompson amply demonstrate their ability in suggesting ways in which a serious analysis of sound can be carried out in the examples they use in the chapter on sound. Their evaluation of the importance of sound is also rather unequivocal when they state that: 'With the introduction of sound cinema, the infinity of visual possibilities was joined by the infinity of acoustic events'.[29] Why then, should they revert to such a visually dominated kind of analysis in the final section of their book? In many ways, I am being unfair here. Bordwell and Thompson's treatment of sound is one of the most serious and best presented available in the 'Introductory' books. Where others, as we have seen, are simply satisfied with a customary side-glance, Bordwell and Thompson's attempt is substantially more engaging. However, precisely because of this, their failure in bridging good intention with actual action is symptomatic of a key problem that has hindered the development of any serious critical appreciation and understanding of film sound.[30] Despite good intentions, Bordwell and Thompson clearly act to reinforce, wittingly or otherwise, the widely held view that sound is a secondary force in film. Most scholars have been unable or unwilling to take that all-important step that would help suture the artificial dichotomy of image versus sound. A clear legacy of early writings on cinema where the coming of sound was overwhelmingly seen as calamitous for film aesthetics, sound has spent most of its life in a film 'ghetto'. Scholars have often paid homage to the importance and role of sound only then to disregard it entirely when addressing theoretical issues, analysing movies, writing histories of cinema and, perhaps most significantly, shaping film studies curricula.[31] The basic common denominator that all the accounts above share, with the possible partial exception of Perkins and Bordwell and Thompson, is a lack of interest in the creative process involved in film sound. The view that dominates all these accounts is one that sees sound either as a technical/technological enterprise, hence not belonging to the creative realm, or as something of a hindrance to the development of film art.

A category of lack: sound as 'incomplete'

Interestingly, this rather 'suspicious', if not hostile, attitude towards sound can often be found in books and articles that have film sound at the core. The main heading under which we can group this different category of literature on sound is the category of 'lack'. This could be summarised as the investigation of sound not in terms of its potential for creativity, but rather in terms of what is actually not doing, in terms of what it lacks. Scholars as different from each other as Michel Chion, Walter Murch, Mary Ann Doane, and John Belton, to name but a few, have contributed in different ways to this 'type' of sound literature.[32] The 'dialogue' between Doane and Belton in Film Sound: Theory and Practice is exemplary in this sense.[33] Belton writes on the relationship between technology and aesthetics mostly in response to Mary Ann Doane's much quoted *Ideology and the Practice of Sound Mixing*, which immediately precedes Belton's chapter in the book. Doane argues that technological improvements in sound, such as Dolby technologies, have worked towards the 'hiding' of the apparatus. In Doane's view, technology has served an ideological function in attempting to eliminate any trace of the fact that whilst at the movies we are actually experiencing a construct, not a value-free representation of reality. In this, she echoes work done by French theorists, such as Cómolli and Baudry, on the importance of what they call 'the ideology of the visible'. That is, the bourgeois notion that the world is as it looks, as opposed to, for example, being a class-dominated version of many possible alternatives (cinema, in its claim to being able to photograph reality impartially can logically be understood as an instrument of bourgeois ideology).[34] Doane argues that the development of sound technologies and practices aimed at eliminating any evidence of artificial intervention and manipulation of what is recorded is another aspect of the ideology of the visible that she defines as a 'repression of the material heterogeneity of the sound films'.[35] She states that:

> 'The rhetoric of sound is the result of a technique whose ideological aim is to conceal the tremendous amount of work necessary to convey an effect of spontaneity and naturalness. What is represented in this operation is the sound which would signal the existence of the apparatus.'[36]

In other words, her argument revolves around what sound does not do: sound's specific lack here is the inability to reveal the work that would 'signal the existence of the

apparatus' (hence of the presence of an ideological struggle). Responding to Doane's argument, Belton appears at first to react to this view by stating that:

> 'Technology and the effects of technology (...) remain visible, though to varying degrees, in every film. The work of sound technology, through its very efforts to remain inaudible, announces itself and, though concealed, becomes audible for those who choose to listen for it.'[37]

However, Belton goes on to define sound once again in terms of what it lacks and cannot do:

> 'Sound lacks objectivity (thus authenticity) not only because it is invisible but because it is an attribute and thus incomplete in itself (...) What the sound track seeks to duplicate is the sound of an image, not the that of the world.'[38]

Belton's argument appears to revolve around the inability of sound to represent the pro-filmic world. The advancements in technology (like Doane, he refers to Dolby and mentions Raiders of the Lost Ark) have resulted in sound that he defines as 'unnatural', to the point that 'one misses the rough, jittery camera movements, floor squeaks, and unmixed ambient sound of films like Jean Renoir's La Chienne'.[39] Belton here is unwilling to consider that his argument implies that the world recorded by the image is not constructed, nor does he acknowledge that the creative processes at work in choices concerning set design and screenwriting are not at all dissimilar from issues of sound design and mixing. This latter aspect in particular should inform any serious attempt to understand how sound works in creative terms for it exposes the artificial nature of the distinction between what the image does and sound does not. However, in these accounts ideology wins the day, and sound is once again relegated to matters of technology, with all the undertones that both Doane and Belton are so capable of bringing to the fore. It is useful to point out that this surprisingly ambivalent attitude to sound by sound scholars is not confined to the arguments above, but can also be found in what Rick Altman calls the 'ontological fallacy'.[40] This is just another example of the legacy left by early theorists who claimed that images without sounds could still be called cinema, whereas the inverse cannot be true. An obvious reaction to the introduction of sound, this view should have remained confined to the period when it was expressed, one of uncertainty and worry about the future of cinema. However, as Belton's case demonstrates, the ontological fallacy still informs so much

writing on sound. Altman has perfectly encapsulated the element of 'surprise' at the persistence of such a view when he says that: 'Surprisingly, this dependence on ontological arguments come not from the enemies of sound, but from its greatest defenders' and that 'A similar danger lurks in the work of Mary Ann Doane, Kaja Silverman, Michel Chion, Claudia Gorbman and other critics.'[41]

The case for both Michel Chion and Walter Murch is only apparently different, but it nevertheless deserves closer attention. Michel Chion has been one of the most outspoken theoretician on sound. His work has indeed been fundamental to the development of a scholarship of sound. His accounts of the role and importance of sound in the cinema has provided a whole new generation of scholars with the basis from which to develop further individual studies of sound. In particular, Chion's work is important in two key aspects. Firstly, he was one of the first scholars to attempt to develop a basic vocabulary of sound with which to articulate thinking on and around film sound (see Appendix 6. Terminologies of Film Sound). Secondly, and perhaps more importantly, he has dared to suggest that sound has, especially in the period I am considering, challenged, often successfully, the primacy of the image. For instance, he claims that 'Today's multipresent sound has insidiously dispossessed the image of certain functions – for example, the function of structuring space'.[42] This has resulted, in his view, in more complex sound constructions. As fas as my study is concerned, also of particular relevance is his view that 'The sound of noises, for a long time relegated in the attic, has therefore benefited from the recent improvements in definition brought by Dolby'.[43]

However, despite the unquestionable relevance of his work, Chion also present some deep ambiguities about sound that fundamentally threaten to undermine his work. These ambiguities manifest themselves in two key areas, namely the real status of sound (in relation to the image) and what it can actually 'do'. In the first instance, Chion would seem to be unwilling to 'go the distance': this produces anomalies in his views that translate in somewhat confusing statements. In the same paragraph where he states that sound has dispossessed the image of some key functions (that I mentioned above) he also states that:

> 'Although sound has modified the nature of the image, it has left untouched the image's centrality as that which focuses attention. Sound's quantitative evolution – in quantity of amplification, information, and number of simultaneous tracks – has

not shaken the image from its pedestal. Sound still has the role of showing what it wants us to see in the image.'

This view sits rather uncomfortably with the previous assertion about the new role of sound in the Dolby period and exemplifies the ambivalence about quite how far one could claim that sound matters. Whilst he is obviously entitled to doubts, these are not articulated enough: Chion would appear to state the sound is important only to then proceed to clip the wings of his own statements by confirming sound's secondary role in relation to the image. Similarly, in the case of what sound can actually achieve, both Chion and Murch, though speaking of the power of sound in the cinema as effectively as any theorist around, again end up defining sound mostly in terms of what it lacks. The most obvious example of this is provided by Chion's book Audio-Vision, Sound on Screen to which Murch wrote a foreword. In it, Murch states that: 'The possibility of re-association of image and sound is the fundamental stone upon which the rest of the edifice of film sound is built, and without which it would collapse'.[44] Interestingly Murch feels the need to state what is a relatively obvious truism: sounds without images do not make a movie, and in doing so, he reveals the traditional emphasis on the image, for who would need to claim the same with respect to the 'film image'?

Murch's comments in Chion's book are also indicative of a certain attitude to value what it is not immediately obvious in a soundtrack, the concepts Chion defines as 'synchresis' and 'added value'. Murch suggests that:

> 'The danger of present-day cinema is that it can crush its subjects by its very ability to represent them; it doesn't possess the built-in escape valves of ambiguity that painting, music, literature, radio drama, and black-and-white silent film automatically have simply by virtue of their sensory incompleteness an incompleteness that engages the imagination of the viewer as compensation for what is only evoked by the artist.'[45]

Once again, we are paradoxically in the presence of two of the key theorists and practitioners of film sound who define sound mostly in terms of what it ordinarily lacks. In many ways, the position they represent is similar to that of early theorists who feared that synchronous sound threatened to reduce film to a lesser version of the theatre. In other

words, sound ordinarily lacks the complexity needed to elevate film as an art form. It is only when there is some 'added value', when 'synchresis' is achieved, that sound finally fulfils its function (one that, in any case, would still appear to be subordinate to the image). When Chion defines his take on the concept of the 'achousmatic' sound (a concept, describing a sound whose visual origin is not revealed, that was first employed by Pierre Schaeffer and the 'musique concrete' movement) he suggests that:

> 'Confronted with a sound from a loudspeaker that is presenting itself without a visual calling card, the listener is led all the more intently to ask, "What's that?" (i.e. "What is causing this sound?") and to be attuned to the minutest clues (often interpreted wrong anyway) that might help identify the cause.'[46]

In other words, both Chion and Murch would appear to value sound in the cinema as an important creative tool, but only in a certain form and as functioning within a certain 'artistic' project. By narrowing down their approach so much, they are effectively excluding 'ordinary' use of sound as interesting, as well as mostly discounting the experience of the audience to which they so often refer. Indeed, who is the listener they refer to? This is important, because their argument would seem to ignore countless accounts, on the part of both audiences and sound people alike, that audiences react mostly in a hostile manner to 'achousmatic' sound (for more see Interviews with the Creators of Sound). Indeed, the presence of sounds whose function within the cinematic experience is not obvious is often mentioned as one of the most disrupting events in cinemas. Murch and Chion 'choose' to ignore this, and this renders their views and ultimately their view of film sound as rather dismissive of most mainstream cinema.[47]

A more positive approach: sound as a creative force

Despite the rather 'bleak' landscape that arises from the considerations above, it is important to note that there is a further dimension to traditional film research that has taken sound into account with a much more positive approach. Although this has manifested itself mostly through articles and chapters, whilst books remain a rarity, the late eighties and nineties saw some ground breaking accounts of film sound appear.

From a historical perspective, the aforementioned Film Sound: Theory and Practice filled a gap in that it provided students of sound with an attempt at outlining the historical

development of film sound criticism. The essays contained in the book, from early criticism to articles on Robert Altman and Dolby, have the merit of showing the many facets of the rather uneasy relationship that scholars have had with film sound. Weis and Belton's 1985 book is particularly relevant because, nearly thirty years after its publication, it remains the most comprehensive of a handful of attempts at dealing with sound from a historical perspective that goes beyond the early sound period. It does so in the fragmented fashion edited collection unavoidably do, but it is nonetheless one of the most serious attempt at discussing sound. Elisabeth Weis is also responsible for a number of very interesting and insightful articles on sound. In particular, her article 'Synch Tanks – The Art and Technique of Post-production Sound' is one of the best attempts at understanding the creative process involved in creating sound in relation to actual filmmaking practices (the word 'art' in the title speaks volume about Weis's stance).[48] Her attitude to investigating sound (she asks a very basic question: 'How does sound get on pictures?') drives Weis in the direction of filmmakers rather than, as it is customary, towards other scholarly accounts of film sound. Indeed, her attempt to establish a 'dialogue' with professionals in the way she integrates material from interviews with sound men and women in her writing was mostly unprecedented in conventional film scholarship. This approach leads her to make two key assertions at the end of her article. She questions the role that directors play in creating sound when she says that: 'Most directors, however, do not use the expressive potential of the soundtrack and leave sonic decisions up to their staff', and she then challenges the notion of sound personnel as 'technicians' by pointing out that: 'The most respected sound designers and supervisors may be called technicians, but their artistry can be heard in all the films they touch.'[49]

The relevance of filmmakers' own experience and views about film sound had been, until that point, mostly the domain of technical books and journals. American Cinematographer and Mix, to name but two examples, had been running a relatively steady flow of interviews with creators of sound. However, despite these accounts and some excellent individual efforts, traditional scholarly publications had overwhelmingly neglected the enormous potential that talking to filmmakers could unlock.[50] Many excellent accounts of film sound technology, amongst which Barry Salt's Film Style and Technology: History and Analysis[51] and Steve Neale's Cinema and Technology: Image, Sound, Color [52] had

investigated the relationship between technology and aesthetics, but had done so whilst firmly remaining within academia.

A key work in venturing into the world of filmmakers for inspiration came with Vincent LoBrutto's Sound-on-Film, Interviews with Creators of Film Sound.[53] A former practitioner in the field of film editing, LoBrutto had already written two books which have at their core a serious attempt at understanding the creative nature of two other areas of filmmaking, film editing (Selected Takes: Film Editors in Editing)[54] and production design (By Design: Interviews with Film Production Designers)[55]. His attitude to all interviews is perfectly encapsulated in his opening salvo: 'The purpose of this book is to allow those who work in film sound to speak in their own voices about their art and craft'.[56] He also wisely choose to interview people whose careers span virtually the entirety of the sound-on-film era, from Arthur Piantadosi (who started working for Warner Brothers in 1935 and won an Oscar for All the President's Men) and Frank Warner (whose career spans nearly fifty years and has almost mythical status amongst the film sound profession, having worked on movies such as Spartacus, Taxi Driver and Close Encounters of the Third Kind) to contemporary key figures, such as Gary Rydstrom (seven time Oscar winner, see my interview in Chapter 3) and Cecelia Hall (one of the few leading women in sound in Hollywood, winner of an Oscar for The Hunt for Red October). LoBrutto does not overlook the more traditionally well-known figures, such as Walter Murch (The Conversation, Apocalypse Now, Godfather trilogy), Ben Burtt (Star Wars trilogy, Indiana Jones trilogy, E.T.) and Skip Lievsay (Goodfellas, Barton Fink, Malcolm X).

Despite the importance of all the aforementioned scholars, no account of film sound scholarship, however incomplete, could bypass Rick Altman's body of work. Altman has undoubtedly been the most prolific and influential scholar on film sound within traditional film scholarship. The width and breadth of his work cover just about any aspect of film sound, and the special issue of Yale French Studies, *Cinema Sound*, dedicated entirely to film sound that he edited in 1980 is widely regarded as being one of the first steps in the life of contemporary film sound research. His most important contribution is arguably his 1992 book Sound Theory, Sound Practice.[57] Despite being a collection of essays, including work from Michel Chion, John Belton and James Lastra, the book is a showcase from some of Altman's most incisive and effective writing (the book contains no fewer than seven

chapters written by Altman). Crudely, Altman's aim would seem that of 'complicating' traditional scholarly attitudes to sound. There is an invigorating sense of rediscovery in his writing: sound is more complex than we have thus far acknowledged and requires accordingly a more sophisticated approach. For brevity's sake, I would like to limit my account of Altman's work to a few key aspects that have influenced my research on sound on the Dolby era in particular. In the introduction to the book, Altman speaks, amongst others, about multiplicity, three-dimensionality and materiality. These three issues help build up a framework that is particularly useful. Steven Spielberg once remarked that to see Close Encounters of the Third Kind in 6-track sound was not just a different experience of the same film, it was like experiencing a 'different film'.[58] Altman treats this difference in release formats as less than a technological curiosity, and more as evidence of the existence of multiple versions of a film. In doing this, he highlights that:

> 'Critics have effectively neutralized much of cinema's complexity. In doing so, they have systematically concentrated on the uniformity of the image, thus neglecting such essential variations in the soundtrack as 1) three decades of live, un-standardized accompaniment of 'silent' films, 2) simultaneous release of silent and sound versions during the late twenties and early thirties, and 3) parallel distribution of magnetic and optical track versions during the fifties and sixties, as well as mono, stereo, and surround versions in the seventies and eighties.'[59]

This concept is of particular importance because it suggests that our appreciation of a film soundtrack depends on conditions of reception, something that most scholars and film critics alike continue to refuse to acknowledge.[60] Altman's emphasis here is clearly shifting from text to reception and the space(s) of reception. He furthers his argument when he discusses sound's three-dimensionality. Unlike the image's two-dimensionality, 'sound cannot exist in a two-dimensional context'.[61] Although Altman refers specifically to cinemas ('sound occurs only in the three-dimensional volume of the theatre at large'), the implication is that we should review our system of critical analysis to include this 'truth'. As a three-dimensional construct, sound needs a vocabulary and a conceptual framework for analysis that allows for such complexity. Most film criticism revolves around the understanding of cinema as a two-dimensional construct (this in spite of the fact that film image attempts at creating the illusion of depth). Finally, the concept of 'materiality' points

at another crucial dimension of sound and of cinema at large. The implication of what Altman argues is that by acknowledging the many 'events' that contribute to the production, exhibition and reception of a film we can begin to see the complex nature of cinema aural audienceship:

> 'Such an approach encourages us to move past the imaginary space of the screen to the spaces and sounds with which cinema must compete – the kids in the front rows, the air conditioner hum, the lobby cash register, the competing sound track in the adjacent multiplex theatre, passing traffic, and a hundred other sounds that are not part of the text as such, but constitute an important component of cinema's social materiality.'[62]

The view from the trenches: filmmakers writing on sound

As I pointed out at the beginning of this chapter, there is a different though related body of knowledge concerning film sound. It arises from countless accounts of filmmakers' use of sound in individual movies, historical accounts of the development of the art and technology of film sound, and interviews with the makers of movie soundtracks. Its main means of delivery have been instrumental in making this 'other' scholarship of sound far more effective at reaching wide and different readerships. Technical journals and home video magazines have provided an outlet in the traditional print format. However, it is the Internet that has ultimately proven to be the real propulsion behind the exponential growth of interest in and around film sound.[63] It is not just the means of diffusion that makes Internet material worth looking at, but also the mode of investigation and the language adopted. As I mentioned earlier, the most traditional scholarship revolves around theoretical discussions in the sense of topics discussed without much direct reference to professional practices and film practitioners. The first thing that is striking about this second body of knowledge is the extent to which it relies on practitioners and on accounts of filmmaking practices. This manifests itself not only in terms of topics discussed, but, crucially, in the way practitioners are often the agents of this literature of sound. One perfect example of this phenomenon is Randy Thom. Responsible for the sound in films such as Forrest Gump, Arlington Road, Cast Away and winner of an Oscar for Best Sound for his work on The Right Stuff, Thom is rightly considered one of the most experienced

sound men in Hollywood. He is also a prolific writer on matters relating to film sound. He writes on both technical issues and 'aesthetic' matters.[64] Thom's writing has mostly raised questions around the issue of status for film sound and the consequent lack of attention on the part of filmmakers. He argues that a greater understanding of the demands of sound work, especially post-production sound, would greatly enhance the quality of film. In particular, he singles out writers and directors as the two categories that can most benefit from thinking about sound more. In a passage that is revealing of the general attitude of directors towards sound in Hollywood, he says:

> 'Feature film directors tend to oscillate between two wildly different states of consciousness about sound in their movies. On one hand, they tend to ignore any serious consideration of sound (including music) throughout the planning, shooting, and early editing. Then they suddenly get a temporary dose of religion when they realize that there are holes in the story, weak scenes and bad edits to disguise. Now they develop enormous and short-lived faith in the power and value of sound to make their movie watchable. Unfortunately it's usually too late, and after some vain attempts to stop a haemorrhage with a band-aid, the director's head drops, and sound cynicism rules again until late in the project's post production.'[65]

Perhaps the best example of the insight into professional practices that Internet material has provided scholars of film sound with is the Open Letter from Your Sound Department.[66] It is a manifesto signed by dozens of Hollywood's leading film men and women in which they outline the situation of production sound in filmmaking today (a vastly under-researched area within sound scholarship) and suggest ways in which this could be improved. As this revealing short passage indicates, the letter is an extremely useful resource in understanding how the image bias at work in film criticism is merely an extension of filmmaking practices:

> 'All of the other departments work for what is seen and not heard. Every single person on the production from make up and wardrobe to grips and props concentrates only on what's seen in the viewfinder. Because the other production crafts work only for picture, no one knows or cares what's happening to YOUR audio. You are the only person on set with the power to allow us to get you good sound. It is always tempting for sound to give in and not go against the grain when

circumstances impose impossible barriers. Film schools are going to need to add psychology courses to their sound mixing curriculum soon. The situation is often that bad.'[67]

What is the picture that arises from looking at existing work on sound? We still know very little in crucial areas such as how a soundtrack actually works, both internally and externally (i.e. in relation to the film's narrative and to its images). In historical terms, most accounts of sound have been limited to either the early sound period, or a straightforward account of 'what was invented when'. Little has been done to try to understand how developments in sound have affected the industry as a whole, in financial, institutional, technological and aesthetic terms. Key areas that could potentially be revisited in light of greater attention to sound remain under researched: from genre to auteurism, from audience reception to performance the potential for further analysis is great indeed. In this sense, the final chapter of this study is a specific attempt at suggesting ways in which a more 'sound-friendly' analysis of some of these areas can be carried out (I will focus in particular on issues of audiences, textual analysis and film performance). When attention has been granted to sound, it has mostly been either in a marginal way or in a rather ambiguous tone. There is a further aspect of this situation that has proven particularly damaging. Accounts of sound in the cinema have too often borrowed from established vocabularies in other disciplines rather than attempting at developing a more medium-specific framework. This is nowhere more evident than in the case of film music. Despite being one of the few areas of sound to have escaped the periphery of film scholarship (several studies of film music and individual composers have been published over the years), film music can actually provide us with an insight into the ways in which the lack of a conceptual and linguistic framework to investigate film sound continues to plague film research today.

A point in case: music in film and film music

Music is one area of film sound that has received a considerable amount of critical attention. Scholars such as Claudia Gorbman, Jeff Smith, Kaja Silverman, Kevin Donnelly and many others have explored its potential, reviewers have acknowledged its influence, and historians have mapped composers' efforts and their lives. Hence, it would be logical to

assume that it should be possible to investigate film music with a certain degree of sophistication. There ought to be a set of linguistic and conceptual tools available to scholars to probe all aspects of film music: how it works, its relationship with sound effects and dialogue, the working practices that regulate its use, and so forth. Unfortunately, this is far from being the case.

I would like to begin with a 'simple' question: why has film music recently enjoyed such a considerable amount of interest whilst other aspects of film sound have been regularly disregarded? Since the inception of audio-visual shows that could be identified in some ways as precursors of the cinema (such as the theatre, magic lantern shows, and opera), sound agency has been firmly kept behind drawn curtains, 'hidden' away in an attempt to avoid distracting the audience.[68] Indeed, in plays, operas, and early film shows the sound effects artists were kept at a safe distance from the audience's eyes.[69] This practice has often been interpreted as satisfying the need for maximizing the sense of audience involvement in the fiction at play, be it a realistic piece of filmmaking or a fantastic reproduction of a journey to the moon. However, the practice of hiding sound agency has not been universally applied to all aspects of sound. Whilst effects troupes were kept firmly away from the audiences they performed for, musicians were often proudly displayed. A clear legacy of the status that music had enjoyed in aristocratic circles throughout Europe for centuries, the display of orchestras and solo musicians has always been seen as an integral part of the show, hence the desire to showcase it. Musicians cannot distract an audience from the show simply because they are part of the show. The ultimate consequence of this practice has been a separation of music and sound effects as belonging to two different areas: the artistic (music) and the technical (sound effects). The former is to be proudly displayed; the latter is to be dealt with 'as quietly as possible'. This separation, and the connotations that it brings with it, is also 'justified' by a key consideration. It is much easier to identify agency in the case of music than sound effects. In the world of aristocracy there were men of letters, playwrights, musicians and painters. That is, men and women working alone. In this sense the figure of the composer provided a clear and obvious opportunity to praise individual genius.

A false dichotomy: the 'purist' approach

Perhaps unsurprisingly, this whole set of expectations and attitudes have been carried onto the appreciation and investigation of movies. This can be partly explained by the fact that some of Hollywood's most successful composers (such as William Korngold, Max Steiner and Alex Newman) had a classical background and often showed clear signs of its influence in their music scores. This, as Jeff Smith reminds us, added a certain air of respectability to what was otherwise regarded as 'second-class music':

> ' Romanticism added a High Art sheen to the work of Hollywood film composers. This not only elevated film music in the eyes of film producers, it also enhanced Hollywood composers' own claims of authorship and creativity'[70]

This artificial separation based on the dichotomy art vs. technology and artist/auteur vs. technician is still very influential in contemporary film criticism. Indeed it has contributed in a substantial way to distort the kind of attention that we have given to film sound in general, and music in particular. This warrants a closer look at the critical approach that this situation has engendered. For argument's sake, I shall refer to this as the 'purist approach'. A first feature of the purist approach is to see the terms 'music' and 'soundtrack' as interchangeable. There are, of course, precise reasons to explain why this should be the case. Historically, film music scores have been marketed as the 'movie original soundtrack' or a variation on this theme. Often composers themselves have referred to their scores as 'the soundtrack' in interviews. Reviewers and scholars also routinely identify the music score as the soundtrack to the effect that the distinction between the two terms becomes invisible and to talk about the former satisfies the need to cover the latter. This has obvious consequences. To negate difference between the 'music score' and the 'soundtrack' is to suggest that the isolated study of the former will offer answers as to how the latter works. In other words, listen to John Williams's score for Saving Private Ryan and you will be able to suggest how the film's soundtrack works. This also extends to whether we evaluate that film's soundtrack to be 'good' or not. Indeed, if we were to view the music score as aurally isolated from its context we would rightly be entitled to assess a composer's effort in isolation, without further probing of all the other elements that might influence our perception of his/her music.

This critical stance, adopted by most film scholars, has some obvious advantages. It favours the concentration of scholarly attention on one figure (i.e. the composer) thus simplifying research (it would clearly take a much greater effort to investigate the web of relationships at the core of film sound). Most importantly, it vouches for a theoretical construct aimed at validating film as worthy of artistic and academic attention. The presence of an 'author', the inscription of meaning in the film as text, and the availability of means (namely, textual analysis) to reveal such meanings are all compatible with the purist approach. This is a fundamental role: film as Art has always seemed to thread a very fine line between tolerance and heresy amongst art critics and academics alike, hence the 'political' importance of anything that might confirm the validity of film as an object worthy of study. As Richard Dyer suggests:

> 'The power of auteurism resided in its ability to mobilize a familiar argument about artistic worth and, importantly, to show that this could be used to discriminate between films. Thus, at a stroke, it both proclaimed that film could be an art (with all the cultural capital that this implies) and that there could be a form of criticism indeed, study of it'[71]

Evidently, the purist approach serves at least one key political function: its focus on music rather than on the soundtrack and on the composer as its sole auteur can be fully reconciled with the auteurist position. It reaffirms both the validity of films as an object of study (especially in its emphasis on high art) and of traditional textual analysis as the valid method to carry out its investigation. In many ways, the very existence of the notion of auteurism tends to direct scholarly attention to individual agency rather than collective effort and to the established vocabulary of music analysis rather than the uncharted waters of film sound appreciation. Indeed, Claudia Gorbman comes very close to actually spelling out the auteurist nature of film music scholarship when she points out that: 'Within the general field of film studies, the study of film music might well represent the last bastion of film aesthetics'[72].

When all the implications of this view are taken into account the result is a position that can be summarised in three key points. Firstly, the purist approach vouches for the validity of the distinction between the 'artistic' and the 'technical' in movies. Secondly, it sees the terms 'music' and 'soundtrack' as interchangeable and fundamentally meaning the same

thing. Finally, it posits firmly responsibility and agency in the hands of the composer. However reassuringly familiar this notion of film music might be, we nevertheless need to ask a key question: does this approach help us ask the most useful questions when investigating film music? The purist approach would seem to be more interested in music per se than in the relationships music enters when being composed, mixed and reproduced for the cinema. Although this is perfectly understandable, it also means that some key aspects of film music and its role in the cinema have been either insufficiently researched or altogether neglected precisely because of this lack of attention to the specificity of the film medium. These neglected areas cover all the major facets of film music: how it is composed, how it is used in the context of the soundtrack and how it is reproduced and received in film and home theatres.

The dynamic duo: music score and music in film

Film music does not work in a vacuum. Its function, and ultimately its rate of success, is inextricably linked to its greater whole, one that includes sound effects and dialogue. This relatively straightforward suggestion eludes the purist approach because of its tendency to identify the terms music and soundtrack as synonyms. To begin to overcome this limitation it might be useful to divide the expression 'film music' into two distinct terms: 'music score' and 'music in film'. The former will identify the score as it is marketed by the music industry. To use the example of Saving Private Ryan once again, John Williams's complete score for the film as marketed on a CD is that film's music score. The latter term, music in film, will refer to music as it appears in the final mix (that is, once it has been edited and mixed with sound effects and dialogue).

In contemporary filmmaking, these two 'versions' of film music are often separate though related entities. Crudely, a composer will most likely put together a 50'/70' score for any given movie. Often other music is added to the music score in the form of existing or purposely composed popular songs, before this is packaged and marketed. However, only a percentage of that score will end up in the final film soundtrack (indeed, it is not entirely uncommon for the soundtrack to feature only a small percentage of the originally composed score). The reason is simple: film soundtracks need to accommodate music, sound effects

and dialogue. In short, all the elements of a soundtrack, including music, need to be mixed according to the needs of the whole, not the particular.[73]

These three aural elements will have to share the physical limitations of sound. The spectrum audible to humans is roughly between 20Hz and 20,000Hz (the higher the frequency, the higher the tone). If sound designers and supervising sound editors were to employ routinely a fully orchestrated piece of music without paying attention to the context in which music is being employed, there would most likely be no room left for any other sound, be it dialogue or sound effects.[74] This is not merely a technological issue: aesthetic choices are informed by technology, as sound designer Gary Rydstrom points out:

> 'Often the composer, the sound editor, and the sound effects people in particular end up competing for any given scene (...) then in the mix you meet this big collision. A lot of time in the mix is spent trying to figure out how we can feature music here, feature sound effects there - how we can blend the two'[75]

A composer's first consideration will be for the narrative dimension of his/her music. However, he/she will also need to be aware of the articulate sonic structure in which his/her music will have to fit. To put it differently, composers find themselves in a position unlike that of music-only composers. Although composing from similar repertoires, film composers will have to confront a series of 'external factors' that will ultimately determine both how their music is employed and how it is received by audiences. Thomas Newman's score for Erin Brockovich might stand in its own right as 'good music'. However, Newman's awareness of the context in which his music is to be used has a fundamental influence in his style of composing. In a film where dialogue plays such an important role and where the silences between sentences are just as important it becomes crucial to have a score that will take all that into account and 'blend' in rather than take over. Newman carefully arranges the kind of frequencies his music covers so that dialogue and silence are not 'drowned' by the music score. Similarly, John Williams' scores for the opening of Star Wars and Superman are a perfect example of composers that have carte blanche in relation to frequency and thus can freely choose to go 'full-throttle' to inject pace and rhythm to title credits: this is a 'big' movie and I want you to know it from the word go whilst credits are still running.[76]

All this points to one consideration. In movies, the context in which music is employed is more articulate than in the case of the music medium.[77] Where music is both content and medium in the music industry, this is not the case in the cinema: film composers will always have to refer to specific reference points, both in creative and technological terms, which are outside of their direct control. Music purists have often regarded this as a limitation to composers' artistic expression, in what is often a reiteration of the elitist nature of the purist approach. Darby and DuBois, for example, state that:

> 'Film music is (further) affected by the ways in which it is added (or 'mixed') with dialogue and sound effects. All too often a composer's hard work must be truncated or submerged, if not lost altogether because of the demands of what are perceived to be more important elements (...) such conditions can grate on composers'[78]

If we are willing to accept that music in film is not 'the film's soundtrack' but one of its elements, we can begin to assess the role that music plays in contemporary soundtracks. A first consideration in this sense might sound harsh: music is rarely the structuring element of a soundtrack. Ask any sound professional in the business today what is the most important element in a soundtrack and you will almost invariably receive the same answer: dialogue. Today, as it has been since the inception of talking dialogue in movies, the principal preoccupation of filmmakers is to 'get the dialogue right' (i.e. clear and audible), as this quote from sound designer Bruce Stambler reiterates:

> 'I think you should hear all the dialog. In a movie you are trying to tell a story. The first thing you think if the dialog can't be heard is 'I didn't hear what they said' and now you are no longer in the movie, period. You need to suck them in and keep them in.'[79]

Despite the enormous improvements in sound technology over the past two decades and the remonstrations of many film composers, film sound is still very much centred on the voice.[80] Sound effects and music play key roles, but usually second fiddle to the dialogue. This is not to belittle the role that music or sound effects play within the soundtrack, but to highlight the collaborative nature of the process. This is particularly important when it comes to identifying agency and responsibility in contemporary film music. In particular, the issue of agency is very intriguing because it does not lend itself to pigeonholing. How

can we to tell who is actually responsible for the way(s) music functions in a movie? What are the criteria we should follow to identify a sonic 'author'? Perhaps more to the point, is it useful to even attempt such an enterprise? If we were to look back at the purist approach, the assumption is that we already know the answer to those questions: the sonic 'author' in movies is the music composer. The argument to back this up is that he/she is the only recognisable 'artistic figure' amongst a group of technologically minded craftsmen and women. This view is so deeply rooted in our understanding of film sound as to be shared by most filmmakers themselves, as this appeal to reason by a leading sound designer indicates:

> 'The main attitude people have to change is that sound is a technical part. People think of it as negative cutting, it's the technical step at the end where you put the door slam, the cat meow, the traffic in – then you have a finished film'[81]

The realities of filmmaking practices present us with a rather more complex and articulated picture than the one implied in conventional accounts of film music and the soundtrack. To begin with, the actual involvement that composers have with a film varies considerably according to factors such as composers' own working practices, the relationship that is established with the director and the sound crew, the time allocated to post-production, and so forth. Most composers will have little contact with sound designers and supervising sound editors in the crucial stage of the creation of the final mix (i.e. when the soundtrack is finalised and all the aural components are 'locked' together). Rarely will a composer discuss his choices with the sound team, and even more rarely will he/she be present at the final dubbing stage to monitor the use that sound designers, directors, film editors and even producers will make of his/her carefully composed music score. Once the music score is handed over to the director and the post-production team the role that the composer plays virtually terminates. There are of course exceptions (see for example the relationship between Ennio Morricone and director Sergio Leone, or John Williams and director Steven Spielberg), but these are more due to the special relationship that exists between director and composers who have worked together over a long period of time rather than the rule. Thus, the music score undergoes a series of changes, such as editing and mixing, that are a direct result of the cooperation between the sound team, the editorial team and the director, but from which the composer will mostly be absent. This is the stage when the composer's music ends its life as 'music score' (to continue its commercial life in a reincarnation on the

music industry stage) and becomes music in film, that is, part of the soundtrack. Once this web of interactions is taken into account, how could we reach a definitive conclusion as to whom is actually responsible for the way music functions within any given soundtrack? We know who composed the music. We can find out who edited it and whether he/she added any significant amount of extra material (a practice rather common in contemporary Hollywood movies). Next, we can investigate which place the music was given in the soundtrack by the sound designer and those who re-recorded it. We can even ascertain as to how well versed in all things sound the film director was. Finally, we can find out how efficiently the editorial machine worked to ensure a smooth progress in the final mix. The deeper we go, the more obvious it becomes that, although we can place the paternity of the music score in the hands of the composer, the same cannot be said of music in film. This is simply because there is a considerable amount of people who can legitimately claim a share of the creative investment that goes in devising and employing music in film. These considerations are particularly important in relation to issues of reception. Film audiences will perceive music not as a separate entity but as part of a whole. In other words, once they are mixed together, the separate elements of the soundtrack will be inextricably linked and audiences' perception of them will be coloured accordingly. As John Williams eloquently points out:

> 'Well, concert music requires 100% of the intellectual and aural attention from the audience. But in a film we (composers) have to understand that we've got maybe 20% of the audience's attention and our role is to support the other aurally-prepared materials of dialogue and SFX the other 80%' [82]

One example might help to illustrate further these key points. Take the case of a romantic piece of music. Music media audiences will perceive the phrasing and mood of the piece based on its musical qualities and conventions. That is, bar factors external to a normal listening environment/situation (such as personal circumstances), they will perceive that piece as 'romantic'[83]. Now consider the possibility that that same piece might be used in a soundtrack, perhaps to underscore a particularly romantic moment in the film. Picture the scene if you will. The two leads are sitting on the porch professing their love for one another. It is a quiet summer evening, and a light breeze occasionally rattles the wind chimes hanging from the ceiling producing a gentle tinkling sound. A distant sound of

crickets and the occasional car passing by complete the soundtrack for this scene. In this context, film audiences will most likely perceive the music in a similar fashion as the music-only listeners: all elements of the soundtrack work towards the same goal, the representation of a romantic situation. Let us now imagine a similar scenario but with a few aural changes. We will retain the music, the romantic leads, the porch and let us throw in the warm summer evening too. We then increase the sound of nearby traffic. The breeze is now playing up with a window that has been left ajar. As a result, there is a constant, almost rhythmic, noise of the window slamming against its frame. In the distance, we hear some people shouting whilst having a heated argument (maybe another couple arguing?). In this second scenario, whilst the visuals, dialogue, general set details and even the music may be the same, the other elements of the soundtrack work to suggest something rather less idyllic about the two romantic leads and their situation that in the previous example. More specifically, this is emphasised by the juxtaposition of sound effects and romantic music. I do not wish to suggest the musical qualities of the music piece have changed. Nevertheless, the way music functions within the soundtrack and the way audiences will perceive and understand it have been radically altered. Once again, these considerations emphasise the need to investigate the roles and importance of the other figures involved in the manipulation and representation (literally) of film music beyond the composer. Music editors, sound designers, rerecording mixers (not to mention film editors, directors and even producers) all have an input in the process that intervenes between a composer handing in the music score for any given film and the soundtrack being reproduced in a movie theatre.

The need for a 'medium specific' approach

The focus on composers and music can rely on a well-established and documented history of traditions. This aids the 'framing' of critical approaches to 'film music as music'. In this sense, discourses on and around tradition are instrumental in vouching for the validity and worthiness of the object of study. Hence, Sam Mendes's success is emphasised as being in the tradition of Orson Welles, Nora Ephron's writing and directing endeavour is in the tradition of Frank Capra's feel-good movies, and so forth. Although tradition is often invoked, especially in the case of acting, directing, cinematography and composing, this

has rarely been the case for sound. [84] In other words, tradition has been used in critical discourses to drive a wedge between the artists and the technicians: composers and cinematographers as artists, film and sound editors as technicians. This reference to identifiable traditions and models is not necessarily damaging to critical studies of cinema. However, the lack of attention to the specific nature of film music has hindered the development of an articulated position on film sound tradition(s). As a result, most work on film sound oscillates between histories of technological development on the one hand, and accounts of the work of individual soundmen and women on the other. This is an issue of attitude as much as critical acumen. Two groups have mostly conducted the debates on and around film music: music scholars and composers themselves on the one hand, and film scholars with little or no direct investment in sound on the other. The first group shows characteristic signs of tension between the desire to investigate film music as another facet of music, and the hierarchy at work in music criticism that regards film music as 'less important' than 'serious' music.[85] Ennio Morricone captures this latter aspect in these starkly aggressive words: 'I don't want to do those (film music concerts). I want to do non-film music, meaning more refined, difficult music'[86]

The second group is genuinely concerned about providing an overview of film in all its aspects, and this necessitates some degree of attention to sound. However, the latter almost invariably focuses on music to the detriment of any serious attempt to investigate film sound (for more see previous chapter). In many ways, the result is further confirmation of the original doubts about the role of sound in the cinema that early theorists had cast: you either see or hear. That is, musically trained scholars can talk about film sound but not images, traditionally trained film scholars are in a antipodal position: they can see but not hear. Gorbman has perfectly encapsulated this in a provocative remark:

> 'I suspect that once scientists have succeeded in mapping and explaining the brain, it will become clear that people who are film critics exercise different areas of the brain from people who can talk articulately about music they hear'[87]

As Rick Altman has pointed out, there is 'not a single sound in the cinema that can be adequately described with music terminology'.[88] That is, we continue to employ a vocabulary that is hopelessly inadequate to investigate film music (and sound). We have not looked hard enough into key issues such as the relationships between music, sound

effects and dialogue. We have not yet even begun to investigate the dynamics of audience reception of music specifically designed and recorded for film exhibition, nor have we attempted to look into related issues such as the design of cinema loudspeakers and their placement. Most importantly, we have not interrogated enough practitioners about the creative, technological and personal relationships that dictate the creation of film soundtracks. In other words, it is time to listen to the creators of sound.

Part 2: The sound makers: Interviews with the creators of sound

One of the most defining features of the Dolby era has been the development of professional figures old and new. In the pre-Dolby era, sound credits were conventionally attributed to a single figure, usually a 'sound engineer'. This was customarily the head of the sound department within any given studio. In other words, if audiences and critics were to judge from credits alone, it would appear that a handful of people were enough to put together even the most complicated of soundtracks, whilst reinforcing the notion of sound people merely as technicians (in this sense, the word 'engineer' is a strong indication of attitudes to sound within the industry). The arrival of the new generation of sound men and women whose work in the seventies was crucial in establishing Dolby as a creative and technological force has since then challenged established patterns of production as well as existing views on the nature of sound work. As I have indicated earlier, the sound conscious generation of filmmakers that had spawned Lucas, Spielberg, Scorsese and Coppola identified early on in their careers the importance of considering sound as a key element rather than just an add-on. Importantly, the new ranks of film sound practitioners had attended film schools just as, and sometimes with, those same directors who were now beginning to impose themselves as the new leading group in Hollywood cinema. Lucas hired Burtt for Star Wars almost immediately after Burtt had finished film school at USC, the same university Lucas himself had attended.[1] Murch was also a USC film school graduate and, indeed, a college mate of Lucas. The director with whom he would become most commonly associated with, Francis Ford Coppola, had also attended film school, but across town at UCLA.[2] Indeed, film schools such as USC and UCLA, both in Los Angeles, and NYU in New York have since provided a steady flow of creative talent.[3] This new kind of film professionals had been exposed to notions of auteurism in their studies and understood well the political and cultural implications that arose from those established views on creative responsibility. It is therefore unsurprising that the work of this new pool of sound talent should show the signs of an impressive sense of confidence in the creative potential of sound coupled with a similarly remarkable will to claim a more substantial role in the filmmaking hierarchy. The latter point is of particular importance to the development of sound aesthetics in the Dolby era for it would be difficult to imagine soundtracks as

innovative as those of Star Wars, Apocalypse Now, The Right Stuff and Raiders of the Lost Ark without the privileged position that sound people working on those films enjoyed in terms of time allowed, relationship with the director, and early involvement in the filmmaking process. In this sense, the 'political' involvement of key people such as Murch, Thom and Rydstrom amongst others in raising awareness of the creative contribution that the sound people bring to a movie is illuminating. The widely documented move by Coppola and Murch to credit the latter with 'Sound Montage' and 'Sound Design' credits, rather than the more traditional 'Supervising Sound Editor' or 'Sound Engineer', represented the first real attempt at addressing the central issue of the 'status' of film sound and thus of sound people. In particular, the main concern seems to have been that of challenging the view, commonly held both in filmmaking and academic circles, that sound is merely a 'technical issue', and by extension, that sound people are 'technicians' (see my interview with Gary Rydstrom in Chapter 3 for more). Since then, the most successful designers have attained the kind of status that pre-Dolby generations of sound people neither dreamed of nor dared to pursue. The issue of status is central to the creative effort because there would appear to be a clear correlation between the status of a sound person and the level of his/her engagement in the decision making process: the higher the status, the earlier the involvement. Because many sound people have highlighted the importance of getting involved as early as possible on a film project so as to be able to have a say in decisions that might later impact on the soundtrack, the issue of status and level of engagement in the filmmaking process are part of the same argument.[4]

This section's aim is to give a voice to some of those creators of sound that have been instrumental in continuing the development of sound aesthetics and technology in the Dolby era. There are two main reasons for choosing Gary Rydstrom, Bruce Stambler and Tom Holman over other interviews I could have included here. First, their work and expertise cover a wide spectrum within film sound. Rydstrom talks eloquently about the two roles he has most often been involved with, namely that of Sound Designer and Rerecording Mixer. Bruce Stambler's views are indicative of the kind of thinking that a Supervising Sound Editor follows in creating and organizing a soundtrack. Finally, Tom Holman's account offers a remarkable insight into the technological and institutional concerns that have affected the development of cinema sound technology in the Dolby era,

especially about the pursuit of a 'quality standard' through the THX sound program. Second, they have all been very influential in shaping film sound as it is today. Rydstrom, a winner of seven Oscars, is undoubtedly the most successful designer of his generation and has been a key factor in developing the world's leading post-production facility, Skywalker Sound, as well as being the inspiration behind the development of Dolby's EX sound system (see Chapter 1). Stambler, himself an Oscar winner, is one of the major contributors within Soundstorm, a leading post-production facility in Hollywood today. As for Holman, his role in developing the THX sound system whilst at Lucasfilm has been instrumental in addressing questions of sound reproduction in film theatres as well as providing filmmakers with optimal working conditions when mixing films. He is now at the forefront of future developments with the company he has created after leaving Lucasfilm, TMH Corporation, and is a key 'educator' of the next generation of sound people as a professor of film sound at USC.[5] Although different in outlook and creative approach, their status and contribution to contemporary film sound marks them as belonging to a cohesive 'elite group', whose views and work have shaped the Dolby era in creative, institutional and technological terms.[6] Ultimately, their views and thoughts are as revealing as they are incisive in offering a fascinating account of the way sound has developed in the more recent stages of the Dolby era.

Chapter 3 - Gary Rydstrom

Gary Rydstrom is a multiple Oscar winner for films such as Titanic, Saving Private Ryan, Terminator 2 and Jurassic Park. He has collaborated with some of the most influential directors in Hollywood, from Steven Spielberg to James Cameron to Paul Thomas Anderson. He is also Director of Creative Operations at Skywalker Sound, a division of Lucasfilm, and has provided the inspiration for Dolby Laboratories' latest sound system, Dolby EX.[7] The following is the result of an ongoing dialogue carried out over the past few years through meetings, interviews and emailing.

Gianluca Sergi: I'd like to start by asking a asking you a very basic question to which we can hopefully get a straight answer: what is sound design?

Gary Rydstrom: Well sound design is a bit of a confusing term and I use it because I come out of a tradition in Northern California, especially in terms of what Walter Murch did, what Ben Burtt was doing. They used the term to mean someone who was really the architect of the soundtrack from the earliest point in the film all the way through the mix so it was really the equivalent of an art director, someone who thought of the whole soundtrack and how it was going to come together to give it a consistency. Within that there is this idea of creating sound effects which I also like to do to create a library and 'manufacture' sound effects but I think it's much bigger than that. It's really trying to be the person that the director can turn to for the whole soundtrack and make sure that it comes together appropriately for the film.

Sergi: Before we get into the specifics of that can you give us an idea of how you get involved in a project?

Rydstrom: First of all, I get a phone call to see whether I'm interested in a film that's many years away, or maybe it hasn't been shot yet. I get that first phone call and, these days, what's nice is that I get projects usually from people that I worked with before. So, it comes down to that first offer that first phone call. Part of the trick of doing this job is to wonder if

a film is going to be good or interesting long before that film is shot so you are taking a bit of a risk like anybody else.

Sergi: Let's say you are on-board a project, what happens next?

Rydstrom: Hopefully there'll be a script and the first thing that I do, because usually I'm on before anybody else starts, is just to think about the feel of the film. The most important job early on for someone doing sound design is to figure out the personality of the film, what kind of soundtrack will fit the mood and the personality of that film. Each film really has its own distinct feeling to it and so you start thinking in terms of what that feeling is going to be and what you can do with the soundtrack that will help it. What I like about sound is that there is no blank page really; it's not like writing and it's not even like visual effects when you create something out of nothing: you go to the computer and create a dinosaur out of the computer, out of nothing. What I like about sound is that the first step for me is going out into the world and recording real life things, recording props, animals, whatever, and it's like nature photography for me, so it's a way to come up with ideas just through the random interacting with the world. So that first step really is to come up with those ideas: where should we go to start recording sound effects, what would be the most promising places to find things to record; then on the way it's a discovery process: the thing that I thought was cool it's not so cool but this thing down the road is really cool. You start collecting raw sounds from the world and then those raw sounds become the building blocks with what you come back to the studio and create.

It's important when creating sound effects, when creating a soundtrack, to have the control that comes from building up from little bits and pieces so you do end up with hundreds and hundreds of little titbits of sound. The job back in the studio is almost like panning for gold; you are sifting through all this stuff and you are looking for those interesting moments, those things that you captured when recording sounds for your library.

It then becomes a big puzzle in my mind: I'm starting to think about these sounds here that seem to group into what'll be a great vehicle sound, these will be great ambiances, this is a good feel for a creature, these will make great doors. You start grouping them and experimenting and throwing a lot of stuff out. The way I work, I use a synclavier to fairly

quickly take sample of different sounds and layer them on top of each other and see what I can turn them into. Part of that jigsaw puzzle is saying: the ambience for this location should not only be good for the location onto itself but it should be a great contrast in the context of the movie to this other location which will have maybe a higher frequency sound, in this location I want a lower frequency sound, in this vehicle I want to be low and smooth, in this vehicle I want to be high and rough so you start orchestrating the various sounds in the soundtrack, how they are going to work in context with each other. The whole key to sound is context; sounds are always playing in relation to what came before and what came after so when you start creating a library of sounds for a movie is very important to consider the whole thing. I've heard people talking about it in the past "always save the biggest gun for the hero" kind of idea so you have various guns but you want to have a bad guy gun that sounds very different than the hero gun, the Indiana Jones gun sounds different from the bad guy gun. So you think in terms of the whole picture in coming up with these sounds.

Sergi: You used the word 'orchestration' and that's an interesting concept because it suggests that you an overall idea of what the picture ought to sound like. Is that what it is, or is it my interpretation?

Rydstrom: No, that's exactly what it is. Sound happens over time. What makes sound different than the visual is that you can take a visual cue and you can take a picture and fairly instantly 'read it'. Sound is always about time, even what you think of as the shortest sound; everything is happening over time. It's all the same elements that make music, music. There is nothing different in what the building blocks of music are to what the building blocks of the soundtrack in a movie are: it's all pitch, and rhythm and orchestration of various elements happening over time, that's all there is. I wish I knew how to orchestrate music literally, because I'm not that good musically but I think that that would be the best of thinking about putting together a soundtrack. It really is orchestration so when you are thinking about what sounds go well together, what instruments would play well together either in concert or in contrast and how you build the music to climax at various points and then to rest so everything is shaped over time and the same thing with

the soundtrack, you are always thinking in terms of time and layers. People ask after a movie is done, especially a big movie, how many thousands of sounds were going on at any one time. The truth is that you shouldn't have thousands of sounds going on at any one time; you can have thousands of sounds over time, but the complexity for a soundtrack is sequential, it happens over time. It's not hitting you all at once: now I'm hearing this element of the soundtrack, and now that one; it evolves and changes over time.

Sergi: Presumably, at some point or other, you come to realise that there are certain sounds that are perhaps more important than others in the movie and that deserve a little more attention. They might be sound signatures, for example, or sounds that are repeated over time and that are particularly important for the narrative. Can you give us some example of that?

Rydstrom: Sure. Any movie is going to have sounds that should be fairly unique or completely unique to it. The obvious example is Jurassic Park because you knew that the sound of the dinosaurs was going to be the signature sound of the movie; so you know where to put your effort, where to concentrate. Those are the sounds that are going to make that movie sound unique. In every movie you need to decide what to focus on early on to make it interesting. In Saving Private Ryan there was obvious weaponry and things that we needed to find the real sounds for, but we also knew that the way the film was shot had made such a point of view, especially the first battle, that the sounds we needed to focus on getting were what battle sounds like from on the ground, from the soldiers' point of view, bullets pass-byes and whiz-byes the head and impacts and just the cacophony of battle from the point of view of a lone soldier on the ground in the middle of that sound as opposed to a big, all-encompassing sound of battle.

Sergi: Many people have commented in the past, including yourself, about the fact that when you are thinking about a sound that can be used in a particular moment in a film, it is not the literal quality of that sound, in other words it is not the sound that the object on the screen would make in real life, but the effectiveness in narrative terms of that sound that you are going for. Is that the way you work?

Rydstrom: Absolutely. I think what we are doing all the time when we are cutting sound in a movie is making note of our own emotional reaction to a sound, so even the simplest sound like a door creak or a cricket chirp you choose because of your emotional reaction to it, and I've always been less interested generally in being realistic than in being dramatic. There are certainly times when you want to be true to the real sound of a car, the real sound of gun, but very often in movie sound you want to create the effect, the feeling of it, and it's amazing how many times something will sound 'right' because you artificially created something that had the right feeling than if you had done the literal thing. You know, we are not making documentaries. If you are making documentaries about the actual sound is different but in movie sound very often you are just trying to make the audience experience the correct feeling for anything from a guns shot to just a spooky forest ambience. You want it to be realistic emotionally and dramatically as opposed to in reality. The old story in Hollywood is that if you record a gun, a real gun and put it into a movie, into a Terminator-type movie, it'll never seem big enough, so you sweeten it with cannon blasts and canyon echoes and all sort of other things to make it movie reality. If you think about it, the images are blown much bigger than in reality on a huge screen. It's all very subjective, and it's about finding the right feeling. One of the great moments of pride I had was after we did Saving Private Ryan, in which we did take a fairly literal approach to some of the sounds of the machine guns and the artillery of that war and tried to stay true to it, but there were other times when we couldn't, or I wanted to find the sound that seemed emotionally correct. There was a scene in that movie where these German tanks come into a town, and they keep coming, and they are coming for five minutes. You hear them off in the distance and they (the soldiers) are preparing for battle while you hear these tanks echoing through the buildings, slowly coming closer, and closer, and closer. Afterwards I heard from several veterans, people who'd been in tank battles, that it was nice to hear that distinctive sound of tanks approaching captured so well in a movie, and that was one of the sounds in the movie that was artificially created: I just scraped things on concrete to get the squealing of the tank threads and I made rhythms not from real tanks motors but from other motors and then I artificially created these pulsing rhythms and did it artificially in that case, but emotionally it worked for the people who should know, so I was happy about that.

Sergi: You mentioned a couple of times the word 'subjective'. Tom Holman (inventor of THX sound system and former chief engineer at Skywalker Sound) once told me in an interview (see Chapter 5 for full interview) that sometimes that particular drive that a sound designer almost naturally has of going out looking for the most effective sound rather than the more literal one might create problems with directors. For example, when you do the final mix, when you lock picture and sound, simply because a director might not be prepared to hear that particular sound at that moment, he might be shocked by it. In many ways, we are talking about 'politics' in many ways. Has that ever happened to you?

Rydstrom: Yeah... I did a movie called Single White Female with Barbet Schroeder and it took place in New York, in an apartment building. Early on he had talked about wanting to use the world around us in the apartment building, the world of cab drivers and traffic and creaky buildings and plumbing to create a psychological soundtrack as opposed to being more realistic. So I did some sounds I thought were purely subjective, purely emotional, rhythmic, very 'David Lynch-Alan Splet' like sounds, and since he was willing to go that way. When he heard them he said: "Rydstrom what you have done with these sounds, it is fantastic", and I said "Oh, thank you very much" and then he said "I think maybe it is too fantastic" (laughs), so that was his way of saying let's go back to reality a little bit. I just did Minority Report with Spielberg and there is a scene where the Tom Cruise character is drugged by this back alley surgeon and it's a very eerie, scary, bizarre scene so I put in these sounds that weren't related to anything at all, they weren't the reality of what was going on. Spielberg wanted to know what they were and he kept asking me "What is it?" and I had to finally say "Well, I would say it's... plumbing, I don't know, plumbing". Then he kept referring to it and he'd say "There I'd like the plumbing, there I would like to take out the plumbing". It is very subjective both in the way an audience perceives it and also in how you work with a director, what you buy as the proper sound effect at that moment and also what the director is going to buy as well, so it's always a negotiation really between the two of you.

Sergi: As you say, there is a certain amount of 'negotiation' going on there.

Rydstrom: Sure and I have to say, and I don't want to appear somewhat negative, but I wish that in general filmmakers were more open to using sound in a less realistic way. I think that everybody in the film industry, including sound people sometimes restrict themselves to being more literal than they should. Some of the best filmmaking has treated sound less literally and it's shown itself to be very effective. But it is considered risky in a way that I don't think it should be. I think it is one of the fights that I wish we didn't lose this much because there is more potential in the soundtrack than most films make use of.

Sergi: What you've just touched on, the issue of being more conservative, shall we use that word, in terms of choices when it comes to the soundtrack is quite striking. You find repeatedly, that people will say, "There are certain things you should never do" or "There are certain things that I would never do". For example, one of the best examples is the dialogue. One of the key tenets is that the dialogue stays up front, where the screen is, where the action is, and that you very rarely move it to the surround channel, to the back of the auditorium. I know there are some technical reasons for that but I suspect that it is an issue of not wanting to 'push it'. What's your take on that?

Rydstrom: It's dangerous to have rules. There are things that work, but there are also things that are too restrictive and you end up making everything the same. If you think about the rules too much all the films start seeming the same and all the films' soundtrack start seeming the same. I think it's very important to, I guess, break the rules but more to the point you really need to think about what's good for the movie at any given moment and it might be that you need to say "To hell with the rules, it's just the movie telling you what to do, the movie saying "I want to move the dialogue in the surround" because, say, in the movie Strange Days, which is about a point of view of someone captured on this futuristic technology that can capture experience, and so part of the experience of life is that things happen around us, including dialogue, so the movie is saying "let's put the dialogue behind us". I think rules are less important then looking at each film individually and saying what's going to be the most important thing. What I find happens when people think about sound, including sound people, is that they think that the dialogue is the literal part of the

track, you get the information from dialogue, and then you have music at the other end of the spectrum that is pure emotion and that is really not connected to anything, and a lot of soundtracks have dialogue and music and really don't make use of this vast area in between that is what the rest of the track can be which is some combination of literal and figurative sound that can always be doing something to set mood and to get you inside a character head and to be dramatic. A lot of approaches say that sound should be this: 'if I see something on the screen put a sound there so the audience believe it's really happening' and that's the extent of it. But even the simplest choice in sound, the cricket chirp, can be made from a dramatic point of view so that the pace of the cricket chirp is appropriate to the mood of the scene. I'm much more interested to pick a cricket chirp even if it's from Australia for a movie that takes place in Ohio that is appropriate to the drama of that scene; if that's what works, that's what works. I think there's a thinking that sound is fairly obvious: you see something you put a sound in and you are done, as opposed of making use of this whole 'angle' on the film to do all sorts of wonderful things to support the film itself. To me what makes it all more powerful is that you have two levels of a film: you have the visual side that is giving you some information and you have the sound side. They are really two aspects to the film and they are equally important and equally able to convey information. What I think is most powerful in films is when they are giving you two different levels of information. In Das Boot there is a scene when they are diving deeper and deeper in the submarine and the pressure is building up until eventually the bolts pop and they are hoping not to be discovered by a ship going overhead. That scene is very tense because it stays on close-ups of the characters as they are nervously, silently waiting to get through this. Meanwhile you hear the creaks of the sub, and you hear the ships going overhead, you hear all this off-screen world that tells you that part of the narrative where the visuals can tell you the human part and they can get you close to the faces so the image and the sound are telling you the story from two different angles. Very often in movies people give you the same information from sound as they are giving you from the visuals as opposed to two different 'angles' on it. In the war film I did, Saving Private Ryan, we did the same thing. The visuals were very close-up and the way Spielberg shot, especially the opening battle, was very 'close' and confusing visually. You didn't get the wide scope of battle. You didn't see the Germans on one hand and the allies coming up the beaches on

the other side and you got this big establishing shot of the battle. It was always shot from a very intimate angle and the soundtrack's job was to tell you the story that is going on all around us. It was an effective use for the track to tell parts of the story that we were not seeing, and vice-versa. That's what makes much more powerful cinema to me than being literal and single-minded about it.

Sergi: That introduces another topic I wanted to talk about with you, and again it refers to these aesthetic rules that are passed down 'from generation to generation'. One of these rules seems to be that you should never distract the audience from what is happening on the screen. Many sound people, and directors, often refer to this as 'key rule number one'. In other words, the worry there is that if you put sound in the surround, that is, sound that you are not seeing on screen, your audience might feel distracted by the sound happening in the back of the theatre and be taken out of the narrative. What's your take on that?

Rydstrom: There are certainly cases like that. If you put for no good reason the sound of a door opening into the surrounds that might make people turn around and think "Somebody is coming into the theatre", or another is when you put a phone ringing in the back. There are things that you can do that are just lame and that might take an audience out of a movie, but my strong feeling about is that since we are predators, the way we perceive the world is that we see up front, we see up front very well, and we hear all around us. We hear 360°, we are always hearing 360° so why shouldn't movies reflect that reality when it's dramatically appropriate? I don't think audiences will be distracted, if you design the soundtrack properly, by a world that is going on behind them and off-screen. In fact, that's where some of the greatest potential for a soundtrack comes from because as I said the soundtrack can very often tell part of the story that is not being told visually so that off-screen world, so called, which includes things that you can out in the surround can be very effective for giving a sense of location, which can also give us a sense of mood and that it reminds us that there might be two people talking but there's a car hurtling toward them on the freeway that's coming from behind us. It tells us a story that's important without being distracting. I think we are able to get through life by looking straight in front of us and

listening all around, that's the way we take in the world, so there is no reason why movies should not reflect that same reality.

Sergi: What is re-recording mixing, and what do you do as a re-recording mixer?

Rydstrom: On my door I used to have my title as 'Re-re-re-re-recording mixer' (laughs). It refers to taking things that have been recorded once and putting them back to a console and recording them again. This is to distinguish it from someone who's on a scoring stage mixing live music onto tape. So re-recording mixing is taking material that have been edited, sound effects, dialogue, music, Foley, and starting to funnel all those elements to the final mix of the movie. It starts with pre-mixing when we'll take different elements from the sound effects and dialogue, Foley and the music separately, get those under control and start making some early decision about how sounds are working together, and how they move across the screen, and equalisation and all the things that you can do on a mixing board. Then the pre-mixing move to final mixing when now we are choosing how to layer all these many different elements that are available on the soundtrack. Whereas editing is a process of putting things in, placing things in synch to the film, the mixing part, I find, is usually a process of taking away. So we prepare too much, everyone always prepare too much, for the soundtrack: you can't play it all together, you can't take it all in, it gets too cacophonous, too confusing, so the mixing process most importantly is about, again, focussing the audience attention on what's important at any given time. If the music is carrying a scene you play up the music, you balance it in and out with the dialogue and sound effects. You know, it's like three or four different roller coasters, everyone is moving up and down, heading off to another element that then has its moment and then heads off to another element. It's a dance really between the different elements that are available on a soundtrack and how you play them, which is something that I guess works so subliminally that you don't realise that the effectiveness of a simple choice of level and how dramatically different it can be.

How you play music and dialogue and sound effects moment to moment really affects the effectiveness of a scene, the drama of a scene, so I think it's probably misunderstood by a lot of people as being a fairly technical exercise of just getting everything at the right level

and you re done but it comes down to a constant choice being made over what elements to hear, how much of them to hear. This is where the 'sound over time' issue becomes important because you are thinking about the shape of a scene, the shape of a reel, the shape of a whole movie so that things have this up and down, peak and valleys.

Sergi: You mentioned the issue of choosing what goes in the background and what stays in the foreground and that sounds like one of the most creative aspects of what you make decisions about. You have all these hundreds of different sounds and there is a process of selection that needs to go on. Can you tell us more about that? First of all, who's present when you do the final mix?

Rydstrom: We just did the latest Star Wars film, Ep. II, and we had three mixers. I mixed the sound effects and foley, then we had a mixer for the dialogue and one for the music. So there's three of us working together, and it's really like driving a car with three different steering wheels so we are trying to work together, and it really is like dancing. Then there is the director, often he is not there for the minute-by-minute part, but the director is involved because they are the final arbiter of what works, and the thing is that there are choices all the time that you have to make and things that go on to the equivalent of the 'cutting room floor', we need a term like the 'mixing room floor' because a lot of things are left on the mixing room floor. Those choices about what works best for the movie aren't always obvious and the director is who makes that final decision. One of the bigger conflicts that happen in the mix, the most obvious one, is sound effects and music. The dialogue usually, unless it's considered ambience, has to be heard, we make sure that audience understand it, but then there is this conflict between sound effects and music partly because they are both tonal, they both have rhythms, they both eat up the track, if you put a type of sound with a certain type of music you might not have clarity in the music, or the music might eat up the clarity of the sound effect and that relationship is what we spend a lot of the time working out in the final mix. It's really orchestrating through the console, it's orchestrating by choosing which elements are going to work best together.

Sergi: Is it a fair thing to say that there isn't that much collaboration between the composer and the people who work on the soundtrack?

Rydstrom: It's very fair to say. There are occasional movies where people are lucky enough to have a true collaboration, but in reality what often happens is that the composer is doing their work up until the last minute. They have a fairly big job to do and it doesn't show up on our doorstep until the final mix begins. So very often we haven't heard the music, we haven't played it with everything else until we are in the final mix trying to make it all work. That's just a matter of scheduling, and time and reality. There can be discussions early on, and at the very least I try to go to music spotting sessions to be there and talk and think of things with the composer in terms of, most importantly, what scenes the music is going to 'take', because the music doesn't 'have' to be there; sound effects, to some extent, are there all the time, but the music can come and go, and where you choose to start it and where you choose to stop it is a very important element of how effective the music is going to be. And since it is orchestration, now we are talking 'uber-orchestration'! We are talking about orchestration between the music, which is complex in itself, and the rest of the track that has to play wit it and so, if we are good, we'll have early discussions about the type of instrumentation, the frequencies the composer is thinking about, and the frequencies the sound effects are more likely going to take. I was lucky enough when we did Jurassic Park because John Williams composed the music here at Skywalker Ranch so I was able to play him some of the dinosaur vocals that I had created early on. He thought of them in terms of the pitch, so he would say "That dinosaur is a cello, this dinosaur feels more like flutes" and then he was able to think about in terms of writing the music and orchestrating it for those scenes. This is pretty rare, but it works well when it happens.

Sergi: Is it also true that the composer is very rarely present during the final mix, when those kinds of decisions are made?

Rydstrom: In my experience the composer is very rarely in the final. They are usually working on the next film (laughs), but it is very useful (to have them there). I have done the last couple of Spielberg movies where John Williams took a very strong interest on how

things were working, not to just 'protect' his music but to make sure that it was all working for the film so in A.I. and Minority Report it would come by for at least playbacks of reels as we were working on them and he was able to see how his music was working so that he could change cues, change the way the music was edited and come up with ideas, and that was invaluable. I like it when the composer can have the time to come to the final mix, as long as they are not there just to... well, you don't want to do this, but sometimes you feel like you are there to 'protect' your work which is not really important. You should be there to see how it is all coming together and see what you can do to make it better. I think one of the areas that can most improve in making a soundtrack is for the sound effects department and the music department to work better together, because that relationship between sound effects and music is such an important one for the mix.

Sergi: The accepted wisdom is that the director has creative control over just about anything but, although obviously the director has ultimate say as to what goes and what doesn't, you are actually painting a picture where the sound people, especially in the final mix, have quite a lot of latitude in terms of creative input. Is that a fair way of describing it?

Rydstrom: Yeah, I think different directors have different amounts of 'hands-on' but in general you can say that the whole idea of making the movie and making the soundtrack is so complex, by virtue of what it is, that a director is not able to create everything that comes into the final product. For me in the mix the director's job most importantly is to be at that point, funny enough, the most objective observer of the mix of that movie to see what's working and make sure that we are helping the movie, not hurting it. Film directors are dependent upon a fairly large group of creative talents who for a good part of the time are working alone. The auteur theory and that whole concept I think sometimes ignores the fact that movies are too complex for any one person to create everything themselves. Their job is to make the paradigm that the movie exist in and to be the final 'say' about what works and what doesn't work but, man, there are many people who do a lot of work, including the sound people, that affects the overall movie, whether it works.

Sergi: You once told me, speaking about Terminator 2 and working with James Cameron, that he often works by taking sounds out, in other words using a 'less is more' approach. That's interesting especially because Cameron has been described, especially after Titanic, as a director of 'excesses', the richness and wealth of detail, and so on, especially in the images. Have I understood you correctly? Do you believe that Cameron has a different approach to sound than he has to images?

Rydstrom: He has a very distinctive approach to sound that is based a lot on contrast. It's really true, he does believe that less is more, and I think you can make an argument for it visually as well. The counterintuitive result of it from the soundtrack point of view, which is really fascinating to me, and I really learned this from Terminator 2 and I learned it from him, is that people thought when Terminator 2 came out "My God, it's huge! It has some of the densest, biggest action stuff we've ever seen". Cameron's trick to making it seem big and dense is to keep it focussed, and I think he does that visually as well as sound wise. On the soundtrack he really didn't want to have a lot of extraneous sound, he wanted to focus moment to moment on "and now we are in the front of the engine of the truck and we hear that, now we are not and don't hear the truck at all; now we hear this, we hear the motorcycle" and so on. He was very focussed on what sounds happened when and by virtue of taking out, which is always what we do in mixing, but he sometimes took it to extremes, things that weren't necessary, since you are not being literal about it, you just take out background and other things that are not so important, it made each of the things that we left seem bigger. Even in the actions scenes in that movie less was more, the more paired down the track became, each of the moments had more freedom to live: the explosions seemed bigger, the big climactic moments seemed bigger.

Sergi: Let's move on to what could feasibly be described as the opposite of this approach. You mentioned before the opening sequence of Saving Private Ryan. In many ways that's the kind of sequence that wins you an Oscar: it's the perfect example of complexity. Can you tell us about how do you go about organising a scene that immediately is huge?

Rydstrom: If sound effects editing is knitting, that scene was knitting a very huge piece of clothing (laughs). That was perhaps the most detailed sound work I've ever been involved with. The trick with that scene was to try to express the chaos of what war sounds like but also to articulate it. That whole track was built up from the smallest little pieces: each bullet impact was cut in individually, and each bullet pass-by and guns. It was built up from the tiniest detail and orchestrated. The first thing that made that scene effective was two choices that Spielberg made. One was the way he shot it: he didn't spend a lot of time establishing the literalness of what was happening. He was very subjective in the way his hand-held camera work was done, so you took to the scene as though you were this unnamed soldier experiencing the landing in Normandy. Because it looked subjective, it opened up the possibility of playing that scene as though you are experiencing it as an audience member. The other choice he made that was really important to me was to leave the music out and have no John Williams' score until the battle was over. In fact, none of the battles in that movie had traditional score. The score was always used to react to something horrific that we had just been through, as a lightening rod for our emotions after we had gone through twenty minutes of horrific warfare, then you stop and the music would come on and be a life saver; it would be something that you could grab on to and your emotions could drain into it as a reaction. Spielberg was very smart to know that having the score, any kind of score, the greatest score in the world, over those battle scenes would take away the subjective feeling of it; you would no longer feel like you were there, you would feel like you were watching a movie. By making that choice then he opened up the track to what we could do with the sound effects by both making it realistic and making it dramatic. Spielberg, like Cameron, also knows the importance of contrast: he built into the scene 'hooks' that we could use to give a scene, that could have been unrelenting, moments of contrast. This is an important thing for directors: the great directors, like Spielberg, think about sound and that aspect of their film form the beginning, as they plan the shoot, not after the shooting is done and the editing is done. So in that opening scene he came up with the idea of, in one case, of camera perspective where the camera goes above and below water. As we go above water, we have the full sound of battle, and when we go under water we are momentarily cocooned from it, the battle gets muffled and goes away. The other idea that he had that way was the Tom Hanks' character would be shell-shocked

and lose hearing. We would go into a point of view, into the Tom Hanks' character, and the natural sounds of the battle would drop away. We were left with what I tried to make into a sort of listening to a sea-shell kind of roar, all the realistic sounds drifted away, dropped away, and it gave us a another point of view on battle. So now we are seeing images without having the realistic sounds go with them and that becomes a different take on it. We can see a man carrying his arm but we are not hearing the reality of it, and we take that in very differently than we were earlier on. He was shifting the perspective that way and making use of these stylistic techniques to offer us the possibility for contrast in the sound, which was really brilliant.

Sergi: We've talked about all the creative aspects involved in your job, but there still seems to be an understanding amongst people that sound is a technical part of filmmaking, rather than a more creative, artistic part. In other words, the afterthought to the image, the second fiddle, or whatever other routinely employed expression you want to use. What would you say to that view?

Rydstrom: One of the reasons why I love film is because it's a perfect blend, a 50/50 blend of art and technology. Every aspect of films: a great cinematographer is equally well versed in the creative use of images and the technical part of using a camera and lighting. Acting is both technical and creative, and certainly a director in a movie has to know what the technical abilities are throughout the making of a movie, as well as having creative goals for the movie itself. Movies became a great reflection of the twentieth century because they so neatly followed along that century in both how technology advanced and art advanced. Movies were the most important art form of the twentieth century because they were very heavily technical and dependent on technology for their very existence as well as creative. Every part of filmmaking is both artistic and technical and it's a little insulting when parts of filmmaking, like sound, are considered more technical than artistic, or sometimes all technical. This is something we fight against when it comes down to credits, which is indicative of this. The Directors Guild of America which control how credits are given out in movies in this country consider any sound credit to be a technical credit, that is, it s not allowed to be a head credit in a movie the way, say, a costume designer and other people

have. They have deemed the sound world of filmmaking to be strictly technical, as if it was negative cutting. Of course, it isn't, and the best filmmakers know it isn't and make use of it. The danger is that, if you think something is just technical you are ignoring the artistic capabilities of it, and so directors do it at their peril if they think that it is a technical exercise. Sound people themselves, I think, suffer from the idea that it is simpler than it really is, than there isn't great potential for creative use of the soundtrack. And if we buy into the fact that other people think that it's a technical exercise than we are just hurting the movie in the long run and hurting film as an art form because it is true that half of the experience for the audience is coming from sound and if you don't use it to its full capacity you are not using film to its full capacity.

Chapter 4 - Bruce Stambler

Bruce Stambler is a supervising sound editor Soundstorm, a sound facility based in Los Angeles. He has been nominated five times for an Academy Award and won for The Ghost and the Darkness.

He has worked with some of Hollywood's most successful directors on pictures like Under Siege, The Fugitive, Batman and Robin, and Clear and Present Danger. I met Bruce while he was preparing the final mix for Pleasantville at Todd-AO West in Radford, Los Angeles. He was kind enough to take some time off to talk to me about his work.

Gianluca Sergi: Let's start from the beginning. How did you get into film sound?

Bruce Stambler: I started as an apprentice at Universal Studios when I was 26, and I worked in film shipping. Then I worked in features, in editorial, for another year. Then I was offered an opportunity, somebody said: 'Do you want to be an assistant sound editor?', I thought, a SOUND editor? That sounds good! (laughs). I was an assistant for a couple of years at Universal still, I did a lot of TV, six, seven days a week, from six in the morning to ten at night, and then they moved me up to editor and trailers, TV trailers. I didn't screw those up and they moved me to half-hour TV shows, and if you didn't screw those up then they'd give you an hour TV show. Finally someone gave me a job on a feature as sound editor and eventually as a supervisor.

Sergi: Would you say that money is definitely an issue in sound?

Stambler: Yeah, money is a big issue. Money is something that you need to control best you can. Unfortunately, the whole artistic aspect of doing what we do leaves a lot of decisions that affect money. Visually a picture changes, and there is constant editorial. That's what they call it, editorial. And editorials comprise of picture, sound and music; they are not separate, they all work together. That means that everybody is changing their ideas and artistic inputs and when you have that, depending on the complexity of the movie, you can get into huge dollars.

My job is to try to control the artistic part as well as the financial part, I HAVE to, I have to

and I always bring it to their attention. It is my responsibility and I always say: I can spend the money with the best of them, but I can help you control and save some money too if you are willing to sit down and talk about these issues and things that we can work together on to control the budget. This is how you get a movie. I have a set of clients that I work with, and the director or producer will call me and say 'Stambler I want you to do my movie', whatever it is, then you read the script and they say 'please submit a budget', you submit them a budget, and they say 'yeah' or 'nay', 'let's lower this this', 'let's raise that' or here's the calendar this is the number of weeks I want you to be on it, then you agree to a budget and you try your best to stick to that budget.

Unfortunately, because of what we do, and that includes picture editing and music and sound editing, it's not always an easy task to stick to the budget because so much of it is totally out of my control. I mean it's nothing I can personally control, I can't tell a director to stop making changes, I can't tell a director to stop cutting a picture, because if you are doing a film like an Armageddon or a Godzilla, whatever it might be, you can have a thousand sound elements per reel! So when the director goes in and makes fifty, sixty, a hundred picture changes all those elements have to be changed, and someone has to do it. In my opinion that is probably the single biggest expense that a film goes through. The second one would be here in post-production. Now we seem to be working on an accelerated schedule; we dub on multiple stages at once, we pre-dub the dialog on one stage, we pre-dub the sound effects on another, we might pre-dub the background and foley on another stage so that we can get it together quicker. It is also a budgetary issue because dubbing is very expensive, very expensive.

Sergi: Some designers have complained about the fact that post-production time has shrunk a lot for you.

Stambler: Yeah, it has shrunk...

Sergi: Why is that? is it just a matter of money? or release times?

Stambler: I think the release times really dictate the schedules. I think the studios want to

fill a particular hole in the schedule that they may have the opportunity to fill. You know, it is a smart business move for them: even though they may spend a little more money on one area because of the rush, or NOT spend it (laughs), at least they can get the film out there when they think it is best suited to go out, and the studios now are much more attuned to that than they used to be. A lot of that is dictated by previews, we have a lot of those, you know, marketing driven.

Sergi: When do you actually get called in on a job?

Stambler: You do it one or two ways. I always pretty much talk to the directors that I work with once every couple of months, some more than that...

Sergi: When the film is in development?

Stambler: All the time, I talk to them all the time anyway, just to talk to them. Because I am lucky, I have some really great people that I work with. I also look at the trades and see what's coming up, because they have pre-production in the trades, and I like to pick. If I don't have a movie that I am working on, I look at trades and say 'Oh, that looks like a good movie' and then I go AFTER that movie, and I try to get that movie. I'll write a letter, or call or get them a resume, see if there is anybody I know on it so that I can get an interview. Then I do the interview thing, if they hire you, do a budget, they approve the budget and then you get started on it. Then basically, on most movies, I record location effects, go to wherever they are shooting, and I try to record every single scene that they are at, every location they go through.

Sergi: Why is that? is that to get a sense of the place?

Stambler: Yeah, to get the ambience. Whenever you do something like that you always get good ideas and you haven't seen necessarily a frame of the movie. For a scene that is two minutes in the movie I'll record about two hours of sound for that location, because I'll go to every place. I always find very cool stuff that you wouldn't think of, than I never would

think of, when I actually go there. It could be a number of things: for example we had a location and there was a very strange sound, I don't what it was, there must have been a heater in the room or something. Every once in a while it would let out this 'whistle' which you never hear. I love that stuff. I love something different for me, and something different for the audience they have never heard of before.

Sergi: Do you try to do that consciously? trying to get 'new' sounds?

Stambler: Totally consciously.

Sergi: You go to the movies, listen to movies and say I'm going to do this....

Stambler: Yeah

Sergi: Can you give me an example?

Stambler: A lot of it has to do with doing a lot of location recordings and the realism that it portrays. In a movie that is much more real than building from your library. An example would be a movie I finished a little bit ago called A Perfect Murder. We went to New York to record some stuff and we ended up with FIFTY hours! But when you go to New York the sirens are very different than any other place you've ever been, very different, so we ended up going to Long Island in a police car and record a lot of sirens sound. And those types of things you think of in the course of doing the movie, they just make it a lot more interesting.

Sergi: Let me be a little more specific. In particular, I'd like to talk about The Fugitive. In that film you almost get a sense that sound plays a more important role than the images...

Stambler: It was like that in that movie. We had a great visual movie, but what we did with that movie was going over the top with sound, but tastefully, not ruining it. Actually, what we ended up doing is making much more of it then it deserved to be. I don't really mean

'deserved to be' but more of it than it's there. We took it to a different level, because basically it's a dialog movie and we were just so into it. I get a real 'go for it' mentality in sound where I'm not really afraid to try anything. In that movie there was a lot of people that do this thing (Stambler turns his head suddenly as if startled by a sudden sound), that respond to things. So we purposely intensified that in every single sequence in a huge way, and we made as much of it as we possibly could.

Sergi: In the opening sequence, there are a lot of things that are not, talking about realism...

Stambler: That are not real?

Sergi: Exactly

Stambler: We didn't want to do real. You know, a lot of it was driven by the picture editor because he's so damn good, Dennis Virkler, the guy is a genius. He was the picture editor also on A Perfect Murder. When you work with certain people in your job you are very careful to toe the line and if they say 'do x' you do x, you don't do x, y and z, because you are going get your... you're going to get in trouble. Dennis Virkler and the producer Peter Macgregor Scott, here's what they say: 'GO for it, make it great'. You are not afraid to bring something new, but when you bring your material here (i.e. the dubbing stage) and there are fifteen, sixteen people watching you on the (dubbing) stage, you really are subject to quite a bit of ridicule, and you have to be able to take the good and the bad, you know (laughs). We had a really 'go for it' attitude. It's a chemistry thing, you just accentuate everything.

Sergi: It's interesting that you mention the picture editor and the producer, but not the director (i.e. Andrew Davies). Why is that?

Stambler: The director actually in my viewpoint has a little bit less of an input. They have more of an overview. For example, in The Fugitive I personally struggled with the train crash. I examine every single element because the picture editor doesn't tell you necessarily

all that it's happening in a scene; the director doesn't tell you either: 'It's a train crash!' he'll say, and so will the producer 'It's a train crash!' but there is this series of shit that happens that makes the train crash. That's the way I think. I particularly struggled with the moment when the train derails off the tracks and then there is a shot in dirt of the train coming at you like this (Stambler simulates with hand the movement of the train towards the viewer). I couldn't figure out how to do that. I'm into 'reality' effects. I'll process sounds but I want a base material to work from. So I got this big dumpster and I tied it to a truck with a 100-foot rope to it and towed it and then recorded the dumpster sliding. That is the kind of very detailed oriented material that go into your film.

Sergi: At the beginning of the film there is a helicopter shot of Chicago. At one point, as the helicopter passes above a skyscraper, you can hear...

Stambler: when the building swishes by (laughs)?

Sergi: Yes, that's it

Stambler: Yes, we did a lot buildings 'swish byes' (laughs)

Sergi: Where does that come from?

Stambler: Again, that's another example of "I'm gonna do something for everything, have fun and make it very detail oriented". Granted, no building is gonna swish by you, but if you were, say, to go by it, you would hear the air-conditioning. It is interesting, weird, subtle stuff that isn't too corny. Sound sucks you totally in. It sucks you in.

Sergi: Immediately after that scene, there is another interesting example. Usually in films there seems to be an unwritten rule: if you see it, you hear it. But in the murder scene visuals and sounds are very different (you see a woman being attacked and as she falls to the ground the sound she makes is not that of a body crushing on the floor but of a long, drained clap of thunder). Where does that come from?

Stambler: It is a process of refinement. It's certainly did not start off that way. When you sit down and look at the film, you look at it over, and over, and over, and over again, and you want to stay away from too many 'like-sounds' in any given movie and kind of put a signature on stuff. We didn't want to use the sound of a head being cracked open, so you try different things.

Sergi: Did you show it to someone and they said 'Yeah, that works'?

Stambler: No, we just cut it

Sergi: And nobody said 'No, I don't think it works'

Stambler: Nobody did.

Sergi: Did you do lot of ADR (Automatic Dialogue Replacement) in the movie?

Stambler: I usually hire an ADR supervisor. In The Fugitive we did about 200 ADR lines

Sergi: Not a lot then

Stambler: No, but that's normal

Sergi: Did you get it all in production?

Stambler: Most of it is production. I am much more a fan of production dialog...

Sergi: Why is that?

Stambler: Because ADR hardly ever matches, there could be synch issues, and can't be as original as production dialog.

Sergi: However, isn't it true that many films add a lot of ADR in post-production?

Stambler: Yeah, you'll notice especially in films like Lethal Weapon, some people tend to fill every possible space with edited lines and off-screen dialog. I think that's because they think the audience is not really bright. In The Fugitive we didn't do that.

Sergi: In that film there is one particular sound, the sound of police and ambulance sirens, that is scattered throughout the movie and works almost as an aural 'theme'. Was that a conscious choice?

Stambler: Totally conscious. For example, when the doctor comes out of the health club and we just hear a quick burst of a police siren, that scares the shit out of you (laughs). We did that a lot. The siren sounds are mixed so that they are not repetitive. I just like to be conscious not to be repetitive and use the same sound too often.

Sergi: You didn't win an Oscar for that movie, but you won one for The Ghost and the Darkness...

Stambler: Which was a lot harder to make...

Sergi: Why is that?

Stambler: It was brutally hard, the hardest movie I've ever done, because of the lions. Animals are the hardest thing to do. Because I cannot use a real lion's growl, it just would not work. It's not threatening, etc. It's much more straightforward to do a dialog movie with traffic and doors, etc., and then the next step would be a Lethal Weapon-type of movie with cars and explosions and car chases, that's also pretty straightforward. But from the level of difficulty animals are the worst, especially if they are major players in the movie. If there is any subtlety, or even more animals, then you are screwed, you really are. It's really hard, and it took me to the end. I think I was on the movie for eight months, and it took me

about seven months to get the right lion sound! (laughs). I went and recorded lions, tigers, bears, oh man, I must have over sixty hours worth of animal recording. That's a lot of recording. A tiger is a great sound, and I have two trainers, one in LA and one in San Francisco. But animal trainers are not going to torture the tiger for you (laughs), because that's what they'd need to do to give me the kind of sound I'm looking for! Will they do that? Of course they won't do that! So you get all this material and then, can you guess what it is?

Sergi: Not in a million years

Stambler: It's a combination of a bear, a tiger, and then a car. It's like a drag race car, you know how they rev? The rev is in there cut to the vocal

Sergi: and that's the lion

Stambler: And that's the lion! It worked good though (laughs)

Sergi: The film went on to win an Academy Award for sound, which must mean that a lot of people thought it was a good soundtrack...

Stambler: Yes, it was good, I'm really proud of it

Sergi: The question I'm leading to is what makes a good soundtrack? How do you know when it's 'good'?

Stambler: To my taste, one that has a lot of parameters in it. I thought that Ghost [i.e. The Ghost and the Darkness] had a lot of that, it was mixed really well. I thought it wasn't loud, that it wasn't painful, there's nothing that stood out and hurt you as a listener. That was a lot of detail, that the effects weren't too loud, that the music wasn't too loud, that you could hear all the dialog, that it was creatively mixed and spread, released in the 6-track format. In that show those were the criteria. A movie is not your movie: you have a director and he

is ultimately the one who calls the shots, but I personally am really anti-loud, I really hate it. These days movies are way too loud.

Sergi: An old bone of contention is that you must always hear the dialogue

Stambler: Yeah, you must always be able to do that

Sergi: But some directors in certain films seem to challenge that old view. In some films dialog is also used to create pace, rhythm, and not so much for its literal value

Stambler: Well, yes, but I think you should hear all the dialog. In a movie you are trying to tell a story. The first thing you think if the dialog can't be heard is 'I didn't hear what they said' and now you are no longer in the movie, period. You need to suck them in and keep them in.

Sergi: Is there a dialogue going on amongst sound men/women?

Stambler: Yeah, I especially talk to Gary (i.e. Gary Rydstrom – see interview Chapter 3). Sometimes you can't be absolutely sure that what you're doing is right. I remember when I was doing The Ghost and the Darkness I called Gary and asked him if he had any suggestions for the lion sounds. He said the same thing that I was thinking: "Just throw it up there and see what works!" and I said, "Thanks a lot Gary!" (laughs). And that's exactly what it is, when you are not really sure of something you need to keep trying different things and be open-minded. You know, digital has really helped that part. You can hear a lot of stuff together and that's really helped.

Sergi: In your opinion, what's the status of film sound today?

Stambler: I think it is more and more important. You know, I don't really care where my credit is at the end of the movie. I think that if sound is the responsibility not only of the supervising sound editor, but also of the sound team, and the director and a lot of times the

end product will not necessarily reflects what could have been and what should have been, without being offensive to anybody. But the importance of sound is becoming much more prominent than it has been, especially in the past four, five years. They hire people like me and Gary and Randy Thom before they start shooting. They used to not do that until after the film was cut. They'd call you up and say "Can you do this...". Also the credits are moving up. I think sound wasn't as important to the film ten years ago, it really wasn't. I mean, there were shitty theatres everywhere, and now there are great theatres, especially here in LA. My son, who's 12, will go 'Dad that movie was way too loud'. Yeah, I'm his daddy and he knows what he's talking about, but I think that audiences are much smarter today.

Sergi: You worked in TV. Lately, there has been a lot of good work in TV sound. What do you think of it?

Stambler: I don't really watch much TV. I only watch some videotapes of the X-Files, but I don't watch it for sound. There is not doubt to me that the feature people are the top people. Period. I came from there, and I know how I thought (laughs)

Sergi: Is that the usual path to features, TV work?

Stambler: Yes, it is. But it is very difficult to get in. I've been working with the same crew since Under Siege. My crew is great, and it is hard for someone to break into that calibre of a crew. Once you're happy with them you stick with them.

Sergi: Have you ever been unhappy with one of your films?

Stambler: I'd have to look at my resume! (laughs) You can give up, because there is a whole political process that nobody knows, and it can be a very tricky and very delicate process. I did a Kevin Costner's movie [i.e. The Postman], a terrible movie, but, in my opinion, that movie sounded great. I didn't give up, like other people did, and you CAN give up, you can get people down.

Sergi: When you work with these big names, how much of their ego get in the way? How much do they understand about sound?

Stambler: They understand enough to 'like or not like' which is really all they need. What I like about people like that is that they say "Do something great, I don't know what, just show me something" and they'll say I want this to sound a bit dreamlike, see what you can come up with. I know Joel (Schumaker) real good, it was my first time with Kevin (Costner) on The Postman, and as you work with people you learn to understand how they're communicating. Because sound is a very arbitrary thing, very unspecific, and you have to think like they think, to get into their heads, to try and get their taste.

Sergi: That must be very difficult because some of the adjectives we use in everyday conversation are rather 'vague': the notion of what constitutes a 'threatening sound' might mean something totally different to two different people

Stambler: Absolutely, and sometimes it is really hard to get what they want. It was really intimidating to me in the early part of my career. I used to go and sit down with the director and the picture editor to spot the movie and I'd pray to God nothing bad happened, that nothing really 'HARD' happened! (pulls a face and laughs), I mean, I used to get upset if a dog barked! It can get very difficult because people say "Oh, that's the wrong dog", or, "That's not in synch", etc. There can be a thousand of those things that can haunt you. When I work on a picture I'm on it 24 hours a day, I'm always thinking about it when there are any unresolved issues. I walk around, I hear something cool, I'm gonna get my recorder! I don't know what I'm going to use it for, but I know I will.

Sergi: How big is your sound library?

Stambler: Very big, it's huge. It must be around 40,000 hours

Sergi: How do you catalogue all that?

Stambler: There's a special computer programme that tells you everything. You pull up a 'lion' sound, and it'll tell you all about that 'lion': who it was shot by, when, where, for what, etc.

Sergi: Do you keep updating your library constantly?

Stambler: Yeah, constantly, on every movie. Some movies not as much as others. Some movies you might do 10 hours, some movies you might 60/70 hours.

Sergi: At present you are working with 6 channels. However, the voice is always in the centre channel...

Stambler: Yeah, principal dialog is always in the centre channel. Because if you put the dialog in another channel your audience will do this (Stambler turns around as if trying to figure out where that line of dialog has been spoken from). For me that's another unwritten rule like the one about understanding dialog

Sergi: But for the rest of the soundtrack you can do whatever you want

Stambler: Put it wherever you want: you can pan it, you can put it in the surround, you are free to do whatever you want. You can be as creative as you dare to be

Sergi: How about the use of the surround channel?

Stambler: This is interesting in relation to what you were suggesting before about the differences between LA and New York (Stambler is now referring to a previous part of our conversation where I suggested that the locality where you mix a movie can have a substantial influence on the way that movie will sound). I really like some of the work that comes out of New York. I've been to Sound One (i.e. one of New York's leading sound facilities), I love some of their work. I personally think this is the result of dubbing in small

rooms. They dub in very small rooms. I mean, they are tiny rooms compared to this room. I think by virtue of that hardly any of those films have any surround at all. All LA based films, not all of them, but most of them have a lot of surrounds and boom; you won't find much boom coming out of New York either.
I think part of that is because of the dubbing environment. I also think that some re-recording mixers, I know that for a fact, are more timid than others, and that's true with us too. The Fugitive was 'out there' from a sound point of view, but we had Franky Montagno as our sound effects mixer, and to me Franky is the best sound effects mixer on the planet, he is just as good as Gary (Rydstrom).

Sergi: Would you ever use the surround channels to give primary information to the audience?

Stambler: Yeah, I would. I wouldn't NOT do anything. I'd go for anything if it worked. You just have to keep an open mind and then see how it works in proximity to the rest of the scene. I think that creatively you go for it, you have nothing to loose, and certainly when you are in an environment to try anything. Again, it is a matter of some money and extra dubbing time and all that.

Sergi: When you read a script do you mind the fact that there isn't much, if any, information about what kind of sound is expected?

Stambler: No, not really. I don't read scripts as much as I used to because they tend to make me feel either disappointed or too happy as to what I end up working with. Of course, sometimes reading them help me understand the story better, but I tend not to (laughs).

Sergi: So what do you work on, a treatment?

Stambler: If I'm in the process of bidding for a show I read the script, but if I can get around not reading it, I won't worry. Then I'll get a tape of the movie and work from that. It's just like when you've read the book and then you see the movie, it's just like that

(laughs)

Sergi: Sound has come a long way in the past twenty years. Some people have called this the 'second coming of sound'. How would you describe the developments that have taken place in this period from your perspective?

Stambler: What you call the 'second coming of sound' I call the coming of sound, period! (laughs), because we didn't really have sound. We pretty much had dialog and had a centre speaker and that was it. But now theatres have spent huge amount of dollars upgrading their sound equipment. It's amazing to me that we would dub in a theatre and then it would almost be so close to what we have done harmonically in a room filled with people! And there are no limits. So it's just a case of not overpowering the picture but complementing it, not being too loud, and involving the audience as much as we can.

Sergi: Where do you see sound going in the near future?

Stambler: I don't know. I suppose you could have vibrating seats and stuff like that. You could literally do anything you wanted, but I suppose it still depends on the visuals

Sergi: Is it still a visual medium?

Stambler: My thinking still takes a backseat to what I see. I will go the extra mile as in a movie like The Fugitive provided that the visuals and the subject matter support it. But a lot of movies don't do that.

Chapter 5 - Tom Holman

Tomlinson Holman is one of the most influential figures of the Dolby era, especially as a technological innovator. He developed one the most ambitious sound projects of the Dolby era, the THX sound system program, whilst at Lucasfilm, and is now continuing his drive for quality sound reproduction in theatres and at home with his company, TMH Corporation. He is also a Professor of Cinema Sound in the film school at USC. I met him to talk about sound quality standards and the THX project at TMH's offices in Los Angeles.

Gianluca Sergi: How did you get into sound?

Tom Holman: I actually did sound and lighting for high school plays. When I went to college I was majoring in engineering but I worked in the theatre as a volunteer. The lighting was always taken care of by a professional and so the sound kind of fell to me because they didn't have anyone else in that area. I did sound design for plays and so forth in college. In my junior year at college I transferred out of engineering into the communication program with a degree in broadcasting and I took film and television classes, but I continued to work with the technical aspects of sound, so it's a long interest that dates back to high school.

Sergi: Can you briefly describe what you do here at TMH?

Holman: I wish I could! (laughs) TMH does consulting on multi-channel sound for film, television, music and so forth. We just do basically anything that we think would be of use in the world. This is pretty much what I did with THX where I worked on both theatrical sound and its representation on the screen through THX and TAP, and then in the home market with home THX and the digital mastering program. So, hardware, software pro, hardware software home. Our main product so far is 'Micro Theater' which is a desktop-based digital audio workstation sound system to scale the sound of a dubbing stage down to desktop so that you can make decision that translate back up to a theater environment so

that you can do more work in the editing room before you get on the dubbing stage. The basic idea is: they (sound people) are very stressed for time when on the (dubbing) stage; it's very expensive time to try and fix things, so you can do that with Micro Theater. We got our first screen credit on Titanic.

Sergi: You have been working on film sound for some time now. What would you say is the place of sound in the film hierarchy today?

Holman: It varies enormously, by orders of magnitude, depending on who the filmmaker is and their knowledge and experience in the area. We try to teach it here (at USC); I don't teach only sound people, I teach all filmmakers and hopefully that will show in their films. I would say that it just ranges all over the map. Some sound designers tell me that when you are putting up music, everybody expects that, when you are putting up dialog, everybody expects that, when you are putting up the kind of sound effect that is sort of 'see a car, hear a car', the literal sound effect, they expect that too. They expect the ambience of a space. However, as soon as you do something different from that then people start noticing and wondering what are you up to, start getting concerned or difficult, or in some cases interested; it starts to change in the inner details of sound design when it becomes surreal or something other than the literal experience on the screen. Directors at the time they (sound people) are doing this have usually lived through the material so much that they are shocked when you present them with inner sound. They are very used to the tempo, to location sound, which may be defective, they've heard it on AVIDs, and it sounded intelligible, but then they put that same sound on the dubbing stage and it sound terrible: backgrounds are mismatched, and so forth and this for them is a shock and so they think that the dubbing stage is at fault because they have this mental, internal image, of what sound is and the experience clashes with that image. That image has evolved through the course of writing, directing, developing the project, and so they throw up their hands and say 'What you guys are doing I can't deal with', that's not an uncommon attitude. That's one banter. There are others who know that they are building a whole surreal world. For instance I really liked Strange Days. I didn't liked everything about the movie, but I liked it. One of the reasons for is the fact that the sound designer on that movie, Gary

Rydstrom, was given much larger power than usual because of the style of the movie. They even put speech in the surrounds, and speech in the surrounds is a big aesthetic 'no-no', but there it is, there's speech in the surrounds! (laughs).

Sergi: Actually, I was going to ask you about 'rules', dos and don'ts.

Holman: Well, there are aesthetic rules that have been developed over the years. They are sort of like passed around and passed on from father to son: how do you use surround sound vs. screen sound and so forth, that kind of stuff. Now breaking the rules is what makes it harder sometimes. Ordinarily it is the music that is given the role to cover the more 'surreal', non-literal element of the soundtrack, even though sometimes sound effects could do the job better.

Sergi: You've just mentioned music. The composer is a figure that would appear to enjoy a different kind of status in filmmaking from other sound people.

Holman: That's complicated. Again that varies very much from film to film. There are some who have made an uneasy peace between sound effects and music. There are others who actively seek out the means to separate out what they are doing.

Sergi: I'd like to talk about your role in developing THX. In all the literature I've read about THX, including the one you produced, there is one aspect that comes through strongly, namely the desire to standardise sound reproduction in film theatres and I'd like to discuss that concept. First of all, is it feasible to pursue standardisation when, even within the THX domain, there is substantial difference between in the way different theatres sound? To give you an example, the Empire Leicester Square in London sounds remarkably different from the Mann's Chinese Theater in LA, despite having both comparable size and 'status', and despite both being equipped with THX.

Holman: Can you actually standardise? Well, probably not as much as you might like, but more than it has ever been done in history. First of all, the primary ingredient of THX is

room acoustics, so how can you standardise room acoustics? You can try and standardise reverberation patterns, reflections levels and so on. We know today how detrimental those things are to intelligibility, localisation and so forth so we know they have to be under control. There is a set of certain standards and theatres are supposed to meet those standards. In Hollywood, the Chinese Theater in particular is listed on the National Historic Register so there are big limitations to what can be done. We measured the floor for speech intelligibility; it's not as high as you would like but there things that are unchangeable. I think maybe it's more important to say: what happens in the new cinemas that are being built, the 400-seat houses, the large houses of the multiplexes: can we make those consistent? I would say: well, you can make them much more consistent than they were. It would be nice to make ongoing additions to the program, take more measurements as we learn things. For instance THX was done in 1982; it wasn't until 1990 that the effects of discrete reflections were well enough understood to set the criteria for them. We knew it was important, but we didn't have the psychoacoustics to know where the criteria should be set. So, can you do it? You can certainly do better than everybody ever did. Whether you can do it totally... maybe yes, but you should do ongoing work.

Sergi: The other side of this question is whether it is desirable to standardise, especially when taking into account issues such as cultural differences, film-going habits, and so on.

Holman: On that point I remember reading in an old psychology book that the volume controls in cinemas in the north of England were set much higher than they were in the south of England, and the reason was the kind of noise that workers were exposed to in the industrial north.

Sergi: Exactly. Did you take these differences into account when developing THX or was the American market your only concern?

Holman: No, we didn't take those into account and the reason is that if we knew how to tailor it to an audience, Hollywood would do that because they want to maximise profit, so they would go to all lengths. But I don't think we have a clue as to what to do.

Sergi: When you were working on THX, did you have a particular spectator in mind? For example, in the case of elderly people, they often complain that films today are too loud.

Holman: Yes, what happens is that they have a type of hearing loss, called the recruitment type hearing loss, where the effect is that they have elevated thresholds and everybody knows about that, they can't hear very soft sounds. But the other effect is, that once they begin to hear something it comes out very fast and you can't solve the problem because it is so individual. What I do about it personally is that I test my hearing every two months, and I have been doing it since I was twenty. My hearing is in good shape and I listen to a lot of movies! Rock concerts, I believe, are damaging, they are substantially louder than movies. My ideal viewer is someone who has normal hearing and who sits anywhere in the auditorium. This is very different from a lot of work that has been done about the stereo 'sweet spot' and making stereo sound work for one ideal spectator sitting in the ideal seat; that is absolutely not what we are up to. I wrote a paper on this: I went out and measured the coverage of the various sound systems throughout the floor and how much they vary. How much the loudness and the frequency response vary across the floor is a measure of the sound system as far as I am concerned: the more uniformed, the better.

Sergi: The map of THX penetration in the cinema market is rather patchy. There some areas that have many THX-equipped theatres, where others have very few. Is there any reasons for this?

Holman: Commercial reasons.

Sergi: Only commercial reasons?

Holman: Well, it took a long, long time to get into a market like Tokyo, for instance, mainly because the Tokyo cinema owners acted like feudal barons, until one or two 'popped up' there. The picture in the US is very different. A city like San Antonio, for example, one million people, has nineteen screens; Dallas is very strong and so is Seattle,

and so is Florida. It is sort of a sun-belt, west coast phenomenon. It is not an east coast or northern US phenomenon. It mirrors the direction the country is moving towards the south and west. It's more oriented there than it is in older areas of the country, so it varies a lot. You know, we didn't do THX just for THX theatres, we did it to set a standard for how films should be seen and heard and virtually all systems being installed today have a relationship to THX.

Sergi: Film audiences today have access to excellent quality sound in virtually all entertainment areas. They can listen to their car stereos, go home and play the latest CD on a powerful home hi-fi; they have home cinema systems that mirror those in commercial theatres and so on. Despite all claims about the search for standardisation, audiences enjoy being able to manipulate sound in their homes, including films.

Holman: Oh yes they do, they certainly do! (laughs) And of course they have that right, but there needed to be someone that could say what is the 'right' way to do it. In a home THX there is a lot of calibration so that you can trace it back to the original level.

Sergi: People's expectations as to what good film sound should sound like is profoundly coloured by what they hear outside cinemas....

Holman: Yes, and that's something I call 'technological leapfrog'. In the 1950s, the best recorded sound you could hear was in the movie theatre. By the mid-1960s it was the home hi-fi system. In the 1970s Dolby's introduction of Dolby Stereo sound in films revitalised the theatres. Then things plateaud for about ten years until the arrival of digital sound. In other words, home sound and cinema sound keep leapfrogging each other. Now we have reached the limits in how loud sound systems will play, in frequency range over which they play, and that doesn't leave us much space to leapfrog in the future. The 5.1 system does more or less what you can do spatially, but there is still room for improvement. An overhead channel, for example, would have been very useful for Godzilla and for the Summer spectacular pictures, that are 'rides' anyway. So adding more sensation, not in terms of loudness because we have hit the top, is a good thing. It makes sense to me

because as this is not 'art', it's suddenly a ride, so why not turn it into a ride? I don't have a problem with that. The problem with a filmmaker's point of view is how you get to play it in two thousand venues tomorrow night.

Sergi: Do you see movies going in that direction, becoming more like 'rides'?

Holman: Well, some movies are but I don't even regard those as 'movies' anymore and I don't go see them.

Sergi: Some of the things you mentioned suggests a very 'physical' involvement of contemporary audiences with films, including sound. Would you say that filmmakers directly employ sound to involve audiences 'physically'?

Holman: Michael Jackson said on the dubbing stage of Captain EO, the Disneyland adventure: 'I've gotta feel it in my soul', which meant that it has to pump his chest. That is a real effect, extra-sonic vibratory effects are a real, active response.

Sergi: Was that kind of enhanced sensual experience one of the things you strived for when designing THX?

Holman: Not really. The idea was to cover the whole range of frequencies that you get in a film so as to have well matched systems that play well across the whole range. In 1982 that was ahead of its time, because if you think about it THX was really designed for the digital era, when the digital era does not arrive for another ten years.

Sergi: I've read a couple of articles you've written about THX standards where you emphasise the need for 'diffused' surround sound rather than directional. Why?

Holman: The same old answer that I've written: there is a picture there but there is no picture here (he gestures as if to indicate the screen and then the back of a cinema). So if your attention is drawn deliberately to the surrounds through the design of the sound

system or through the aesthetics of what is put on the soundtrack, your attention is drawn to that exercise and you are suddenly out of the movie. You've lost the experience. Now, vision is forward-oriented and sound is three-dimensional so you can make an argument for putting directional sounds anywhere but if you draw everybody's attention to there (snaps his fingers) how do you support that? So traditionally what goes in the surrounds, as you know, is ambience, sometimes the returns of reverberation from screen sound to kind of break the proscenium arch and make you part of the experience, and things like the corn field in Field of Dreams, or the jungle in Apocalypse Now. In the rolling boulder scene in Raiders of the Lost Ark, all the boulder stuff is up front, but the general chaos that goes on is all around you so that you are made part of the cave.

Sergi: And yet, in one of the THX trailers, the TEX trailer, you get...

Holman: Directional sound in the surrounds! That's true, good point! (laughs).

Sergi: Do you see any developments in the surround area?

Holman: Well, more channels would be absolutely useful.

Sergi: Why is that?

Holman: There are three reasons that I've given in a talk on multi-channel music. The first of them is that in real architectural spaces, or outdoors for that matter, sound does comes at you from all directions. There are three sound fields: direct field, reflections and reverberations. You might need the direct field from any direction. Discrete reflections you might need from any direction. Reverberation is the only thing that is the foggy cloud of diffused sound. In architectural spaces you get reflections off the ceiling and we don't reproduce those in motion picture theaters. So, physical distance is the first reason. The second reason is psychoacoustics. The fact is that we hear sound and we localise sound all around us. We are much better up front than back, and much better horizontally than vertical, worse at the sides and so forth, and there's something called the minimum audible

angle, maa, that shows how that works. The third reason is the history of music. Think of the history of music as going from Mozart to Beethoven to Mahler to Terminator 2. What you hear is an ever-increasing dynamic range, and ever-increasing frequency range, an ever increasing use of space. It's filling up the sensorium: it's like you open up the box and start pouring ingredients in it so that they can all get mixed up.

Sergi: you are describing an ever-increasing sense of sensual pleasure. Would you say that that is the ultimate aim of today's sound?

Holman: At the ultimate level I suppose it is pleasure but there can various kinds. There can be visceral pleasures as opposed to intellectual. You might say, for example, that the English audience is more pleased with verbal repartee and the Americans with pratfalls. Can you explain the differences between those two audiences, I don't really know. For example, I think that the film Dinner at Eight is very static visually but very dynamic verbally; it works principally at the verbal, speech level whereas today's modern film are using much faster cutting technique, there is more fluid camerawork. Armageddon apparently has no shot longer than three seconds, so it's 'cut cut cut cut cut'. It's a new sensibility; it's not even pleasure, I think it's pure sensation because everything is boring to modern audiences, so how would they sit through Dinner at Eight.

Sergi: That's interesting that you should make a distinction between intellectual and visceral pleasure. Isn't there more of a relationship between the two, as far as cinema audiences are concerned, than it is customarily acknowledged?

Holman: That's a thorny issue. There probably is more of a relationship that covers a spectrum where you might have Nights of Cabiria at one end and Star Wars at the other end, but they both use sound effects.

Sergi: Let's talk about another common view of film sound. A lot of people still consider Hollywood film sound to be all about technique.

Holman: I don't agree with that at all.

Sergi: How much truth is there in that though?

Holman: Oh, too much, because of the production schedules. There is something I call the post-production squeeze, which is the fact that you've got your release date, and that often means having very little time to get the movie ready. In the case of The Fugitive, for example, I think they wrapped up filming on May 31st and the movie was out July 6th, or something like that. It was insane! That's because the original director had cancer and was replaced and so forth and so on. That post-production squeeze means there is no time to worry about the kind of things that you and I have the luxury as academics to worry about. So it is their training and their ability to bring that training to bear very quickly that really matters in the end.

Sergi: So it is time over skills ultimately?

Holman: Yeah, I think it's time. As I said, the trick is to be able to bring that training to bear instantaneously so they have to be incredibly well trained.

Sergi: Some designers and supervising sound editors have commented on being able to join a film now in pre-production rather than just in post-production.

Holman: That's something that George (Lucas) did and everybody knows that story.

Sergi: Is that something that it is still relatively unusual and reserved to a few individuals?

Holman: Yes, I'm afraid so.

Sergi: I'd like to talk briefly about education, especially since you teach film sound at USC, one of the most influential universities out of which many Hollywood filmmakers have come.

Holman: Sure

Sergi: In most university syllabi sound is seen as a very specific interest, if it is dealt with at all, rather than something that is important in general terms to film studies as a whole. What's the situation at USC, is the interest in sound there specific to the course you teach?

Holman: I'd say it's very specific to the course because we suffer the same problem as other people do. We have the professors who are specialists in sound, there are a couple of students who have graduated with us who are now doing PhDs in sound, so there is certainly an interest. You know, I'm often thought of as a teacher of engineering, by many other professors and students. We obviously have a certain amount of technology to teach, but I call that the 'typing course'. It's the same relationship that typing has to writing. You have to be able to run ProTools to get the job.

Sergi: Is sound a thriving industry, a possible way into the industry for students?

Holman: Oh yes, absolutely. It's still perhaps the easiest way in, not that there's anything easy about it because you still need to know your craft. It does take a combination of skills.

Part 3: Reinstating the auditory dimension to cinema

This final section aims at bridging the gap between a general understanding that sound matters to actually considering sound as an integral part of analysis and research. In particular, I will consider more closely three areas that are central to cinema and its investigation: filmmaking, audiences and film analysis.

Chapter 6: The role of sound in movie-making: the case of The Fugitive

I would like to explore the role that sound plays in the creation of a movie. In particular, I will focus on the specific example of The Fugitive. The choice of The Fugitive is not based on notions of 'quality' or 'uniqueness'. Simply, it is a very interesting example of how sound can play a key role in helping a movie. Moreover, in view of my interview with Bruce Stambler, the film's sound designer, I can attempt an analysis that incorporates the 'view from the trenches'. Indeed, it is the attitude of the filmmakers behind the film's soundtrack that I would primarily like to focus on because I believe it is the most effective way to begin to understand the contribution that sound makes.

The Fugitive was received almost unanimously as a critical success, echoing its popular appeal.[1] Roger Ebert in the Chicago Sun-Times, for example, enthusiastically suggests that: 'Davis [the film's director] paints with bold visual strokes so that the movie rises above its action-film origins and becomes operatic'.[2] He goes on to state that: 'The [train] crash sequence is as ambitious and electric as any I have seen, with Kimble fleeing for his life while a locomotive bears down on him'.[3] Even those who were less enthusiastic about the film's merits, like Desson Howe in the Washington Post, seemed willing to acknowledge the film's effectiveness describing it as a 'juggernaut of exaggeration, momentum and thrills without a single lapse of subtlety "Fugitive" is pure energy, a perfect orchestration of heroism, villainy, suspense and comic relief'.[4] His colleague at the Post, Rita Kempley, goes one further stating that: 'Shot on the fly by Andrew Davis, the director who came into his own with Under Siege, the yarn is not only gripping, but ripping'.[5] In her view, Davis took full advantage 'working from a well-oiled screenplay by

Jeb Stuart and David Twohy'. It is possible to identify a position, shared by most critics, which would seem to suggest that the success of the movie in critical terms is ascribable to the film's 'energy'. This roughly translates into Davis's 'bold visual strokes' that confers to the movie 'operatic' quality. No mention is given to the role of sound within the movie. In this sense, the critical response to The Fugitive is rather typical of the critical attention blockbusters (and movie in general) commonly receive.

Making more of it': sound as a primary force

> 'We had a great visual movie, but what we did with that movie was going over the top with sound, but tastefully, not ruining it. Actually, what we ended up doing is making much more of it then it deserved to be. I don't really mean 'deserved to be' but more of it than it's there. We took it to a different level'

(Bruce Stambler, Supervising Sound Editor and Sound Designer on The Fugitive)[6]

Stambler's extraordinary remark that sound makes 'more of it than it's there' deserves attention. What exactly does Stambler mean when he says that sound make more of it? More importantly, where is the evidence to support his statement? The Fugitive tells the story of a respected surgeon, Dr. Richard Kimble (Harrison Ford), who is wrongly accused of the murder of his wife Helen. He is found guilty and sentenced to death. Following an unlikely series of events (including a bus crash and a train crash) fate hands him a new opportunity to hunt for the real murderer of his wife, a one-arm man. U.S. Marshal Samuel Gerard (played by Tommy Lee Jones) is dispatched to apprehend Kimble. A cat-and-mouse storyline develops into the central theme of the movie: will Kimble find the murderer before Gerard finds Kimble? The storyline suggests a rather conventional narrative development: an innocent man is found guilty, escapes and finally manages to prove his innocence to his tough-but-fair pursuer and the world entire. Given this well-established storyline, it is perhaps not surprising that the film's overall style mostly follows generic conventions. Indeed, adhering to generic convention would obviously be the safe option from a sound perspective: when you see a camera flash on screen what you expect to hear is a sound approximating that which a real flash would produce. Nobody expects anything different because generic conventions concerning sound suggest that, ordinarily, sound will

map closely what the image is doing, as this quote from Lucasfilm's THX sound web site indicates:

> 'The First Rule of Sound Design: See a sound; hear a sound. Every time you see some action on the screen, your mind expects there to be a complementary sound. The support of sound effects helps you 'willingly suspend your disbelief' and become immersed in the movie experience.'[7]

Thus, departure from convention cannot be understood as merely 'accidental': a sound designer might stumble across an unexpectedly effective sound, but its use in the final mix is no accident. I would suggest that one of the key indicators of the 'going for it' attitude is precisely the willingness to depart from convention as often as it is possible and feasible in narrative terms. The degree of distance between expectation and actual performance then becomes a measure of the filmmakers' ambition in making more of what it is there. In this sense, The Fugitive shows great ambition from the very beginning of the movie. The film opens with the brutal murder of Dr. Kimble's wife, Helen. The film credits are interspersed at first with an aerial shot of the Chicago skyline. Reminiscent of Ridley Scott's Someone to Watch Over Me, the camera moves slowly across the skyscrapers.[8] Suddenly, the film cuts to a shot of a woman being attacked in her own home. The shot is in black and white and slightly slowed down. Cutting between the aerial shots and the struggle between the woman and her assailer goes on until the woman is finally shot dead. At this point, a new cut to a police ambulance arriving to the scene of the crime takes us outside the apartment for a brief moment. The murder sequence finally ends with a point-of-view shot of a police photographer's camera flashing shots of the crime scene and of the body of the murdered woman.

Ordinarily a sequence like this would be laid down with a rather basic soundtrack. Aerial shots of Chicago would probably have no specific sounds, and music would cover over both credits and aerial shots. The murder scene might require some attention, mostly because of its importance in the overall narrative (it is after all the raison d'être of the whole film) and the way it was shot. However, the choices made by Bruce Stambler and John Leveque (the film's supervising sound editors and sound designers) counter these expectations. At first, the film soundtrack seems to follow the pattern I have just highlighted, and music is laid on in the background (James Newton Howard, of E.R. fame,

is the composer). However, suddenly this traditional pattern is interrupted by the sound of a slamming door. It is the sound of a heavy, metal door sliding shut. The sound is repeated three times in succession. This rather unsettling sound (especially so as we are not provided with its image equivalent) confers a rather 'threatening' feel to the otherwise beautiful views of the Chicago skyline. If you compare this opening with Scott's aforementioned Someone to Watch Over Me the contrast could not be starker. Scott's movie does not wish to 'disturb' the beauty of the images: the film's famous title track (composed by George and Ira Gershwin) accompanies the images undisturbed by other sound elements. In The Fugitive, the echoing sound of the slamming door jars tremendously with the images: directionality is used cleverly by bouncing the sound from channel to channel all around the auditorium to prevent pinpointing the sound to any specific action on screen. When the shot cuts to the struggle in the home, we would expect to hear the kind of sounds one would associate with the struggle portrayed on screen: screaming, cries for help, objects being thrown about, running steps. Instead we are confronted with sounds that are manipulated to such an extent that their origin becomes impossible to pin down. One example above all, when the assailer throws Dr. Kimble's wife to the floor we don't hear the sound of a falling body but that of a long drained clap of thunder (it is worth noting that there is no indication that it is actually raining). The gun shot is also 'massaged' into something different, more closely resembling a long distant echo of a shot rather than the classic short loud burst we are used to (we are indeed offered an alternative, more conventional version of this later on in the film when the murder scene is relived during the trial).[9] Throughout the cutting between the shots of Chicago and the murder, a distant police siren is heard echoing through the steel canyons. When the film cuts to the arrival of the ambulance, the soundtrack would appear to revert to a more conventional approach (i.e. we hear what we see). However, that illusion lasts only a few seconds. As a police officers climbs down the ambulance, the sound focuses on his rattling keys rather than on those sounds that in real life would have been more prominent (by this stage there are several police cars and reporters at the scene). The final departure from convention is the sound of the flash of the police photographer: it only remotely approaches that of a camera flash. Its attack is much more aggressive and its aural characteristics resemble more those of a muffled gunshot than a camera flash.[10] The way sound is edited (i.e. a fast succession of flash sounds) gives this

final shot a very aggressive tone. The sequence concludes, once again, with the sound of the slamming door.

Whilst some of these choices are undoubtedly 'encouraged' by the images (the murder sequence is shot in slow motion and encourages an alternative use of sound), Stambler and Leveque's choices are so removed from expectations as to provide us with a clear indication of the 'making more of what's there' attitude. In particular, the 'door slamming' sound (there is no visual equivalent of such a sound in the opening sequence), the police siren (a key aural theme developed throughout the film as we shall see) and the massaged flash sounds are all substantial departures that suggest careful planning. When I asked Bruce Stambler, one of the film's two sound designers, about this issue, he confirmed that this was a conscious strategy on the sound team's part, not simply a case of serendipity. In particular, Stambler interestingly refers to what he calls a 'process of refinement', indicating a sense of development of an idea from its raw state into a refined strategy.[11]

By highlighting both concepts such as 'refinement', and the freedom that the sound team enjoyed in The Fugitive in terms of decision-making, Stambler suggests a very important dimension. Namely, he would appear to posit responsibility for sound choice with the sound team, rather than with the director. This presents us with one of the most intriguing questions that arises from a study of sound in movies: who is creatively responsible for this 'process of refinement'? If we consider the kind of critical acclaim that film directors customarily receive (and Andrew Davis is no exception, as we have seen earlier) one question becomes relevant: is it legitimate to attribute creative responsibility solely in terms of the film's visual style? If we look at the creative process behind The Fugitive we find a situation that would seem to confound such expectations/assumptions, as this further quote from my conversation with Bruce Stambler unequivocally indicates: 'The director actually in my viewpoint has a little bit less of an input. They have more of an overview'.[12]

Conversely, the investigation of creative responsibility in aural terms can reinforce the concept of directorial input just as forcefully as the case of The Fugitive suggests the opposite. James Cameron's example is illustrative in this sense. I discussed Cameron's creative input with Gary Rydstrom, who headed the Oscar winning sound team in Cameron's Terminator 2 and Titanic. Rydstrom confirmed Cameron's near obsessive drive to review and assess every meaningful sound in the movies he directs. Thus, there is little

doubt that Cameron has a very direct and knowledgeable input in creating the soundtrack for his films. This should not lead us to underestimate Rydstrom's creative input, but rather it should serve as further proof of the need to pay more attention to sound because of what it might reveal in terms of creative input and working practices. The latter aspect is particularly relevant when Stambler speaks of the freedom that the sound team enjoyed whilst working on The Fugitive. In contemporary mainstream filmmaking, the concept of the sound team being allowed the space and freedom to 'refine' their work is by no means typical. In the case of The Fugitive, however, if we follow Stambler's experience of the filmmaking process, the sound team was given plenty of latitude to experiment and refine.[13]

Maintaining space: sound and narrative space

One of the areas where the aural process of refinement that Stambler talks about is most evident is the relationship between sound and narrative space. Mainstream cinema conventionally employs camera angle, framing and lighting to establish a location and/or narrative scenario, and then move onto the particular. A classic example is an establishing shot followed by a medium shot or a close up of one of the main characters. A key storytelling device in visual terms, this movement breaks up significantly narrative space into smaller units, from the general to the particular, and vice-versa. Sound, however, does not follow similar conventions traditionally. It would be very difficult for audiences to accept a constant readjustment of aural perspective. A long shot of a scene will call for the creation of a certain soundscape. One of the key elements will be aural perspective. The scene immediately after the train crash sequence in The Fugitive, where U.S. Marshall Gerard (Tommy Lee Jones's character) is introduced, is a useful example. When Gerard arrives on the scene, a long shot establishes clearly, and for the first time, the aftermath of the crash. The camera then follows Gerard and his team as they move through the debris until they finally reveal their identity to a local cop on the scene. The tracking shot employed in this second stage of the sequence focuses on Gerard and his team: framing is kept as tight as possible on this unit. We are barely shown, at the edges of the frame, a glimpse of the wreckage and of the dozens of cops and rescue workers working on it. The passage from long shot overlooking the crash scene to the team walking through the wreckage ends with a medium close-up of the team, after a few quick insert close-ups of

the team members. In this sense, it follows a rather well established editing pattern (long, medium, close-ups, back to medium). This is perfectly acceptable in terms of visual conventions. That is, we accept this as one of the possible arrangement of shots and framing that can be employed effectively to illustrate this particular section of the story. Sound could not confidently employ an equivalent strategy. If it did, the aural landscape would change tremendously, several times, within the space of a few cuts. To remain with the same example, the complete soundscape of the shot overlooking the crash site could potentially features hundreds of different sound elements: from sirens to rescue helicopters, from huge cranes to lift the mangled train carriages to the dozens of voices of the rescuers and their tools, and so on. From this aurally dense moment, the cut to the team walking through the crash scene would ignore all the sounds that are not directly pertaining to what is actually visible on screen. In other words, we would be hearing only the voices of the people on Gerard's team and those of one or two workers visible at the left of the frame. In the case of the close-ups, we would only hear the voice of the character speaking (i.e. no other sound surrounding him/her). This would be far more difficult to accept in the case of sound than they would with the image: audiences have come to expect sound to retain certain elements of the soundscape that is created at the beginning of a scene throughout that scene.

This difference should not be understood in terms of 'lack'. It is not so much that sound lacks the flexibility of the image, nor that audiences give filmmakers greater latitude in playing with image editing than they do with sound editing. Rather, sound would seem to be particularly effective in carrying out a fundamental role, namely that of 'maintaining' narrative space. Maintenance here is intended in the 'servicing' connotation of the word: a process that ensures that the narrative space created at the beginning of a scene continues to function properly and it is modified, updated, refined, or extended if the narrative makes it necessary. This is not to be understood as a role more or less important than that of the image, only substantially different. One of the aims of the soundtrack is to situate the audience precisely within narrative space, in both narrative and physical terms. Clearly, using sound as a narrative device to suggest scale and scope can be particularly useful in the case of a 'big' film like The Fugitive: sound can provide a huge narrative environment despite tight visual shots just as effectively as it can suggest intimacy in large vista shots a

la David Lean.[14] In this sense, a film like Spielberg's Saving Private Ryan is a good example of both: during the Normandy landing Tom Hanks's character slips in and out of the reality surrounding him. Whilst the images continue to portray the overall scale of the event (i.e. hundreds of men desperately trying to reach a safe position on the beach) sound is used at times to isolate the character and provide us with a much more intimate take on his emotional state. At other times, whilst the shot is kept tight on Hanks, sound maintains narrative space and continuity by reminding us of where we are and what the character is facing.

To state the obvious once again, this crucial property of sound should not be seen as a 'natural given': sound does not just 'happen' to maintain narrative space. It needs to be carefully designed and structured in order to do so. Thus, the manner in which sound functions in this sense can be seen as a good measure of the filmmakers' attitude towards the film. The Fugitive shows clear signs of sophistication in this area. As Gerard enters the movie (immediately after the train crash), a quick burst of his car's siren announces his arrival. This sound serves the function of singling out Gerard's car from the several other police cars on the scene: this car is different, this person is special. Whilst Gerard briefly surveys the scene (i.e. the establishing shot described before), a very dense soundtrack accompanies the shot. This reinforces the scale of the disaster and of the ensuing rescue effort. The sounds we hear are varied in identity (i.e. we can hear police cars and ambulances, police officers and rescuers, heavy machinery, etc.), but they are diffused around the auditorium mostly in a rather non-directional fashion (i.e. audiences cannot necessarily pinpoint their point of origin). They all generically originate from the scene that Gerard is surveying. As Gerard and his team walk through the mayhem, sound becomes much more directional (i.e. it becomes possible for the audience to pinpoint exactly from where sounds originate: front or rear, left or right, etc.). This shift from non-directional to directional is one way to 'maintain' narrative space and refine it. Physically, as well as in narrative terms, we are placed side-by-side with Gerard: that is, we are offered the same aural perspective as that of Gerard and his team, whilst retaining a considerable amount of the previous shot's sound density. Finally, this pattern of directionality and density is sustained in the final shot of Gerard speaking to a cop. In other words, whereas the film's image strategy substantially breaks up visual space, its soundtrack provides continuous

density and increasing directionality. That is, a substantial number of sound elements are layered together that employ direction with increasing precision through the effective use of multi-channel sound. The effect sought is to place the audience firmly within narrative space whilst also providing that space with a 'tangible' physical presence. This sequence clearly operates differently from the opening scene: in the case of the latter, a considerable degree of risk is taken by moving away from verisimilitude and realism: sound operates in a way that is not at all 'natural' and counters expectations. In the sequence we have just described, sound works in a fashion that is more 'realistic': it matches rather closely the action on screen, adhering to what the quote from Lucasfilm indicates as 'the first rule of film sound'. Effectiveness clearly does not require a substantial departure from convention: there is sophistication in both approaches, and both approaches can be found in the same film serving the narrative without creating any substantial problem in terms of coherence. Indeed, the careful selection and layering of the various sound elements employed in this brief passage is a further indication of that process of refinement Stambler refers to.[15]

Genius is in the detail: the use of sound detailing

An important corollary to the issue of narrative sound is the filmmakers' use of sound detail. The attention given to this aspect is a further important element in the assessment of the filmmakers' attitude towards sound. Detailing is not necessarily a question of size: a minimalist approach to sound detail can be as effective and revealing as one that favours extreme wealth of detail (see Rydstrom's reference to Cameron's 'less is more' approach in Terminator 2 as an example in Chapter 3). In the case of The Fugitive, attention to detail is particularly evident in the sound team's use of sound signatures.[16] Two of these are particularly effective. Firstly, the slamming door sound mentioned before is scattered throughout the first part of the movie, until Kimble's escape. Its echoing across the auditorium has a peculiar haunting quality: from the moment we hear it, we begin to assess what it might be the sound of. Its origin (in visual terms) is not revealed until the very last shot of the opening fifteen minutes (when the jail's door is slammed shut by a police officer). Its enveloping sound (achieved through the intelligent use of multi-channel sound) adds to its jarring impact on the audience because no answer is provided to two key questions: what is this sound and where does it come from. These instinctive questions are

not met with an answer until much later. This unsettling sound precedes Kimble's arrest, continues during his trial and incarceration and ends only with his escape. Its key function is to help framing the first part of film's narrative: the ominous, jarring quality of the door sound perfectly mirrors Kimble's situation. He is unable to react to the events surrounding him until he is finally locked up in prison (the moment where the visual source of the slamming door is revealed).

The sound of police and ambulance sirens is the other key sound signature in the movie. It is repeated in many instances throughout the film to emphasise Kimble's precarious position. Wherever he goes, no matter how safe his hideout appears to be, a quick burst of siren sound will remind him (and the audience) of one harsh reality: he is a fugitive from the law and he is being chased by just about everyone who wears a uniform. This sound more than any other is present throughout the movie and works as a real aural theme.[17]

Ultimately, there is virtually no big box office hit of the Dolby era, from Jaws to Star Wars, from The Lion King to Titanic that upon investigation of its soundtrack will not reveal an attitude to filmmaking similar to what Bruce Stambler calls 'making more of it than it's there'.[18] In this sense, Stambler and Leveque's work on The Fugitive is part of a continuing tradition whose boundaries, key features and significance are still to be properly assessed. In some important ways, Stambler's words pave the way for a greater appreciation and understanding of film sound at large when he emphasizes the careful and thoughtful process of selection and refinement necessary to create soundtracks as complex as that of The Fugitive. Sound can expand and refine narrative space, it can provide overall scale and scope, and it can substantially enhance key areas such as production values and performance. Ultimately, sound can help the narrative achieve continuity and coherence, and can substantially increase the overall impact of the film. There are, of course, movies where the soundtrack's only aim is to be 'loud and noisy', where poor cooperation between filmmakers, lack of attention to detail or time and financial pressures translate into unimaginative work, but this should not become a reason to deny sound the attention it deserves. After all, we do not give up investigating performance, direction and scriptwriting simply because there are poor example of one or all of these in some movies. Investigating sound might help develop a greater understanding of filmmaking dynamics. Critics like Rita Kempley emphasise Andrew Davis's merits in the terms of the film's 'bold' visual

style. What are we to do then with the knowledge that Davis actually had little creative input as far as sound is concerned in a film where the latter clearly plays such an important role in the creation of the film's dynamics, narrative space, tempo, and performance? The issue here is not whether Davis is a good director but whether we know enough to be able to express any sort of judgment that is not solely based on considerations of the film's visual style. This is not a matter of directorial fame either: the fact that Davis might not be as well-known a director as superstars such as Cameron and Spielberg is less a factor than it might appear. Consider, once again, Cameron's case: critics and scholars almost unanimously agree that his style is one based on wealth and endless means, a style that one might call 'opulent'. However, this notion of excess does not match Cameron's attitude to sound where he appears to have a much more measured approach. In my interview with Gary Rydstrom (see Chapter 3) he often remarked on the fact that Cameron's approach to sound could indeed be described almost as 'minimalist', where less is more. The example from Terminator 2 I mentioned earlier is but one instance of this approach. Clearly, as scholars, some of our notions concerning how filmmakers work, how movies are put together and how audiences experience them are substantially challenged by the 'view form the ground'.

Chapter 7 - The Sonic Playground: Hollywood Cinema and its Listeners

One of most noticeable features of the Dolby era is the variety of ways in which film sound has played a key role in Hollywood's strategy to engage audiences. As we have seen, Hollywood sound has undergone a huge change, both in production and, more relevant here, in reproduction. Sound in the Dolby era is experienced by audiences sharing a technologically advanced 'space' (the film theatre itself) which is used as a kind of sonic playground for the spectator to actively join in, make sense of what is around him/her and discover new pleasures. Approaching audiences of Hollywood films from an aural perspective might therefore have far reaching consequences: if scholars were to accept that audiences not only look at, but also listen to films then it might possible to investigate a whole different set of cultural implications, skills employed and pleasures offered. Thus far, film scholarship has focussed on film audiences solely as 'viewers': from the theory of the mirror image[1] to the notion of looking and being looked at,[2] film theory would appear to have wholeheartedly accepted a view that is perfectly summarized by John Ellis: 'The spectator looks up towards the image: image dominates the proceedings. It is the reason for cinema, and the reason for the spectator's presence at the event of the film projection'. [3]
I would like to argue in this chapter that audiences in the Dolby era are neither passive nor solely addressed in visual terms. Contemporary film sound requires the spectator to perform extremely sophisticated and demanding tasks which would seem to suggest a view of Hollywood audiences that is a far cry from the accepted view of being 'comfortably inactive'. This would also clearly contrast with the notion of the audience as in a dreamlike state; a kind of receptive state in which the spectator dozes off lulled by a succession of continuously edited sequences. This is a view widely accepted in psychology and often reported in film theory, as these words from German psychologist Hugo Mauerhofer exemplify: 'The spectator gives himself voluntarily and passively to the action on the screen and to its uncritical interpretation supplied by his unconscious mind'.[4]
I would not wish to suggest that what I am about to argue applies exclusively to contemporary audiences either. The arrival of widescreen cinema in the fifties as a means to counteract television's increasing appeal has been widely documented. However, the

auditory dimension of that 'clash' has been overlooked despite the fact that widescreen cinema meant stereophonic sound. This was a huge departure for television audiences from the traditionally limited and unexciting low fidelity monophonic sound they could get from their TV sets (whose speakers were in any case hopelessly inadequate to reproduce film soundtracks' dynamic range). In other words, Dolby audiences are not the first audiences to be addressed directly by film sound in terms of 'pleasure'. However, just as we have seen in the case of filmmakers and exhibitors, the reliance on good quality sound in most cinemas is unprecedented in the history of cinema and this sets the Dolby era apart from other periods. To state what should be obvious, to investigate the many ways in which audiences interact with movies aurally is important beyond the scope of this study.

We don't hear eye to eye: experiencing films differently

Ellis's aforementioned words highlight the belief, held by most scholars, that the image is the primary (and often unique) source of useful information/pleasure for an audience. The corollary to this is the view according to which there is no major conceptual difference between the two acts of seeing and hearing a film because the image structures our perception of the soundtrack.

This view, predominant as it might be, appears very debatable when we consider the processes through which we learn how to listen and look. As audience members, we bring to the cinema multiplex our cultural background and the expectations that it elicits. Although it would be unwise to attempt to dissociate any particular component from its overall context, it is clear that within our cultural patrimony we 'apply' experience and exercise our senses according to the stimuli we encounter. The way in which we relate to the film's stimulation is mostly dependent on whether the stimulus is visual or aural. Clearly, the sources of our engagement with sound differ substantially from those relating to the image. In the latter case, photos, paintings, sculpture, graphics, etc. provide us with our main source of visual reference. In the former case, radio, home hi-fi systems, car stereo, p.a. systems, telephones, etc. absolve the equivalent function for our ears. The experience of hearing and seeing that these provide help us develop vocabularies of both image and sound, and the necessary confidence with which to articulate them.

However, the differences between the sources for visual and aural reference are pervasive indeed, spanning from their historical and technological development to their modes of production, and from conditions of reproduction to the pleasures offered. Thus, as audience members we employ different strategies and skills, we refer to a different set of references, and we perceive sounds and images differently. In short, our way of listening to a movie is different from our way of viewing it: this is true in technological terms (different systems of production and reproduction), in physical terms (a different set of sensory expectations)[5], and in mode of address (the sound track and the image track, although obviously working within the same narrative framework, cannot but differ in their address to audiences). Hollywood filmmakers understand this particular dynamic and integrate it in their approach to film sound. Talking about The Hunt for Red October, supervising sound editor Cecilia Hall points out that one of the key emotional aspects of the movie was to create a sound environment for the American submarine featured in the film that would feel somehow more familiar than its Russian counterpart would. [6] To achieve this she appealed to the audience's cultural background in aural terms:

'We wanted to create a friendly atmosphere (for the American sub). We used familiar-sounding computers. The matrix dot printer you are used to hearing in offices and that people recognize is exactly the kind of equipment that exists on those submarines'[7]

Pleasures on offer, tasks to perform

The period that created the conditions for the rise of the Dolby era in the late 1960s and early 1970s saw a great advancement in all areas of sound technology. Most importantly, the latter was also fast becoming affordable for consumers on a mass scale. The general response of the public matched the magnitude of these developments and, as Charles Schreger suggests:

> 'In 1978, America seems sound-obsessed. You can feel the full impact of a symphony or a rock concert in your living room; you can take it with you in your car or in a pocketsize radio'[8]

Although this new 'sound wave' was rippling throughout the Western world, Hollywood filmmaking lagged behind conspicuously. Indeed, the conditions of reproduction in cinemas in the same period were at a low point. As we have seen, the huge costs involved

in upgrading from mono to magnetic stereo (the only 'real' alternative to mono) had de-facto frozen any meaningful development of the relationship between Hollywood films and their 'new' listeners. Audiences of Hollywood films, both in America and abroad, had now access to home hi-fi systems, they could attend concerts and experience earth-rattling amplification, and they could even enjoy better sound in their own car than at the local cinema.[9] Crucially, this new 'sound obsessed' generation who went to concerts and owned hi-fi systems was roughly the same 15-30 demographic group which Hollywood was targeting, and had been doing so for some time.

This meant two things. First, Hollywood had to play 'catch up' with sound quality once again (indeed, this is something which has happened at regular intervals since the inception of sound in the cinema), it needed to react in order to gain the same aural appeal on young audiences that the new consumer technologies seemed to have. Second, and most importantly, this 'reaction' would have to deal with the now higher-than-ever set of aural expectations, born out of the availability of increasingly sophisticated means of sound reproduction, which that same young audience was bringing to the cinema. Perhaps not surprisingly, these two key aspects were perfectly clear in the mind and intents of the emerging generation of filmmakers such as Lucas, Spielberg, Scorsese and Coppola. They understood the crucial relationship that exists between aural expectations born outside the film theatre and what Hollywood film sound could offer to its listeners. Lucas directly addresses the importance of meeting audience expectations when he remarks that: 'The audience today know what good sound is, and they expect it. They don't expect to walk into a theatre and hear static and hiss and no low end. They know good sound, and they respect it'[10]

Thus, it is possible to see how some of the choices that have shaped the Dolby era were partly Hollywood's way of responding to contemporary audiences' demands and expectations. In this sense, it is important to remember that the introduction of new sound technologies in other entertainment industries, music in particular, and the rise of cultural phenomena (such as the rock 'n roll concerts) had a huge impact on increasing film audiences' aural expectations. In other words, Schreger's 'sound-obsessed' new generation of spectators craved and obtained a change which affected the whole axis film-theatre-audience. The 15-30 generation now expected the hardware available in theatres to be able

to match the kind of quality they had rapidly got used to hearing not only at huge concerts, but also in their house and, increasingly, in their car.

Although a long time coming, Hollywood's response to these demands was comprehensive (see Chapter 1 for more).[11] Filmmakers began to employ multi-channel technology capable of delivering extremely detailed sound from a multiplicity of perspectives. The extension of frequency and dynamic range available in film sound (which used to lag a long way below human capability) was also dramatically increased by the introduction of Dolby at first and digital sound later. In some respect, we are now on the opposite end of the scale, as Walter Murch humorously points out when he says: 'We've actually got too much dynamic range. We have to control it in the mixing or we will blast people out of the theatres'.[12]

Inevitably, the emergence of a new audience and the development in both sound personnel and technology affected the way cinemas were designed. In particular, cinema architecture began to reflect the acoustic demands of the new sound systems. The old movie palaces and even their smaller relations were fundamentally built still following blueprints that had rarely had to cope with any severe acoustic demands (stereo was a rarity and confined to a few first-run theatres in big cities). As Tomlinson Holman points out, this is a fundamental issue for 'there's a fundamental difference between a concert hall, which is a space for production(...) and a movie theatre which is a space for reproduction'.[13] This new architecture needed to address a series of well-documented problems and worked to a precise brief. To name but some of the most important aims: i) to reduce the possibility of unwanted echoes (by employing better phono-absorbent material and avoid too many 'bouncing' surfaces); ii) to minimize background noise (like sound spillages from adjacent theatres in multiplexes, the noise of the projector and air ventilation systems, etc.); iii) to accommodate surround speakers correctly (by arranging speakers according to the layout of the seating plan and to the needs of surround sound). This new attention and care in producing sophisticated soundtracks and spaces capable of reproducing them in all their dynamic potential shows an evident positive shift in the weight given to the figure of the spectator as listener at the beginning of the Dolby era.

In a somewhat logical extension of this development, the 'aural lure' of sound began to be exploited also outside the auditorium itself, by for example installing speakers throughout the cinema complex and playing back music and trailers from present and forthcoming

films (in some cases even in the cinema toilets!). Apart from operating as an effective marketing device, this has had the effect of further increasing audience expectations by extending the aural dimension to the 'before' and 'after' of the filmic experience. Thus, the Hollywood sonic playground seems to extend well beyond the actual auditorium and the film projection; it pervades the whole of the theatre experience, heightening our expectations and enticing us to 'come in and play' from the moment we enter the cinema complex.[14]

When audiences finally reach the auditorium, they are able to experience a situation where they are placed 'inside' the filmic space, not just 'before' one (i.e. the images on the screen). This awareness of the correlation between audience involvement and (filmic) space is a key factor. Working on the soundtrack as a kind of architectural construct, Hollywood sound 'architects' have chosen to regard sound as an increasingly tangible expanse in which to arrange a series of sound objects for the audience to engage with. As Walter Murch points out: 'You (the sound designer) are given an architectural space and you put things in it and make it look good'.[15] This powerful, sensual involvement with this three-dimensional (sonic) space is clearly designed to appease those high expectations I referred to before, heighten the cinematic experience and provide audiences with a constant source of pleasure. The Hollywood listener is bestowed with an aural experience that elevates him/her to a state that may defined as that of a 'super-listener', a being (not to be found in nature) able to hear sounds that in reality would not be audible or would sound substantially duller. This is a new breed of audience who can expect screen objects to fly above their heads into (and out of) the auditorium. All this, as ADR (Automatic Dialogue Replacement) supervisor Juno Ellis correctly points out, requires a great deal of engagement and discernment: 'Audiences have gotten more sophisticated in what they want from sound'.[16] The 'new' generation of listeners that Ellis refers to expects to enter a playground where sound objects are, to follow Murch's analogy, placed around for him/her to play with. The promise is a world of sonic wonders and pleasures that is very appealing even though, or perhaps precisely because, this requires a certain degree of physical and mental participation. Contemporary listeners are required to sustain physically aggressive soundtracks, to process dozens (sometimes hundreds) of different tracks in any single moment of a film, to navigate in this ocean of sound by correlating sound direction and its

(visual) source, and to constantly update their own personal sound data bank with sounds never heard before. Because of contemporary recording practices, where conditions on the set may require sounds to be recorded afresh in the acoustically friendly studio environment, film sound is rarely produced by its visual source on (or off) screen. Indeed, most of the sounds we hear in Hollywood movies are literally designed. This is mainly because their real equivalent would often simply not sound 'right' for the kind of emotional and narrative impact that they are meant to achieve (for more see next chapter). The goal then becomes not reality, but expressiveness. In other words, audiences are asked by filmmakers to accept an 'interpretation' of that sound that bypasses the original features of it (e.g. what a straightforward sound recording of a sound would sound like) in favour of narrative effectiveness (e.g. the 'designed' sound that replaces its original). To make matters even more intricate, some of these sounds are themselves a combination of different sounds aimed at achieving that kind of 'filmic eloquence' mentioned above (for more see next chapter). This would again suggest that most Hollywood sound is not only 'artificially' constructed, but also not a unique event, rather a combination of events that the audience has to 'splice' together and make sense of. Moreover, audiences are asked to perform these tasks under extreme physical conditions. Sound systems in the Dolby era are powerful enough to move a significant amount of air. Consequently, the spectator can be 'hit' with sound, and thus experience the film with a far greater degree of physical involvement than ever before.[17] This creates a situation where audiences have to deal with sufficient constant sound pressure to lead to physical exhaustion, if exercised over time. Sound designers are aware of the physical demands they place on their listeners, as this quote about Top Gun from Cecelia Hall clearly illustrates:

'Our biggest fear was that we were going to pound them (the audience) into oblivion. We knew the sound effects could not be unrelenting because by the time you got to the end of the movie, you'd be so exhausted that you'd have no energy'[18]

Chaos in the hall: who is in charge of the soundtrack?

Hollywood's careful 'orchestration' of all the aforementioned issues notwithstanding, the relationship between Hollywood films and its listeners is far from being devoid of blurred areas. There are contradictions to be found, both in the theatre and out, which makes this a

rather difficult partnership to assess. On the one hand, Hollywood has been investigating thoroughly its potential: from the introduction of new technologies to their use in production, from their reproduction in theatres (now built with sound demands in mind) to their home fruition (where the circle has now closed again and home consumers can enjoy cinema-like sound quality after the recent introduction of Home THX and Digital sound systems), the signs of the industry's desire to explore its spectators as listeners are all too apparent. On the other hand, there are aspects of this relationship that betray a rather more chaotic situation than what might appear on the surface. Most noticeably, the concept of a unique soundtrack, experienced by a 'unified' audience is a famous casualty. This is an important issue to investigate because in many ways one of the 'side-effects' of the introduction of Dolby was to kick-start a new drive for standardization (See my interview with Tom Holman in Chapter 5). However, the experience of audiences in the era that Dolby introduced is more complex than companies like Dolby might have hoped for. I would like to suggest that there are at least two distinct 'parallel soundtracks' to the film's own: the *structural* soundtrack (i.e. sound produced during the film performance by the cinema structure itself), and the *audience* soundtrack (i.e. sounds produced by the audience). The issue of a structural soundtrack can be defined as being directly dependent to those conditions of reception that may affect our experience of a film. These possible 'influences' include aspects already mentioned, such as sound spillage from adjacent theatres, noisy ventilation systems, lack of proper insulation of the projection booth, distortion due to excessive volume levels or inadequate speakers, and so on. Any, indeed all, of these factors inevitably interact with the film's own soundtrack, creating a sort of hybrid that is different, not least because it is likely to vary from theatre to theatre. However, this would still seem to be a problem that is mostly related to issues of cinema technology and architecture, and therefore in some ways 'adjustable'. Far more complex is the situation pertaining to the 'audience' soundtrack. As in any respectable playground those who visit it wish to be more than mere 'observers', they want to interact with it. In this sense, theatre architecture, noticeably seating arrangements, has limited the degree of visual interaction of the spectator (it is impossible not to acknowledge the 'restraining' nature of the cinema seat, which obliges the audience to face the screen and limiting audience physical movement). This is not, and could not be, the case with sound, given the

latter's modern dimension as multi-perspective (i.e. sound is generated from various points in the auditorium). As a logical result, audiences are relatively 'free' to establish a rather complex interaction with the film soundtrack. This begins outside the auditorium (from the usual socializing 'chitchat' to talking about the film one is about to see; from food munching to drink sipping, etc.) and is then somewhat naturally carried on inside the auditorium itself. Once inside, this 'interaction' takes a different form. The talking may stop, but the munching, drinking and, more importantly, the laughing, crying, screaming does not. This interpretation of the relationship between audiences and sound as having a different dynamic from the one with the image would also seem to be 'institutionally acknowledged' by the fact that although the audience is made well aware that there is to be 'no talking' during the projection, there is no perceived need to adopt a similar strategy for the image (perhaps with a similar request that there should be 'no looking away'?). Indeed, there are many ways in which the audience's own soundtrack can support, undermine, reinforce or even contradict the film's own (by, for example, laughing at the 'wrong' time, screaming when prompted through a scary moment, applaud or boo at the end of the film, and so forth). Hollywood filmmakers seem to be aware of this 'threat' to the integrity of their soundtrack and have tried to address it. A good example of this attempt is Lucasfilm's revolutionary and comprehensive sound program that includes THX and TAP (Theatre Alignment Program).[19] Crudely, the THX program aims at recreating in the theatre the same conditions and sound quality which can be found in Hollywood mixing studios. Its stringent criteria also address the issue of the 'parallel soundtracks' by demanding that a series of parameters regarding 'structural' conditions, such as those already illustrated above (background noise, sound insulation etc.) must be met if certification is to be awarded. Moreover, realizing the further problem of the differences between theatres that a print may encounter, the TAP program was created to complement the THX treatment. The Theatre Alignment Program also comprises, amongst many other sophisticated quality controls on the film's sound and image track, a series of 'print policing' strategies (including a free phone line and a web site for cinema customers to report any problems encountered when viewing/listening to a TAP-managed print). Behind all this remarkable and unprecedented interest in the quality of both recording and reproduction of the film soundtrack lies the awareness that, regardless of the individual efforts of the filmmaker, a

variety of factors 'outside' their control interact at the point of reception, hence, as this quote from James Cameron clearly indicates, the desire to minimize the 'damage':
'All that stands between us and entropy is TAP. We work so hard to create quality, it is a relief to know that there exists an organization whose sole purpose is the preservation of quality at the actual place where the film and the audience first meet.'[20]

There is something of a paradox here, with Hollywood filmmakers creating a playfully 'inviting' sonic environment while at the same time hoping to standardise or regulate the conditions of reception. The contradictory impulses here present us with the most damning piece of evidence that audiences as listeners are indeed active and constantly involved in an interactive relationship with the film's soundtrack. This conception of an active listener is also reinforced by the situation existing in the other, often overlooked, place of fruition of Hollywood films, the home.
At home, audiences of Hollywood movies are free to manipulate virtually all aspects of a film soundtrack, such as sound direction (by arranging speakers at will), loudness (simply by pumping the volume up or lowering it down), the relationship between surround and front channels (most home surround processors have separate controls for them) and, perhaps most importantly, their talking and commenting over the film soundtrack are not anymore 'forbidden' and are free to reach a level of sonic interaction with the film unobtainable in a cinema.[21] Thus, given these considerations, it would seem unwise, at best, to address the issue of the interaction between Hollywood films and their listeners/viewers as a unified event and, similarly, to talk of a passive, uniform spectator of that event.

The comfortably active spectator

The concept of being active or passive spectators is one that in film scholarship has been firmly located in the spheres of meaning and interpretation. The argument is deceptively simple: a film that is 'easy' to understand will not call for an active involvement on the part of audiences. On the other hand, a movie whose meaning is somewhat 'cryptic' (or open to alternative interpretations) will solicit an active response. Leaving aside for a moment the rather slippery notions of meaning (films are not necessarily about 'meaning something') and interpretation (is there ever one single 'correct' interpretation that we can isolate from

the many possible ones?), this view overlooks the aural dimension of film going and underestimates other dimensions of movie-going where audience behaviour may be categorised as 'active'. The playful nature of the audience relationship with movie soundtracks is one such dimension. As we have seen in the case of the 'audience soundtrack', audiences interact aurally with each other and with the film in many ways. Whilst the level of sonic interaction varies considerably from culture to culture (clapping and cheering at the actors/events on screen, for example, is a practice more commonly accepted in some countries than others), this interaction is too evident to be unnoticed. Similarly, contemporary sound systems are capable of producing intense sound pressure on film audiences, thus involving the latter also on a physical level. This is more than just about being 'loud'. Unlike the bi-dimensional image, the three-dimensional nature of sound allows soundtracks to be enveloping and, importantly, multi-channel, multidirectional sound is today structured around the auditorium, not around the image on screen. This is not to underestimate the importance of the image: images can suggest sounds (although the degree of this relationship clearly varies from film to film). However, sound is directed to and orchestrated around the seats to put the spectator literally 'inside' the film, reducing the distance between audience and narrative world. Audiences are invited to share the same sonic dimension as the characters on screen: as Michael Cimino once remarked, 'sound can demolish the wall separating the viewer from the film'.[22]

On a different level, the popularity throughout the world of theatres bearing the THX logo or boasting the latest digital sound systems, not to mention the remarkable diffusion of home sound systems, suggests a third dimension where the contemporary Hollywood listener can be seen as active. By choosing in which cinema to see a film, audiences actively seek the best comfort available. In this respect, sound plays again a key role: audiences know that a cinema showcasing the THX logo is very likely to feature comfortable seats, and large screens, as well as high-quality sound.[23] The commercial success and huge popularity of high-end sound reproduction systems (all mainstream Hollywood productions are now released in digital sound format) testifies to the relevance of this particular audience choice.[24] This combination of technological comfort, physical involvement and social interaction suggests a figure of the Hollywood listener that we might be tempted to define, in opposition to the view originally expressed in the quotes by

Austin and Ellis at the beginning of this article, as 'comfortably active'. The industry has long acknowledged the importance of providing audiences with the necessary aural comfort and choice. Filmmakers provide enough visual clues to facilitate the process of linking image to sound (no matter how improbable that link might be), and cinemas provide all the necessary 'creature comforts' to make sure that contemporary audiences enjoy an aurally sophisticated environment in which to be active part of the ride and not merely passive 'spectators'. Whether this makes for 'better' soundtracks or rather leads down a path towards theme ride style soundtracks is a debatable issue. What appears certain is that contemporary audiences have at their disposal an unprecedented array of choices and possibilities to be actively involved in the movie-going experience, and that sound plays a key role in this picture. Recent developments point towards an even greater attempt to position audiences inside the sonic playground. The introduction of the new Dolby EX sound system, enveloping audiences with a sonic environment where sound can reach them from no less than six different directions: front left, front centre, front right, surround left, surround centre and surround right (see Fig.4), is one good indicator of this continuing trend. The sonic playground has just become more playful.

Chapter 8 - Tackling sound: suggestions for sound analysis.

Textual analysis is an important tool for film scholars. This is true both in an interpretative framework and in a more inclusive approach as a means to study the dynamics at work in the relationship between audiences, movies and their makers. Indeed, textual analysis has played a crucial role in, at the very least, legitimising some of the most influential theoretical currents in film studies.[1] However, despite its continuous influence, textual analysis has been remarkably impervious to all things sound. Although the vocabulary we employ to analyse images in movies is far from being completely satisfactory, the confidence that it has generated in scholars has helped to produce countless examples of 'visual' textual analysis. The same cannot be said of sound. The most obvious sign of this bias is the notion of mise-en-scene. This established way of (literally) looking at movies takes into account some core aspects of filmmaking, such as acting, lighting, framing and costume. In less 'strict' interpretations of mise-en-scene scholars have included other aspects, such as camerawork, but have routinely disregarded sound as central to the close analysis of a film. It is my aim in this chapter to identify and indicate some areas of film soundtracks that I believe might yield useful questions about the way sound works in films. In this sense, I am more interested in analysing sound in film in terms of practices and dynamics and less as a means to ascertain 'meaning'. For someone who claims such a 'bias' I am exposed to challenges about the actual possibility of separating those two acts, since they are central practices in my own profession. Nevertheless, the 'political' project here remains one that hopes to move away from a straightforward investigation of how meaning is constructed so as to help understand more about the surface of movies produced in the Dolby era. This is not to suggest that previous to this period sound was not worthy of attention, or that most of my arguments apply exclusively to contemporary cinema (see Conclusion for more), but rather to emphasise the level of complexity and exuberance that film sound has achieved in the period I am dealing with.

Several scholars, Chion, Altman, Bordwell and Thompson amongst others, have contributed to a greater understanding of how sound works with a number of significant attempts at developing a terminology of sound. Indeed, I should speak of sound

terminologies, given the richness and variety of these attempts (see Appendix 6 – Terminologies of Film Sound). Although these terms and concepts are instrumental to the development of film sound scholarship, the nature of their project is to illustrate individual instances of sound. That is, they provide scholars and students with analytical tools at a 'micro-level', but they do not address the investigative framework, the 'macro-level' of sound aesthetics, within which those terms and concepts could function organically. When Bordwell and Thompson speak of diegetic and non-diegetic sound, to name but one famous example, they are more concerned with specific instances of sound in a film and less with how sound functions overall in any given movie. I believe this lack of a structural framework to be one of the key reasons why, despite so many good examples of sound vocabularies, most scholars still show uneasiness when attempting at incorporating sound in their analysis of movies. Thus, my main aim here is to provide a first level of 'macro' sound analysis.

It is a common enterprise to dissect films in ways that attempt to reproduce lab work: scholars will take a movie or a sequence and will watch it several times in conditions they assume are best suited to reveal whatever insight into filmmaking they are seeking. Textual analysis is the most classic of these examples. Michel Chion, to name one famous example, puts forward his suggestions for a macro-analysis of sound in the last chapter of his Audio-Vision entitled Introduction to 'Audiovisual Analysis'.[2] Chion suggests the process he calls 'masking' (i.e. turning attention to either sound or image whilst masking the other element out from viewing or hearing) as a central strategy to sound analysis. He suggests that:

> 'The trickiest stage of the masking procedure involves listening to the sound by itself, acousmatically. Technically, this must be done in a relatively dead sound environment that is well isolated from outside noise conditions which must be carefully arranged. Second, participants must be willing to concentrate. We are not at all used to listening to sounds, especially non-musical sounds, to the exclusion of anything else.'[3]

Chion here assumes that his implied readership of film scholars will accept his 'quasi-scientific' approach as an unnecessary evil. I must confess that I am tempted to adopt the same strategy (and, indeed, I am 'guilty as charged' in parts of this study). However, there

are problems that arise from this commonly used methodology and they all revolve around the question of audiences. Chion mostly disregards the experience of ordinary audiences who, as I have outlined in the previous chapter, are in a position that is diametrically opposite to the one he suggests. Their everyday experience of cinema, our everyday experience of cinema, is one that is strongly dependent on a variety of conditions outside our direct control. We cannot be sure that the theatre we will be sitting in will have perfect insulation from adjacent theatres or even from the outside world, and that its instrumental equipment will be rendered acoustically neutral (these elements, as I outlined in the chapter on audiences, constitute what I call the structural soundtrack). Even if we were in the 'perfect theatre' (and agreeing on what constitutes such a thing would require much debating), we would still have to contend with other members of the audience (i.e. the audience soundtrack), whose aural contribution to the film experience cannot simply be bypassed. Secondly, Chion chooses to ignore the fact that filmmakers do not design sound for the kind of audience experience he suggests. Indeed, the process of final mixing, as any account of filmmaking practices will confirm, relies on two core notions that are based on exactly the opposite premise:

i) The power of sound in creative terms depends on the immediacy of the experience, the 'here and now' of the film experience. Audiences cannot spend too much time thinking about sound (or the image for that matter) and that transient, momentary nature of the act of seeing and hearing is what makes the illusion of cinema work;

ii) Audiences do not inhabit an ideally standardised audiovisual space, but rather a pale version of it (hence witness the amount of money and resources that studios and film companies have poured into the search for improving standards of reproduction).

I believe that greater consideration needs to be given to filmmaking practices, that it is important to develop a method of analysis that favours the investigation of what sound does, not what it should do, and that 'everyday audiences' should be seen as central to this project. This is not to devalue the importance of close analysis, but to reposition it in a wider context as a tool for analysis, not 'the' tool. It might be useful in this sense to lay down clearly the foundations upon which my suggestions for sound analysis are based.

There are three key features that describe my approach: inclusive, medium specific and contemporary. The approach I am about to suggest is inclusive in the sense that it attempts to move away from the concept of individual authorship and take more into account the complex web of relationships at work in any given contemporary soundtrack. It would be tempting to focus on the body of work of individual sound designers such as Walter Murch, Gary Rydstrom, Ben Burtt or Dane Davies as 'authors of sound'. Indeed, this is partly inevitable for they are the most interviewed and written about people, and their views and ideas recur more often than others do. However, this need not amount to a redressing of auteurism as it could easily hinder our understanding of the dynamics at work in the creation of a soundtrack, not to mention its relationship with audiences. The views and work of the key designers in Hollywood are central to my approach but only insofar as they serve the 'greater good' of understanding how sound works. Secondly, this approach wishes to be medium specific in that it needs to overcome some established notions of film sound that have been particularly limiting in their vague attention to film's own specificity. The most obvious example of how 'unspecific' textual analysts have been in relation to sound is the rather vague and often contradictory vocabulary that has been employed over the years. To conflate the terms 'music' and 'soundtrack', to name but one example (see case study on film music in Chapter 2), is to betray the fact that the former is part of the latter, and not vice versa. Consequently, even the most basic question 'what is a film soundtrack?' has often been taken erroneously for granted. This remains as much a conceptual problem as it is one of language. Finally, it is a contemporary approach. Historically, most versions of textual analysis and mise-en-scene were formed and hardened into film studies in the Sixties and early Seventies. Crucially, this was before the exponential increase in the interest on and investment in film sound by both industry and consumer took place.[4] Moreover, political hostility towards Hollywood heavily characterised debates and critical thinking at the time. The immediate consequence of this is that established concepts that we routinely employ to carry out sound analysis are, literally, outdated. Contemporary soundtracks are neither intrinsically better nor worse than the ones that preceded such a seismic change, but they are undoubtedly extremely more complex, and sound people have been encouraged to be creative by the new possibilities

that opened up before them. This is true in relation to both filmmaking practices and audience reception, as these words from Murch emphasise:

> 'The general level of complexity (...) has been steadily increasing over the seven decades since film sound was invented. And starting with Dolby Stereo in the 1970s, continuing with computerized mixing in the 1980s and various digital formats in the 1990s, that increase has accelerated even further. Sixty years ago, for instance, it would not be unusual for an entire film to need only fifteen to twenty sound effects. Today that number could be hundreds to thousands of times greater'[5]

Ultimately the approach I am outlining revolves as much around considerations of context as of text. As I hope this study has proven thus far, any attempt at understanding how sound works in the Dolby era, indeed in any era, has to deal with issues such as attitudes, projected audience, established views, and assumptions. It is for this reason that I have structured the first part of this suggested framework as a series of brief questions and issues directly addressed to the reader. I am assuming, and as with all assumptions I am aware of the risk that this entails, that primarily student and scholars of film will read this study; that is whom I refer to when I say 'we' or 'us'. I would also like to state the obvious and emphasise that although there are similarities amongst different movies in terms of how sound is employed, there are also substantial differences depending on a variety of factors, including issues concerning production (the composition of the film crew), time (release dates), and money (budget). In other words, what I am suggesting is a tool for investigating sound, not a template of what contemporary soundtracks 'ought to sound like'.

For a more organic approach – Part One: a question of attitude

I suggest that before carrying out any attempt at analysing (and evaluating) the way sound functions in any given film it is crucial to address a few concerns and ask some basic questions. I offer these in no specific order, as I believe them all to be important.

On audiences.

What audience are you going to have in mind when writing? Is it the 'ideal audience' Chion engages with, or the 'unstructured' audience who inhabits your local theatre? Clearly, this is a rather incomplete choice I am offering you (is there such a thing as an

'ordinary' audience?), but it is a central choice nonetheless. If the audience we have in mind is an ideal audience, capable of detecting every subtle instance of film sound, impervious to extraneous noises and distractions, and uniformly predisposed to constant attention, then we do not need to concern ourselves with conditions of reception in film theatres (or at home), nor do we need to account for other differences (in cultural references, hearing patterns, age). However, if you wish to account for a less 'ideal' kind of audience, then the issue of the dynamics of a soundtrack, as well as conditions of reception, become much more important. To name but one example: there are some choices that cannot be noticed by audiences for they happen at such subtle level that there is no time for the audience to register them. The sound of Erin Brockovich's car slowing down to a gentle 'purr' to enhance the mood of the scene when she is told that her little daughter has just spoken her first word cannot be noticed in itself, its effectiveness is in the overall mix.[6] On the other hand, any gun sound employed in Terminator 2 stands in its own right and demands to be noticed. One works because it is not noticed, the other because it is; one chooses shadows, the other steps into the limelight. It is not a matter of value or effectiveness: both strategies can be very effective.

On research.

It should be obvious at this stage in my study that I value accounts of filmmakers' practices in creating sound as much as I appreciate the importance of academic literature. Indeed, a synthesis of the two ought to be seen as central to my enterprise. However, most traditional accounts of film sound (indeed, of film at large) have mostly eschewed any attempt at incorporating filmmaker's voices and have elected academia as the core of their investigation. Although this is perfectly understandable (indeed the same attitude is true of most filmmakers, who have often regarded academic accounts of film sound as 'alien' and irrelevant), many scholars in the past have chosen to employ this artificial division between theory and practice as a comforting 'buffer zone' between academia and the filmmaking community. This is a very important issue in relation to the kind of attitude you are likely to adopt in your research. One of the few advantages that sound scholars have enjoyed as a direct consequence of the 'lesser status' of the discipline is that sound men and women are much more open and willing to talk about their art and craft than other, more established

aspects of filmmaking. Thus, it is reasonable to assume that exchanging views with filmmakers is a real possibility for scholars, and indeed a choice to be considered when writing about sound.[7]

On budgets.

The gap between low budget movies and big budget movies is not as wide as one might logically assume. Sound need not be a tremendously expensive part of filmmaking, assuming (and this is a big assumption) that planning is carried out properly. In this sense, good communication and collaboration between producer, director, picture editor and supervising sound editor is crucial in order to avoid needless time wasting. Undoubtedly, would-be blockbusters will have substantially larger budgets than any low budget, or even average film production. However, precisely because of the money and expectations involved, this will often translate in less time for post-production (mostly because of the need to hit a specific release date to maximise profit and avoid head-to-head confrontations with other big budget films) and greater pressure on sound crews. This has also led to the shrinking of time allowed to the sound crew in post-production from the mid-eighties onwards. The latter is an issue that filmmakers often indicate as a serious threat to sound quality.[8] Most importantly, most sound men and women approach sound making with much the same attitude, be it for a run-of-the-mill movie or the latest blockbuster. In this sense, it is interesting to note how most leading designers in Hollywood occasionally work on 'small' projects.[9]

On technology.

What is the place that technology occupies in your research? This question refers to a particularly limiting dichotomy, once again arising from auteurist notions of creativity. Many scholars have correctly emphasised the role that radio mikes and multi-track mixing have played in helping Robert Altman achieve the rather unique style of sound that characterise most of his movies.[10] However, rather than seeing this as one of many instances of how sound technology can empower filmmakers when they are open to the possibilities that technology can offer, Altman's example has often been indicated as the exception that confirms the rule. This false dichotomy between (passive) technology and (active) creativity is an obstacle to our evaluation of the central role that technology plays,

not only in sound, but also in cinema at large. Technology empowers as much as it shapes (and hence, limits) filmmakers' creativity.

On creativity.

This issue is a further extension of the previous question on technology. Most scholarly attitudes towards sound, as we have seen, see sound as a technical part of filmmaking, creativity being located elsewhere in the filmmaking process. In my opinion, this is perhaps the most damaging of all common assumptions about sound for it cripples our ability to investigate fully the creative effort involved in making film sound. To consider sound as a button-pushing, knob-tweaking exercise is to limit the scope of our research to investigating only those same aspects. Important though these may be, the huge creative effort that goes on before and after those buttons are pushed remains an unknown quantity in film sound. As Gary Rydstrom points out (see Chapter 3), there are people who:

> 'Have deemed the sound world of filmmaking to be strictly technical, as if it was negative cutting. Of course, it isn't, and the best filmmakers know it isn't and make use of it. The danger is that, if you think something is just technical you are ignoring the artistic capabilities of it and so directors do it at their peril if they think that it is a technical exercise. Sound people themselves, I think, suffer from the idea that it is simpler than it really is, than there isn't great potential for creative use of the soundtrack.'[11]

On sound vs. image.

Another important question to arise from considerations of creativity is whether you believe the image to have inherently greater power of creative expression than sound. I recall a colleague whom, in the Q. & A. session after his paper at a conference on Hollywood cinema, confidently stated that images are more complex than sounds. This is a central issue because, once again, it is a matter of intellectual attitude: if you believe that the image is creatively the more important force within a movie, indeed, that it possesses greater expressive powers, you are mostly likely to approach sound in a negative fashion. Elisabeth Weis has perfectly captured the pitfalls inherent to this problem as early as 1978. In an article she wrote on Hitchcock's use of sound[12] she says:

> 'In a famous attack on Alfred Hitchcock's work, Penelope Houston complained that in The Birds 'most of the menace [comes] from the electronic soundtrack, to cover the fact that the birds are not really doing their stuff' (Sight and Sound, Autumn 1963) (...) Miss Houston's comment is representative in its implication that Hitchcock's use of film sound is a 'poor relation' to his manipulation of the image. The belief that aural techniques are a means of expression inferior to visual ones is shared by most film scholars and, indeed, by many filmmakers.'[13]

On filmmakers.

The Directors Guild of America considers sound a technical category and thus prohibits head credits be given to sound.[14] This is not merely an issue of 'ego'. Film sound has a problem with status within the filmmaking community, as much as it has within the academic community. In this sense, Randy Thom's remarks about directors: 'treating sound as a 'necessary evil', and afterthought, or whipping boy' reveal the political struggle sound men and women need to fight on most jobs. This 'struggle' involves all aspects of film: from not considering sound early enough in the production process to allocating insufficient times during post-production, from considering sound as 'technical' to employing sound as merely a support to the image. Conditions of labour are thus important because they may provide us with an important insight into the creative process of a film. The suggestion that the final mix is a process whereby sound crews execute the director's vision is an empty statement partly born out of the belief that film production is a 'standardised' process. The reality is that the degree of creative input and choice that sound people will be allowed varies tremendously according to who is in charge of the overall movie project. Obviously, there will be many instances where to research these issues will be extremely difficult, if not unfeasible, even for the most enterprising of scholars. However, to ignore these issues and treat each movie as if conditions of production were always the same is simply another way of bypassing questions of filmmaking practice altogether.

Issues and questions such as the ones above are crucial because they can help us confront those deep rooted fears about sound by (re)evaluating issues of production, technological

choice (and limitation), creative processes, conditions of labour, before we take on assessing how sound contributes to any given film. If nothing else, they can help inject a healthy dose of self-doubt in even the most image conscious scholar.

For a more organic approach – Part Two: sound dynamics

I have articulated my thinking in this section around the concept of sound design. The latter is here used in the wider acceptance of the term as the process of arranging sound objects and spaces to produce an overall effect, not just in terms of 'creating' new sounds. In this sense, the role of the sound designer can be most usefully compared to that of the production designer: some filmmakers, like Murch, have indicated the director of photography as their 'visual' equivalent. However, as a three-dimensional construct sound is closer to production design than cinematography, both in conceptual and physical terms.[15] Within the overall concept of design, there are elements that can help structure our thinking about how sound works in any given movie. I would like to begin by suggesting four groupings that can help us explore individual issues. Once again, there is no particular hierarchy amongst these headings. They are: orchestration, contrast, focus, and definition.

On Orchestration

The concept of sound orchestration is a good starting point simply because it is the most macroscopic of all four groups. It involves developing an overall impression of how the soundtrack of a given film articulates a series of key relationships. One obvious starting point is the balance between the four different elements in a soundtrack. Virtually all movies will have a proportion of music, dialogue, sound effects and silence.[16] Interestingly, most attention in existing critical literature has focussed on cinema's 'voco-centrism'.[17] Although it is true that dialogue intelligibility will take precedence over other elements in the soundtrack, this does not nullify the issue of choice: how these four elements are combined will vary tremendously between different movies. A film like Magnolia relies more on a very complex combination of music and dialogue, and less on sound effects and silence. Conversely, The Right Stuff has a much greater balance between all four elements. There is no intrinsic value in either approach for clearly the permutations possible are almost limitless. The question of whether the specific chosen approach works is to be

considered within the confines of the narrative of that movie, especially in the case of filmmakers who have shown a sophisticated approach to sound in their movies. I will reprise this topic when I discuss sound layers and stems.

A further aspect of orchestration is the relationship between front and rear channels, what I call the aesthetics of surround. Contemporary film sound is defined by multi-channel technology. Again, the virtual totality of mainstream movies in Hollywood over the period I am considering has been released in one or more multi-channel system (analogue in the late seventies and eighties, digital from the nineties onwards.). This means that sound men and women have the choice of sourcing sound from a variety of points around the theatre. Indeed, the proliferation of channels available has not stopped since the beginning of the Dolby era: from the original 3+1 (i.e. Dolby Stereo's 3 front channels and 1 rear channel for surround sound) we have progressed to the present 3+2 (DTS and Dolby Digital), 5+2 (SDDS in its full version) and 3+3 (Dolby Labs and Lucasfilm's latest development, Dolby EX). In other words, the 'balance' of sound between front and rear does not 'have' to be heavily weighted towards the front, that is, towards the screen. That this should still be the case in so many movies is a choice, not a necessity, and this clearly has consequences in the way sound functions within the overall project of a movie. Some movies, like Forrest Gump, choose to use the rear channels sparsely (see case study below on Forrest Gump). Others, like The Remains of the Day make heavy use of it to emphasise the many 'hidden' areas of the house at the core of the narrative as well as providing audiences with a sense of 'geography' within the house (how big, where we are, and so on). Ordinarily, Hollywood movies still rely heavily on the front channels, in what I call the one-wall narrative approach (see Chapter 1: The Dolby Phenomenon). However, some designers, Dane Davis (The Matrix), Gary Rydstrom (Saving Private Ryan, Strange Days), Ren Klyce (Se7en) amongst others, have been rather more willing to explore the potential of the surround channels. This is not just an issue of 'putting effects or music in the surround'. Surround sound has the potential of expressing levels of narrative that confirm, contradict or simply differ from what the front channels suggest. Dolby EX has now placed rear and front channels on an almost equal level: front channel speakers still have greater dynamic range than surround speakers (although this is more a consequence of established practice than technological limitations) and, obviously, front channels can rely on being the 'screen

channels'. However, the present situation is very different from that of mono sound or even early stereo when the imbalance in favour of front channels was all too evident and limiting. In other words, the possibility for greater articulation of the relationship between front and rear sound is available to sound designers, and their taking up this 'challenge' is partly dependant on being able to break down old established views as to what 'works' with audiences. Greater critical attention to this issue might help filmmakers in this sense.

There is, of course, another aspect to the issue of orchestration that I do not wish to take for granted. The availability of a technology does not make that technology inescapable: mixing films in stereo is still a choice. Indeed, just as silence makes sense only in a world of sound, the choice of mono makes even more sense in today's world of multi-channel technology. Over the years, some filmmakers have chosen mono for some of their movies for a variety of reasons. Most recently, the Oscar winner for best movie, Traffic, was mostly mixed in mono, music aside. When I asked Larry Blake, the supervising sound editor on the movie, about it he confirmed that this was a conscious choice in order to highlight the 'documentary' feel of the movie. Similarly, Martin Scorsese and Frank Warner adopted the same approach for Raging Bull, where most of the movie is mixed in mono, stereo being dedicated specifically to fight sequences to enhance their impact and slightly 'surreal' feel. Thus, mono is still a choice, much as black and white can still be chosen over colour cinematography. Interestingly, this should not be seen exclusively as a technical matter of whether only one channel is used. The concept of mono also refers to mixing style: some filmmakers might use directionality and surround to widen narrative space as widely as possible, whereas others may prefer to keep the sound 'smaller' and restrict sound space in much the same way they may choose to 'restrict' image exuberance (just think of techniques such as overexposing the picture, as indeed it is the case in some instances in Traffic, or 'washing it out' of all colour to give it a kind of 'silver-bathed' look as in Se7en). Ultimately, the concept of orchestration is useful to establish early on in the investigation of a soundtrack the relative weighting and role that each element will have. In this sense, questions of whether a hierarchy of sounds is discernibly central to the way the film is narrated can help understand the creative process involved.

On Contrast

The complexity of most soundtracks requires a great deal of preparation before sound and images are married together in the final mix. When done properly, preparation can help filmmakers' thinking about a particular sequence by, for example, deciding how to break down that sequence in terms of sound effects, music, and so on. Preparation can also save time in the final mix, and that can mean big money savings. The most important process in this sense is pre-mixing. This is a process where the sounds that a given sequence require are broken down into 'stems' or groups of sounds that can then be mixed to the picture individually. The purpose of this process is to get to the final mix with as much material already mixed and ready to be married to the picture as possible. What is relevant here is that sound is composed sequence by sequence. This means that in order for it to work over time, filmmakers need to keep control over their material across sequences as well as within sequences. In other words, there is material that needs arranging within each sequence, but this also needs to be done with an overall understanding of how it should all play once all sequences are sewn together. The concept of 'contrast' can help us investigate this aspect of film sound.

Once a rough cut of the process of selecting the different sounds that will go in each sequence is completed (I will talk more in detail about the process of selecting the material that goes into each sequence when I discuss the concept of 'focus'), filmmakers will have to deal with several sequences, all potentially sounding different - for each will have its own ambience and dynamics. The way the different sequences play against each other provides possibility for contrast: some sequences might have a quiet ambience with little sound playing at low level whereas others might have great density and be played at full throttle. The way these different ambiences are contrasted against one another is a good place to investigate how sound works in a film. An excellent example of how contrast can be used effectively comes from Alien. The crew of the Nostromo is awakened prematurely from their deep sleep to answer what appears to be an S.O.S. call from an unknown planet. An away team is assembled and sent to the planet's surface to investigate. At this point, the narrative calls for a mismatch to be created in terms of the two environments: the (safe) ship humans inhabit and the (unsafe) planet's surface. In the soundtrack, the hostility between the outside space of the planet and the comforts of the ship interior is clearly established through contrast by creating two completely different ambiences (contrast in the

soundtrack is rendered all the more effective through picture editing by alternating shots between the ship and the planet's surface). Although both spaces are in the dark, save from a few artificial lights, sonically the two environments are opposites: the ship interior is a weather controlled and sonically insulated environment: the gentle 'whirring' of the chair of one of the crew members aboard ship moving slowly into position works to emphasise this 'quiet quality'. The planet's surface, on the other hand, is raged by continuous thunderstorms of great ferocity and deafening force: members of the away team on the surface need to shout to make themselves heard over the roaring winds. It is not a matter of loudness alone: the planet surface sounds deafening because it is contrasted with the virtually silent ship interior. In this sense, contrast can also happen over a whole movie to establish an aural theme: in Forrest Gump (see more below) the ambience of Forrest's home is used as an aural theme and contrasted with the various ambiences of the places and times Forrest goes through in his 'journey'.

Contrast can also be used within a sequence to shape it dynamically. Towards the end of Saving Private Ryan, a small group of American soldiers is enjoying a rare moment of, literally, peace and quiet. Indeed, some of them find a gramophone and begin listening to an Edith Piaf song. Amongst rubble and destruction (the sequence takes place in a destroyed little town), the melody echoes through the buildings permeating the moment with a rather harmonious ambience. However, as the men begin relaxing into the moment, a strident, metallic distant sound is heard as German tanks approach the town. Here the shift in sound within the same ambience signals the end of one stage of the movie and the beginning of the next. There is no need for loud explosions, nor any p.o.v. shot of German troops advancing being spotted by the American soldiers: aural contrast does it simply and effectively. Here contrast works both within the soundtrack and between image and sound, as the contrast between Piaf's song and the rubble that surrounds the characters creates a powerful mixture of emotions: peace amidst destruction. Perhaps the most revealing aspect of the notion of contrast comes if we look at it from the perspective of 'sound happening over time'. As Gary Rydstrom points out: 'sounds are always playing in relation to what came before and what came after (...) You think in terms of the whole picture in coming up with these sounds' (see Chapter 3 for full interview). Clearly, this is not a new phenomenon, nor is it a domain of Hollywood movies: Robert Bresson once suggested that

'Against the tactics of speed, of noise, set tactics of slowness, of silence.[18] However, the complexity of contrast achievable in the Dolby era is remarkable even in relation to great examples of the past.

On Focus

If filmmaking is a matter of choices, sound is no exception. Nowhere is this more evident/relevant than in the creative process involved in organising sound within a sequence. Each sequence in a movie will have a certain number of sound elements: individual sound effects (such as the sound of cars, trains, guns, explosions, breathing, water flowing, etc.), voices (dialogue, background voices, etc.), music (incidental, non-incidental, orchestral, solo, etc.), foley (footsteps, rustling of paper, etc.) and, as a consequence of the way these elements are arranged, silence (emphasised by the distant humming of a ship's engine, the gentle breeze of a Summer evening, etc.). The concept of 'focus' can help investigate the articulation of these elements as well as identify the selection process that it is inevitably involved. A simple example might help. Imagine this sequence: it is Christmas time. A man walks purposefully through a busy shopping mall in search of someone. He enters some shops, peers through the windows of others and never even stops for breath. Finally he realises that he has come full circle; whoever he is looking for is not there. He walks back to the parking lot and drives off to continue his search elsewhere. If the sound crew were to decide to fill this sequence with all the possible sounds that could be heard they would need hundreds, possibly thousands of sound elements. Think of all the different ambiences of each shop as well as the overall soundscape of the mall: add the sounds coming from the hundreds (thousands?) of people busy shopping for Christmas: busy chatter, children screaming, people arguing, couples laughing, etc. Now include the typical Christmas music fare: bells, choirs, Santa's Grotto and the like. Do not forget the 'mechanical' aspects of the sequence: heating vents, tills ringing, automatic doors opening and closing. Once you have done all this, add all the echoes, reverb and distant sound that would fill a space as large and as busy as a shopping mall at Christmas. To include all these elements in this (rather brief) scene I described would be both unwise and impossible for reasons that are both perceptual and conceptual. There is a point where adding another sound element, no matter how small, will cloud the

clarity of an existing sound. Soon the clarity of the whole sequence will be compromised and cacophony is all that the audience will be left with. In perceptual terms, sounds covering the same frequency will simply cancel each other out: three children screaming will form a screaming 'group' (or, as it is commonly known, a layer) adding twenty more screaming children to that layer will not improve the 'screaming' quality of the layer, but it will most likely reduce its clarity.[19] In other words, it will sound just as loud but less distinctive. In conceptual terms, too many sound layers will produce a kind of conceptual cacophony: they will end up sounding like a mass of sound whose individual components are not distinguishable. This issue is rightly considered of paramount importance amongst filmmakers. Murch has been the most eloquent in this sense for he has coined what he calls the 'Two-and-a-half things' law, according to which he organises sound elements:

> 'There is a rule of thumb I use which is never to give the audience more than two-and-a-half things to think about aurally at any one moment. Now, those moments can shift very quickly, but if you take a five-second section of sound and feed the audience more than two-and-a-half conceptual lines at the same time, they can't really separate them out. There's just no way to do it, and everything becomes self-canceling.'[20]

Clearly, then, we would not simply be able to piece together all the sounds in the mall sequence and make them magically work together. The relevant questions here then become: what elements to use in the sequence (how many sound elements, of what 'kind'), but also what to leave out. We will also need to decide what elements will drive the sequence in the foreground, and what elements will work better in the background. Ultimately the combination of all these elements works to 'focus' audience attention to specific sounds and to specific combinations of those sounds, and that is why it is important to investigate the issue of focus. Every movie, and every sequence within that movie, will have a certain degree of density and clarity. A film like Magnolia is very dense, with only a few instances where that density is mitigated. As we discussed about contrast, this can be made to work to the film's advantage: the few moments where sound is used sparsely work to highlight the dense moments in the movie. On the other hand, a film might use little density for most of its duration so that when a 'peak' is reached density can be increased accordingly to emphasise that moment in the narrative. In a horror movie like Halloween it

is customary to have a relatively sparse soundtrack, other than the moments where an attack takes place. Then the sudden and substantial increase in sound density will help jolt the audience.

What is important to bear in mind here is that, as in the case of orchestration and contrast, there are no rules, other than those of physics and human perception (and even these are constantly being rewritten) in terms of what 'works' when it comes to focus. Ultimately, the combination of density and the degree of clarity that filmmakers might want to achieve are only one of many combinations that could 'work' for any given narrative. Nor does clarity mean being able to hear everything all the time: the lack of clarity in a sequence could work to the film's advantage. In Blade Runner, Deckard (the character played by Harrison Ford) chases one of the female replicants across the streets of a futuristic Los Angeles. The sequence is incredibly dense with several dozen sound elements all playing at full throttle. The result is cacophony. However, that is precisely the way the characters involved experience the city environment. Indeed, Scott and his sound crew use this level of density and lack of clarity to contrast the much quieter moments when the characters are above street level (like in the case of Deckard's apartment), as Graham Harston, the sound mixer on Blade Runner, emphasises:

> 'Ridley always wanted energy. He never wanted the energy level of the track to drop. He created this horrendous environment in the future in this city full of pollution and he wanted noise pollution to be there all the time as well to keep you on the edge of your seat.'[21]

In contrast, a scene in The Conversation that could potentially be very dense and have little clarity (a busy city square) employs a rather sparse soundtrack with a great degree of clarity (indeed, Harry Caul's search for aural clarity is perhaps 'the' central theme of the movie). In both instances, the filmmakers' choice of the combination of density and clarity work to focus audience attention: to the violent, discordant nature of the crowded streets that the characters inhabit in Blade Runner, and to the very personal world of a man whose life is spent 'eavesdropping' on other people in The Conversation. Thinking about focus is thus very important because it helps highlight the need for filmmakers to achieve some kind of 'order' in what could potentially otherwise be irreversibly chaotic. This aspect is crucial in terms of the final heading: definition.

On Definition

To investigate aural definition is to ask questions about what sounds are emphasised, how they work, what kind of interplay is created with other sounds. The choices that filmmakers need to make in terms of what to focus on are defined by the specific sounds to which audience attention is to be directed. In particular, there are sounds that can define a space, a character, a moment in the narrative, or even the whole film. They become central to the narrative and often recur over time to punctuate, reinforce, or contradict the narrative or elements within it. These sounds can often also stand as a 'spectacle' in their own right. Voices and music themes can also be part of such sounds (Tom Hanks's voice in Forrest Gump is more than just a narrator's voice, it helps define the character). However, most of these sounds are often 'designed' in the sense that they are created by sound designers: their function is never literal, but always aimed at achieving the highest level of effectiveness. They can be made of a single recording of a sound, but they are more likely to be the result of a combination of disparate sounds. They can be 'electronically' created, but they are more likely to be recorded from a 'real' source and then modified in a variety of manners. Their effectiveness is clearly dependent on the choices filmmakers make in terms of focus: the greater the drive to highlight individual sounds, the greater the need for 'clarity' in the soundtrack. A film like Terminator 2 relies heavily on a few sounds that characterise the whole movie, often by contrast: the liquid metal sound the T2000 makes immediately sets him apart from Schwarzenegger's older terminator model that still sounds 'mechanical'. The gun the latter employs sounds considerably 'bigger' than any other gun fired in the film (see interview with Rydstrom in Chapter 3), the sound theme that Brad Friedel composed for the movie immediately identifies the film and Schwarzenegger's accent and delivery are a trademark of the character he plays. These sounds are a central part of how the film affects audiences, as the film's sound designer, Gary Rydstrom, reminds us:

> 'People thought T2 was huge (however) Cameron's trick to make it sound big was to keep it focused. He didn't want to have a lot of extraneous sounds, he really wanted to focus moment to moment ... By virtue of taking out (...) things that are

not necessary each sound that we left was bigger... each of the moments had more freedom to live.'[22]

It is useful here to point out that sound density is not necessarily dependant on the fact that Terminator 2 is a sci-fi movie. The huge density of sound at work in most of Star Wars 1: the Phantom Menace, for example, reduces substantially the possibility of meaningful definition for this is likely to be lost in a mass of sound.

It would be impossible to make even a simple list of examples of definition. For the purpose of this study, it is significant to point out that although this practice is by no means the exclusive domain of contemporary cinema (indeed, many date back the beginning of the art of designing sounds to King Kong and thirties cinema) this is one of the defining features of sound in the Dolby era. There is a variety of strategies in the way designed sounds can characterise aurally a sequence or a whole movie, and some examples here might help. Films that have a strong central narrative usually employ few designed sounds and repeat them at different points in the movie. Raging Bull is a good example of this kind of aural definition: Jake LaMotta's struggle with violence, both in his personal and public life (he is a boxer) is at the core of the film. The most defining sound in the whole movie occurs during the fight sequences. It is an interesting type of designed sound because it is not a single sound but rather a combination of sounds that work as if they were one. Frank Warner's melee of animal roars, human breathing, sound of wind and other sounds work over time to give the fight sequences a surreal character. It is a personal world where internal sound, what goes on in the mind of the boxers, is emphasised and contrasted with the wider public watching the boxers, either in person or on television.[23] The sound designed by Warner works all the more effectively because Scorsese films the fighting sequences in an 'intimate' fashion, with frequent close-ups of the boxers and often slowing down the action. In other movies, the film might present the need for sound to aid the creation of a variety of distinctive narrative spaces. In The Hunt for Red October, the three submarines at the core of the plot (the 'good' Russian, the 'bad' Russian, and the American) need to be clearly differentiated. This is true of at least three different elements: the ambience of the sub, the sonar 'ping' each of them makes (there is a rather complex interplay between who is 'pinging' whom) and the sound of the torpedoes (again, there are some rather complex moments in the movie). Moreover, the whole movie is based on the

fact that the Russian sub, the Red October, is supposed to have a new revolutionary propelling system that works... silently. The sounds that Frank Serafine, Cecilia Hall and George Watters created (it reportedly took six months to come up with the sound of the sub pings alone) provide the necessary definition for all the narrative elements I mentioned.[24] Voices can also work to help define a sequence or a whole movie, and can themselves be 'designed'. Films like Star Wars and Toy Story have an enormous array of voices, each with its distinctive quality, and all playing as if part of an operatic choir. They occupy different frequencies, have different tone and timbre, their envelope varies from character to character and so on. In other instances, a sound can function like a signature for a specific character: sometimes it is a vocal aspect (Darth Vader's breathing famously defines the character), in other cases it is a sound that plays against expectations (in Toy Story, the contrast between the fact that the character of Dino is a tyrannosaurus rex and the 'little' voice he has is used to comic effect). There are times when a sound is or becomes a character, both at an individual level (Indiana Jones's whip, R2D2's bleeping voice) or at a collective level (the submariners in Das Boot are defined by the sound of the sonar: when the sonar pings, signalling the possible arrival of depth charges, they cease to be individuals and become one single listening entity). In creative terms, even the absence of a 'core' sound (a sound that is crucial to the narrative) can function very effectively to define a sequence. In A Civil Action, John Travolta's character is a lawyer investigating a series of deaths clustered around a small town as part of a lawsuit against a local firm whose polluting agents are regarded as a possible cause for such deaths. During one of his many trips from the office to the town, he is forced to stop his car on the hard shoulder of a busy highway. Suddenly, the noise of the busy traffic transports his imagination to a similar place where a family, one of the families involved in the lawsuit, is in a car (in a final desperate attempt to rush their child to a hospital). The car is stationary on the hard shoulder: through the rain and amidst the busy traffic rushing by we can see the father and the mother taking turns to try and revive the child, but to no avail. Ordinarily, we would expect to hear much more clearly the sounds of the people inside the car. Instead, we are offered the sound of the busy traffic on this fast road and only occasionally do we hear muffled instances of what goes on in the car. It is the sound of the oncoming rushing traffic that makes the scene, not the sound of the desperate parents. In this sense, the core sound

element we expect is 'hidden', replaced by another one whose effectiveness is emphasised by the emotionally poignant effect of the everyday traffic of people going about their business unaware of the tragedy that is taking place.

The combination of the four aspects around which I have structured my analysis of sound is entirely dependent on the specific movie you will look at and listen to (or, to use Chion's expression, 'audioview'). Walter Murch emphasises this particular aspect by suggesting that, for example:

> 'Conceptual density is something that should obey the same rules as loudness dynamics. Your mix, moment by moment, should be as dense (or as loud) as the story and events warrant. A monotonously dense soundtrack is just as wearing as a monotonously loud film. Just as a symphony would be unendurable if all the instruments played together all the time.'[25]

Loudness can be a function of contrast (a loud sequence that is preceded and followed by a quiet moment will sound louder than it really is), directionality can help the process of focussing by defusing the density of a particular moment in a movie and hence enhancing the clarity of the sequence by displacing sound to different channels. In other words, to think about sound in the manner I am suggesting is to understand sound as happening over time, as being one of most effective conduit of cinematic movement, and as being as fertile a place for creativity as any aspect of filmmaking can ever aspire to be. In this sense, a brief overview of how sound works in a movie, in this case, Forrest Gump, might help emphasise the organic nature of contemporary film sound.

For a more organic approach – Part Three: No place 'sounds' like home (a few notes on Forrest Gump)

The film's opening sequence, where Forrest is first introduced, is representative of the kind of strong focus that the film employs. Despite being at a bus stop by a relatively large square in the early/mid afternoon the scene has a low density in order to emphasise some key sounds that work as definition for that sequence. Forrest's voice, such an important defining feature in the whole movie, is strongly emphasised by cutting out most extraneous

sounds (especially loud sounds, save that of buses that punctuate the passing of time) and backgrounding a few distinguishable 'quiet' elements, such as the chirping of birds and rustling of leaves. This strongly focuses audience's attention on Forrest's voice. As that sequence becomes one of two key moments to which we keep returning, the choice is all the more important. The other key ambience that works as a benchmark for the movie is actually rather similar in aural characteristics. The Alabama house where Forrest and his mother live is defined by a quiet, almost idyllic ambience. Traffic is never heard (save, once again, for a bus, a school bus this time); the rustling of leaves and the chirping of birds are, again, what shape the soundscape of that place. In this sense, the concept of 'home' in the film functions as a point of contrast between that quiet ambience and the ambience of the places Forrest's 'adventures' take him to: from the roaring crowds of the football field to the battle field of Vietnam or the human mass gathering around the Mall in Washington, DC. It is interesting here to reflect briefly on how camerawork, production design and sound work in relation to each other to create these two key moments we keep returning to. The two locations (i.e. the bus stop and Forrest's home) are very different from each other: the most obvious one is that one is an urban setting and the other a rural home. However, both sound and camerawork work remarkably well to give the two locations a sense of cohesion. Robert Zemeckis, the director of the movie, chooses to frame the characters at the bus stop rather tightly and does not offer any wide shots of the whole square, save from the crane shot that opens the movie (the one with the feather flying down towards Forrest's foot). The 'intimacy' of the framing, especially the way the bench at the bus stop is used as 'focus' for those scenes, encourages audience attention to be given fully to Forrest. In addition to this, the camera often looks head on to Forrest and vice-versa. This aids tremendously the work of the sound designer in smoothing the passage from Forrest at the bust stop to Forrest narrating the events, just as it helps bridge the transition back and forth from the bench to the various locations of the story. Indeed, the collaboration between image and sound crew is strongly emphasised by the film's sound designer, Randy Thom:

> 'Bob (Zemeckis) and Tom Hanks knew that when Forrest was telling his story on the bench he shouldn't be looking at the people he was talking to before or after the flashbacks. The fact that he is looking straight ahead at nothing in particular puts him into the action he is describing and reinforces the idea that what we are hearing

is usually his point of view. That opens the door for the sound of the bench to blend a little bit into the beginning of the story he tells, and for the sound associated with those stories to bleed over onto the bench as well. The most obvious example is the helicopters flying over our heads in Vietnam and continuing their fly-by over the city park where Forrest waits for his bus. In moments like that it becomes clear how powerfully picture and sound can work together.'[26]

The film's orchestration relies heavily on the interplay between dialogue and music. Although this is true of many movies, in Forrest Gump this relationship is particularly complex. The film has an unusual number of songs as well as tom Hank's voiceover narration to deal with. They both serve the same function, helping audiences trace the passage of time (which could otherwise become a very confusing issue when you consider that Forrest's adventures cover at least three decades, from Elvis Presley's early days to the nineties). Because of the amount and importance of music and dialogue in the movie, silence and sound effects are used sparsely. However, precisely because of this attention to clarity (there is no wall-to-wall sound in the movie and great attention is put into maintaining a relatively low density of sound through most scenes) the sounds that help define the different moments in Forrest's life and events he goes through are even more emphasised. The film's narrative traces historical development by portraying both events in which Forrest plays a key role and other moments where Forrest is simply another bystander/witness. Examples of the former are the Vietnam war, the peace gathering in Washington, and Forrest's sport exploits both as a football player and as a ping pong player; examples of the latter are the assassination attempts of political figures (George Wallace, John Ford, and Ronald Reagan, but also John and Bobby Kennedy, John Lennon), and the moon landing. All of these moments in Forrest's life are defined clearly by the way those these designed sounds characterise them. In the case where Forrest is only marginally involved, television pictures are used as a device to 'cover' those events. However, sound is often more intrusive than the image in these instances and helps punctuate those points more forcefully. In particular, the gun shots of all the assassination attempts are very much in the foreground and can be distinctively heard (not just casually 'overheard'), and Neil Armstrong's 'One small step for man one huge leap for mankind' speech is clearly heard

even though the television screen showing the event is rather small and the camera moves away from it.

The best examples of how those individually designed sounds help define sequences come when we look at the events in the narrative where Forrest is personally involved. Each 'moment' in Forrest's life is emphasised by a few carefully designed sound. The leg braces in his young days (the sound of the Forrest breaking loose of the braces is particularly emphasised as it is the beginning of a new stage in his life), the football crowds in his college years, the rain (there is markedly evident variety in the way the rain sounds in the different moments of the movie) and helicopters in Forrest's tour of duty in Vietnam (the solo sound of a helicopter reminds us where we are when there is a cut from the bus station to Forrest in an army hospital), the sound of ping pong (all rather different from each other according to the 'kind' of ping pong that he plays: solo, one bat, two bats, and so on), the seagulls in his shrimping boat captain days, the music tracks in the running sequence (there are five different songs in that sequence alone), and, most importantly perhaps, the moment of quiet that define Forrest's times with his mother and with Jenny at the house in Alabama. All these sounds are to be expected and are hardly new (helicopters and Vietnam are a rather well trodden path in Hollywood movies!), but the way they are used in the movie suggests the strategy that I outlined before and the kind of control over material that Thom and his sound crew strive for. In this sense, it is useful to remember what this soundtrack is not, and could just as easily have been. It is not very dense, despite obvious potential for density (Vietnam, huge crowd gatherings, assassinations, etc.). It does not use surround sound very often: music and a few effects, especially in the Vietnam ambush sequence, are most of what is there. This is a strong indication of the sound strategy employed in the movie: since Forrest's voice is what drives the narrative, and density is low, to begin using surround sound more frequently would have meant 'complicating' the soundtrack for the sake of complication. Interestingly, Thom is unequivocal about the fact that this was a conscious, joint decision on his part and the director's early on in the process:

> 'Surrounds were an interesting issue on Gump. What with Pro Logic and AC3 there has been a flood of interest in surrounds, and the tendency now is sometimes to put lots of stuff into the surrounds just for the sake of novelty. Some movies can benefit from heavy use of surrounds and some will suffer from it. Bob Zemeckis and I

agreed that Gump was in the latter category, so we used surrounds sparingly. Most of the score was bled into the surrounds, some ambiences, a couple of aircraft flyovers, some bullet-by's, and that's about it. I'm not against surrounds, but we thought there was a danger of distracting the audience from this particular story by feeding too much material into the rear of the theatre.'[27]

The consequence of all the creative choices I have outlined above is a film whose soundtrack can be described as heavy on contrast, with a simple orchestration, strong focus and a marked degree of definition. The adjectives I am using, heavy, simple, strong and marked, are not intended to be evaluative of the 'quality' of the soundtrack. Nor is there 'one right way' of doing sound for Forrest Gump. It is not too difficult to envisage ways in which less emphasis could have been placed on Tom Hanks's voiceover, where density could have been much higher, and consequently with a much more complex level of orchestration required. However, the ways in which these different choices would have affected the narrative should act less as a value judgment on the filmmakers' choice and more as another reminder how central a role sound plays in filmmaking.

Conclusion.

Few could have predicted in the early seventies that the introduction of the Dolby Noise Reduction System was to spearhead a true revolution in the way film sound is created, recorded, reproduced and received by audience. Thirty years on, it is possible to begin to map the key developments that have given rise to the Dolby era of sound in Hollywood cinema, as I hope this study has proved. Indeed, in this final chapter I would like to reflect briefly on what has arisen out of the evidence so far examined and highlight the aforementioned key features.

The tide of technological improvements that has punctuated the development of the Dolby era since Dolby's arrival on the scene is one such key feature. This has been characterised by three aspects: continuity, stability and visibility. The introduction of the Dolby Noise Reduction System in 1971 ignited a succession of technological developments whose momentum has not yet shown signs of a slowdown. This element of continuous change has been characterised by a remarkable ability to identify new markets and possibilities. Dolby's latest ventures into digital cinema (with the new 'Dolby E'), the computer world (with 'Dolby NET') and personal stereos (with 'Dolby Headphone') offer some evidence of this apparently relentless growth, as well as provide clues as to where the Dolby era might be headed next in terms sound technology development.[1] An equally notable level of stability has matched this element of continuous development. Sound as a business venture has enjoyed an unprecedented period of stability and expansion in the Dolby era. This has not just been the case for Dolby Laboratories. Sound projects such as Lucasfilm's THX sound system, and the SDDS and DTS sound systems, have all proven to be extremely successful ventures, both in the cinema and home market (with the exception of Sony's SDDS, all the sound system mentioned are available to consumers in some form or other). Whereas in the past periods of technological innovations and financial success were often short-lived, the Dolby era is now in its fourth decade of expansion. Finally, this technological prowess has been very visible. The myriad of acronyms, logos and symbols that have come to become familiar to audience of Hollywood cinema worldwide is the tangible presence of these developments. The names Dolby (in all its incarnations), THX,

DTS, SDDS, the double-D logo, the trailers that accompany these systems, their presence on film posters, their availability on all kind of consumer products (from videocassettes to DVDs, and from TV sets to home cinema processor) have contributed to making this revolution very visible as well as audible. Indeed, since over a billion products bearing the Dolby name and logo have been sold across the world, the suggestion that the name Dolby is today one of the most recognisable brand names in the world is not as implausible as it might seem.

The impact that technology has had on filmmakers has also been a defining factor in the Dolby era. This has been particularly true in terms of creative opportunities, filmmaking practices, and in the many ways in which this fertile situation has helped redefine professional figures. The dissociation of the terms 'mono' and 'optical sound' has been a key factor in providing filmmakers with new creative opportunities. The possibility to employ stereophonic sound, a wider frequency range and an ever-increasing dynamic range on conventional 35mm optical prints has freed filmmakers from the old constraining choice of magnetic stereo vs. mono optical. This has characterised the Dolby era as one where filmmakers' confidence and ingenuity in employing sound is less hampered by technical and financial constraints than in the pre-Dolby period. Multi-channel soundtracks have become the norm rather than the domain of a few expensive films, and improved conditions of reproduction in theatres (see below) have helped create a sense of confidence in the possibility of using sound innovatively and effectively. In many ways, this newly found confidence is mirrored by the redefinition of professional figures. When Walter Murch and Ben Burtt begun employing terms such as 'sound designer' or 'sound montage', the attempt was to shift the focus from sound people as 'technicians' to sound people as 'creative' figures, both in political and creative terms. Many sound men and women, from Murch and Burtt to Rydstrom and Davies, have had their work recognised in ways that past creators of sound never achieved. Moreover, their opinions have been heard and written about in record numbers, and their contribution to movies recognised in many ways (see below). This new 'status' for sound, despite continuing problems with both traditional academic accounts of filmmaking and entrenched views of the role of sound amongst filmmakers themselves, has also marked a substantial increase in numeric terms of people involved in the making of a soundtrack. From sound mixers (often several for each of the three main

categories, sound effects, dialogue and music) to Foley artists, from rerecording mixers to music supervisors and composers, and from supervising sound editors to sound designers, the number of sound people involved in any given film has at times reached the size of a small army.[2] This has inevitably had consequences in terms of filmmaking practices. Although this is one of the areas that suffers most from the inevitable variations in practice that characterise different post-production facilities, the evident increase in number and status of sound people has meant that some of them are now able to get involved in pre-production and have a say in some key early decisions that are made at planning stage. This is still limited to a relatively small group of established, 'elite' sound people, but the emphasis on collaboration is what most sound people stress as potentially one of the defining factors of future stages of the Dolby era. Increasing political status might lead to greater collaboration between different sound departments (namely post-production sound and music) as well as different areas of filmmaking (in particular, choices in terms of scriptwriting, directing and editing that might later impact on sound). In this sense, the rise during the Dolby era of several new post-production facilities, such as Skywalker Sound (San Francisco)[3], Soundstorm (Los Angeles)[4] and Sound One (New York)[5] have provided the technological and creative opportunities for the new ranks of sound people to experiment and develop their craft. Indeed, at least in the case of Lucasfilm's Skywalker Sound, now a company in its own right, sound people have been in a position to influence directly the development of future technologies, as Gary Rydstrom's role in the development of Dolby's latest sound system, Dolby EX, demonstrates.[6] The period immediately preceding the success that Dolby was to enjoy with the release of Star Wars was not devoid of sound experimentation. Indeed, it exhibited the clear signs of premonitions in terms of what was to come. Some of the key sound people who would change the sound of Hollywood films were already at work. In particular, directors such as William Friedkin (The French Connection and The Exorcist), Francis Ford Coppola (The Conversation and The Godfather), George Lucas (THX 1138 and American Graffiti), Robert Altman (McCabe and Mrs Miller and Nashville) and Steven Spielberg (Duel and Jaws) showed a remarkable level of sophistication in the early seventies. Crucially they all benefited from being able to employ the skills and creativity of a new generation of filmmakers, such as sound designer Walter Murch, production sound mixer Chris Newman,

sound re-recordist Richard Portman, sound re-recordist Robert Hoyt. However, despite their unquestionable desire to explore sound in new terms, Murch for instance approached sound from a Musique Concrete perspective, the technological limitations that I have outlined above hindered aesthetic progress substantially.

The aforementioned developments in both technological and creative terms explain, partly at least, the relevance of a further defining factor in the Dolby era, namely the development of a new kind of relationship between audiences and film sound. This primarily revolves around three core aspects: changes in cinema architecture, the rise of a 'new' audience and the home-cinema dimension. None of these is merely a direct consequence of the introduction of Dolby or any other sound technologies, but they have become inextricably linked since their meeting at a fortunate historical crossroad in the seventies. The development of mall cinemas and the demise of old movie palaces created fertile ground for Dolby's development to be adopted, especially in view of Dolby's choice to make their technologies backward compatible with existing systems. Issues such as sound spillage from adjacent theatres, unwanted echoes, projector noise and other noise contributing factors (such as air conditioning and heating), speakers quality and theatre equalisation have all been addressed since the seventies in an attempt to improve sound quality in the 'B chain' and raise them to approximate those of the 'A chain'. The development by Lucasfilm of the THX programme is perhaps the most enduring example of this drive for sound quality that have characterised cinema architecture and film reproduction in the Dolby era.[7] Ultimately, the demands on cinema acoustics that sound technology has placed on theatres have forced a fundamental rethink of the importance of sound in determining the way cinemas are built. The adoption by the Academy of new quality standards for sound reproduction, following Dolby's specifications, has been in this sense instrumental in removing cinemas from the time warp they had drifted into towards the late sixties and propelling them into today's 'sonic playgrounds'. These drastically improved conditions of reproduction in theatres have arguably gone a long way in matching audience expectations as to what 'good sound' ought to sound like. As I have outlined in Chapter 7, filmmakers and innovators of the Dolby era directly addressed the rise of new aural expectations born out of a revolutionary decade in aural terms like the sixties. In this sense, the relationship between Dolby, new technologies, emerging sound figures and the new generation of

filmmakers, such as Lucas, Spielberg, Scorsese, Cimino, Kaufman and Coppola that established itself as a dominant group in the late seventies, is a further defining feature of the period I have investigated. Most noticeably, the industry's desire to pursue this relationship aggressively is very 'visible'. Perhaps this is best exemplified by the ways in which audiences are directly addressed as 'listeners' through film trailers of the various sound systems, and cinema advertisements emphasising which sound system theatre 'x' can boast. However, the most important and visible aspect of this relationship is undoubtedly the home cinema dimension. As I mentioned earlier, sales figures for Dolby-licensed products leave no doubt as to the pervasiveness of the name that symbolises the Dolby era. From television sets to computers, and from video recorders to DVD players, consumers have grown accustomed to good quality sound in their home. The direct marketing of cinema sound systems to home audiences is further evidence of how this new kind of relationship between audiences of Hollywood cinema and sound has been carefully nurtured. Now your home can be THX-certified!

Finally, the amount of institutional recognition of the importance that film sound has attained since the early seventies is a further area that has helped define the Dolby era. Two aspects in particular are relevant here, namely the increase in academic attention devoted to sound, and the film industry's embracing of Dolby's developments. The development of a sizeable film sound scholarship during the Dolby era and the rise of the 'novel literature of sound' (see Chapter 2) have kick-started a transformation in the way film sound is regarded by academics and scholars the consequences of which have not yet fully matured, but that has the potential to be a defining feature of future scholarship in film studies. Similarly, the industry's initial reluctance to accept Dolby's new paradigm for sound quality has given way to a seemingly unassailable position of strength for Dolby where sound quality is concerned. Key figures within the Dolby organisation, such as Ray Dolby and Ioan Allen, have been awarded multiple special Oscars for their contribution to the improvement of the art of film sound. Dolby's suggested parameters for theatre architecture have replaced the old Academy standards and are now codified (the 'X Curve') as the Academy's own sound quality standards. All major studios now have a 'digital-only' release policy for their films, and they have all invested heavily in upgrading their sound facilities.

The significance of the Dolby era arises from reflecting on the developments that I have just outlined above in all their implications, both for the industry and for academia. When considering the size and scope of the changes that have taken place in the period that I have investigated, it is possible to state confidently that these have affected the whole of the film industry. The development of new sound technology, its adoption by filmmakers, the improvements in cinema architecture and film reproduction that followed, and the level of audience engagement with Hollywood movies paint a picture that is a far cry from its pre-Dolby times. It is in this sense of meaningful, sustained and pervasive development that the term 'era' can, and indeed, need be employed. The demarcation line between what Hollywood cinema was and what it is now, in all its aspects, appears to have been affected by film sound in a substantial and fundamental manner. Similarly, cinema as on object of study cannot delay much further the recognition of the central role that sound can play. The Dolby era and its legacy have provided scholars and critics with a wealth of opportunities to further their knowledge of and about the cinema, just as it has empowered filmmakers to advance their creativity. The questions that arise from established views of sound in movies are not simply relevant to sound; they are central to film studies as a whole. The answers theorists have given in the past to questions about the role and aesthetic potential of sound have shaped film studies both as an academic discipline and as a subject of general interest. However incisive and influential those past accounts of film might have been, the need for a re-examination of some core areas of film sound in light of the impact that the latter has had in the past three decades would now appear to be less a matter of personal choice and more one of intellectual integrity. Every major area of investigation has been affected, much as in the case of the film industry. The place of technology in filmmaking, the creative input that the makers of sound have on a movie, the role that sound plays in films, the relationship between audiences and cinema, the nature of central concerns such as genre, audiences, representation, auteurism, and textual analysis: all these areas would benefit substantially from an engagement with sound that went beyond harmful generalisations and indefensible subordinations. Sound matters.

Table of Figures

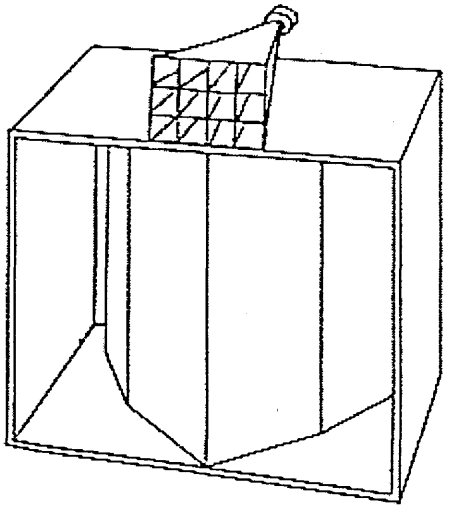


Fig. 1: Drawing of the Shearer Two-Horn Speaker

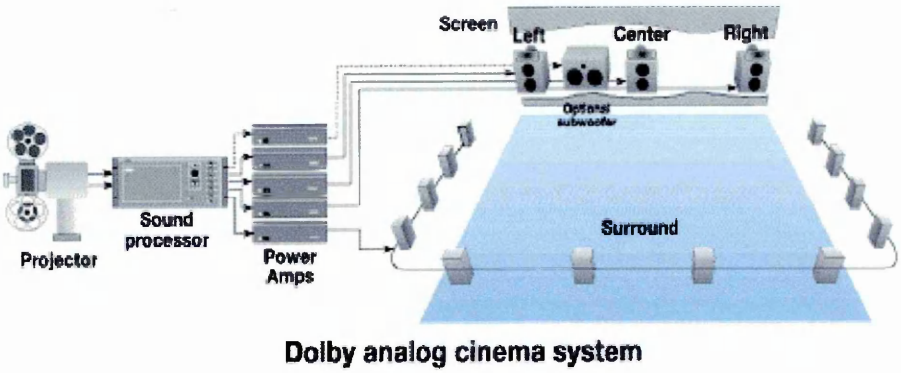


Fig. 2: Speakers set-up for Dolby Stereo (Channels: 3 Front +1 Rear)

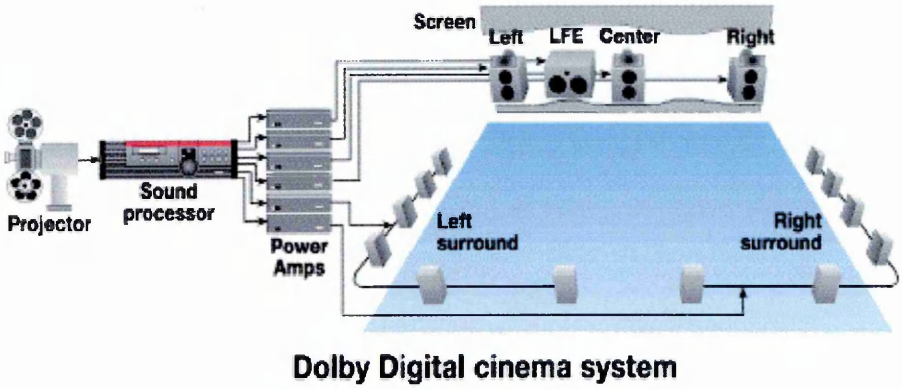


Fig. 3: Speakers set-up for Dolby Digital - Channels: 3 Front + 2 Rear + Subwoofer (LFE)

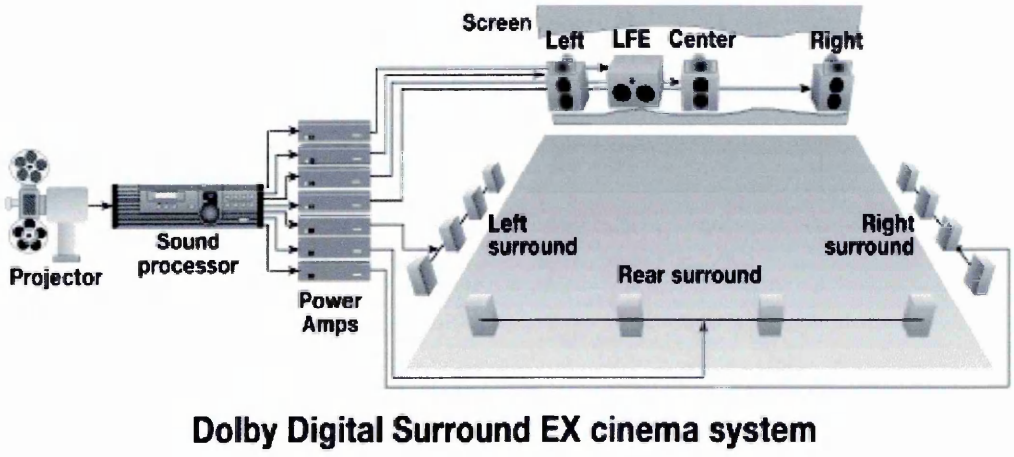


Fig. 4: Speakers set-up for Dolby Digital EX (Channels: 3 Front + 3 Rear)

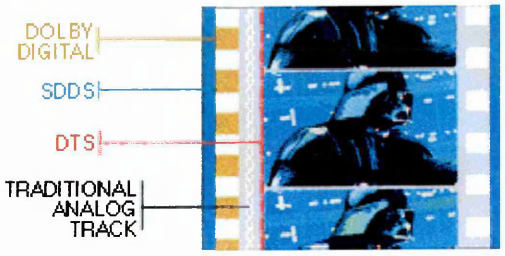


Fig. 5: Sound-on-Film

The figure above shows the placement of the sound tracks for all existing sound formats. Please note that the DTS track is used to keep the picture in synch with the sound that is provided by two CDs played back by a special reader. DTS is a sound-on-disc system.

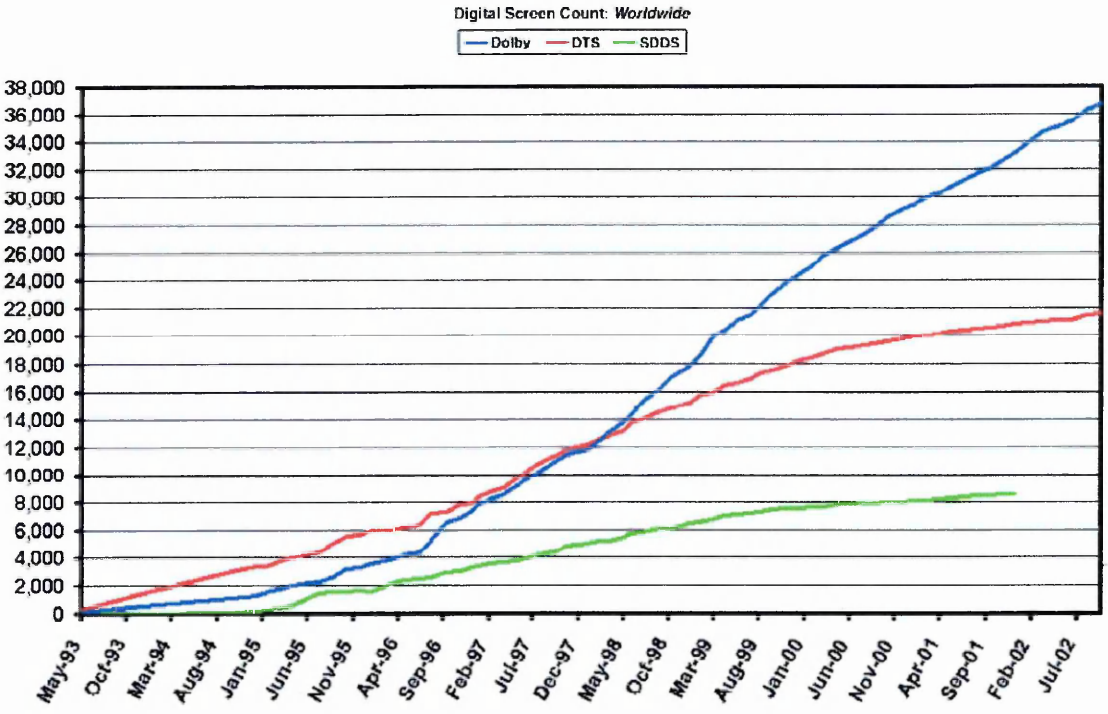
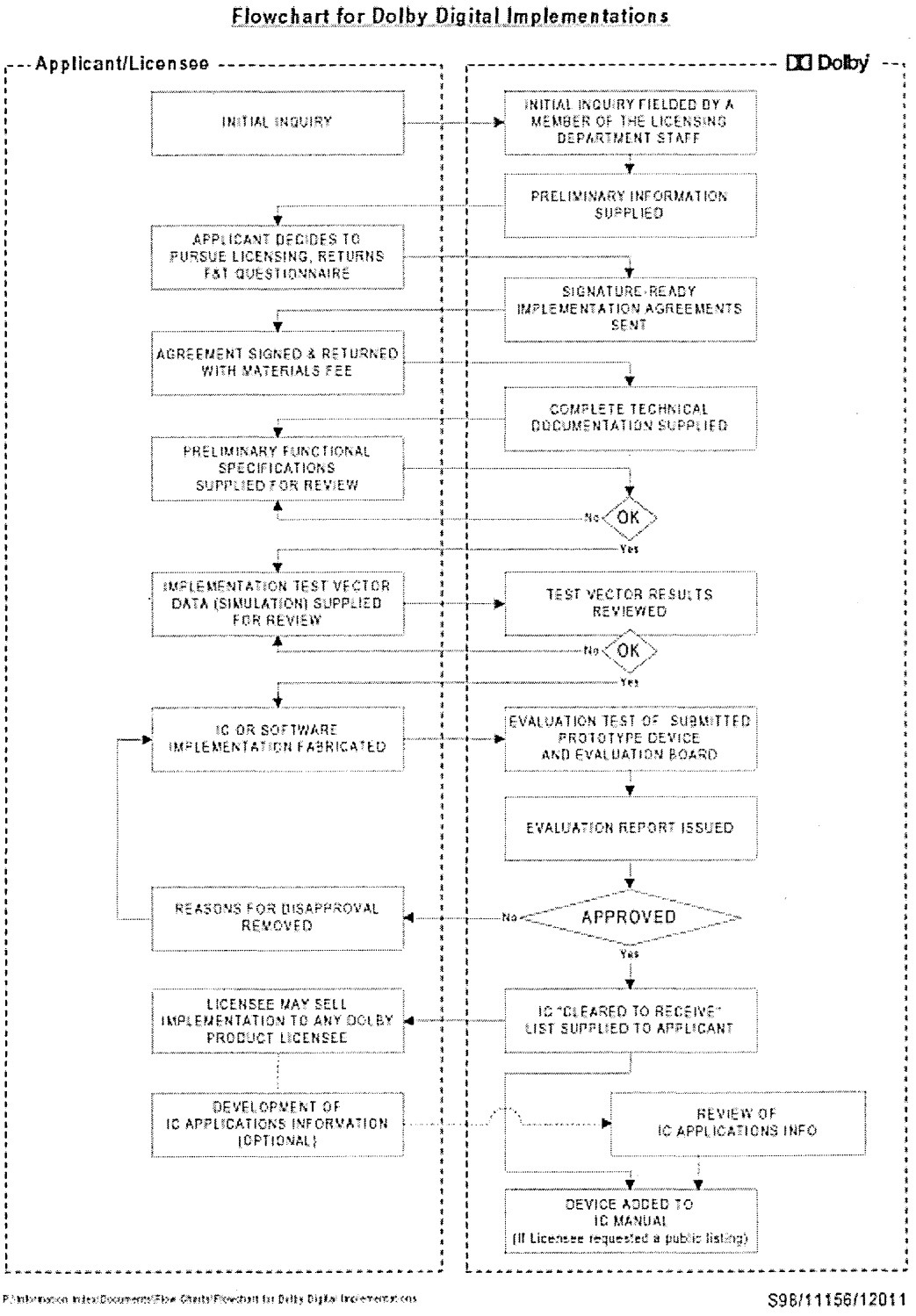


Fig.6: Market share of digital sound systems as of September 2002.

Please note that Sony's SDDS has ceased releasing sales figures as of 2002.

Appendixes

1. Dolby Quality Assessment diagram



2. Dolby Chronology.

(Source:

Dolby Labs	Key milestones 1970-2001 (source: http://www.Dolby.com)
November 1970	Investigation of application of A-type noise reduction to cinema sound results in first tests with excerpts from a production film, Jane Eyre.
January 1971	Japanese licensing liaison office established in Tokyo with Continental Far East, Inc.
Summer 1971	Increased licensing activities result in 30 licensees by end of year, including Sony, Matsushita (National/Panasonic), and JVC.
December 1971	A Clockwork Orange, first film to use Dolby noise reduction on all pre-mixes and masters, released (with conventional optical soundtrack).
February 1972	Introduction of Dolby Model 364 cinema unit for decoding mono optical soundtracks encoded with A-type noise reduction. Distributed outside U.S. by Rank Film Equipment.
Summer 1972	Results of incorporating Dolby A-type with experimental 16 mm stereo optical soundtrack format reported by Eastman Kodak.
September 1973	Dolby Model E2 Cinema Equalizer introduced for use in theatres to complement A-type noise reduction techniques for film soundtracks.
October 1973	Philips, inventor of Compact Cassette, signs license.
May 1974	Callan, first film with optical soundtrack (mono) encoded with A-type noise reduction, shown at Cannes film festival.
July 1974	First 35 mm stereo optical recorder commissioned by Dolby Laboratories at EMI Elstree Studios, England. Milestone in development of stereo variable area (SVA) soundtrack format now widely associated with Dolby Stereo film sound.
November 1974	35 mm Dolby Stereo optical soundtrack format introduced at Society of Motion Picture and Television Engineers (SMPTE) convention in Toronto using specially remixed section of Stardust. Advantages include performance comparable to older 35 mm magnetic process at considerably less cost to producers, distributors, and exhibitors.

February 1975	Dolby CP100 Cinema Processor introduced for reproduction of Dolby Stereo magnetic and optical soundtracks. First units installed for London premiere of film Tommy in March.
September 1975	First feature film for general release with Dolby Stereo optical soundtrack, Lisztomania, completed.
Spring 1976	First 35 mm Dolby Stereo optical film with encoded surround effects, A Star Is Born, released.
October 1976	Introduction of Dolby CP50 Cinema Processor, economical theatre unit for reproduction of 35 mm Dolby Stereo optical releases.
January 1977	Establishment of Dolby Laboratories Licensing Corporation with responsibility for all licensing activities.
May 1977	Opening of Star Wars in 46 US theatres equipped for Dolby Stereo, plus release of Close Encounters of the Third Kind later in year, greatly increase public awareness of Dolby Stereo and trigger further theatre installations.
December 1977	Twelve films released with Dolby Stereo soundtracks in 1977, bringing to 30 the number of films with A-type encoded soundtracks.
April 1978	Star Wars is first in continuing series of Dolby Stereo films to win Academy Award for Best Achievement in Sound.
December 1978	Superman, 50th film with soundtracks encoded with Dolby A-type, opens simultaneously in over 200 theatres; also used in first experiments with 70 mm stereo surround.
April 1979	Dolby Laboratories receives Scientific and Engineering Award for "improved film sound recording and reproduction system" from Academy of Motion Picture Arts and Sciences.
June 1979	The Deerhunter is second consecutive Dolby Stereo release to win Academy Award for Best Achievement in Sound.
November 1979	Apocalypse Now is first Dolby Stereo 70 mm film exhibited commercially with stereo surround (in 15 theatres).
May 1980	First installations of Dolby CP200 Cinema Processor, comprehensive theatre unit incorporating for the first time Optical Bass Extension and format programming.
April 1981	The Empire Strikes Back, one of four Dolby Stereo releases nominated, is fourth consecutive Dolby Stereo release to win Academy Award for Best Achievement in Sound.

June 1981	2,000th US theatre equipped with Dolby Stereo processor (Fox Westroads, Omaha).
November 1981	200 films recorded in Dolby Stereo released to date, with 25 more in production.
December 1982	First licensed decoder with Dolby Surround circuitry introduced by Surround Sound Inc.
May 1984	Release of 500th Dolby Stereo film, The Karate Kid . Indiana Jones and the Temple of Doom released with more than 1,500 Dolby Stereo prints in US alone.
March 1985	First AC1 (digital sound) encoding unit, Dolby DP80, manufactured in San Francisco.
March 1986	Dolby SR (spectral recording) introduced at AES in Montreux. Dolby Cat. Nos. 280 (single track) and 431 (multi-track) modules shown. Out of Africa is ninth consecutive Dolby Stereo release to win Academy Award for Best Achievement in Sound.
November 1986	Release of 1,000th Dolby Stereo film, Heartbreak Ridge.
January 1987	First Dolby Pro Logic directional enhancement surround decoder shown at CES. CBS broadcasts Super Bowl XXI in Dolby Surround.
July 1987	First Dolby Stereo SR films released, Innerspace and Robocop
April 1988	The Last Emperor is eleventh consecutive Dolby Stereo release to win Academy Award for Best Achievement in Sound. All nominated films released in Dolby Stereo. Dolby Laboratories receives Academy Award for Technical Achievement for Dolby Cat. No. 43 playback only background noise suppressor.
March 1989	Ray Dolby and Vice President Ioan Allen awarded Oscars for "continuing contributions to motion picture sound through the research and development programs of Dolby Laboratories" by Academy of Motion Picture Arts and Sciences.
March 1989	Bird is twelfth consecutive Dolby Stereo release to win Academy Award for Best Achievement in Sound. All nominated films released in Dolby Stereo.
September 1989	Ray Dolby awarded Emmy for "outstanding achievement in engineering development for audio noise reduction systems for professional television tape recorders" by National Academy of

	Television Arts and Sciences.
April 1990	Dolby 3 Stereo for stereo televisions introduced.
April 1991	First demonstrations of Dolby Stereo Digital for film industry held in San Francisco. Further demonstrations in Los Angeles, New York, London, Paris, Madrid, Munich, and Milan during summer and autumn. Skywalker Sound begins using Dolby AC2 digital coding to transmit high quality audio over T1 link between facilities in Marin County and Los Angeles.
August 1991	Introduction of Dolby CP65 Cinema Processor for playback of all 35 mm analog optical formats and interface with new Dolby Stereo Digital format.
June 1992	First film released in Dolby Stereo Digital, Batman Returns, premieres in ten US theatres equipped with new Dolby DA10 Digital Film Sound Processor.
August 1992	Zoran Corp. announces program to develop Dolby AC3 ICs for implementing Dolby Surround Digital, multi-channel consumer format based on Dolby Stereo Digital film format.
April 1993	HRH The Princess Royal (Princess Anne) officially opens Dolby Laboratories' new European headquarters at Wootton Bassett.
August 1993	First 35 mm projector soundhead capable of reading both analog and Dolby Stereo Digital optical soundtracks introduced by Cinemeccanica.
November 1993	First ISDN transmission utilizing Dolby AC2 coding (Burbank, CA to London).
May 1994	First Direct Broadcast Satellite service with Dolby AC3 digital audio, DMX for Business, begins.
January 1995	First Dolby Digital consumer products and laser discs utilizing Dolby AC3 announced at CES. Toshiba and Time Warner demonstrate prototype DVD with Dolby Digital AC3 audio.
February 1995	Ray Dolby awarded Technical Grammy for 1994. BBC broadcasts first radio production in Dolby Surround (Bomber, BBC Radio 4). Technicolor London records its 100th Dolby Digital soundtrack, Nell.
March 1995	Speed first film with Dolby Digital soundtrack and eighteenth consecutive film in a Dolby format to win Academy Award for Best Achievement. Total of facilities in Europe equipped to mix in Dolby Surround tops 120.

Spring 1995	20th Century Fox announces all future releases to be in Dolby Digital.
July 1995	Paramount chooses Dolby Digital as primary release format.
September 1995	Warner Bros. announces that all future titles will be in Dolby Digital.
October 1995	2,100 digital and more than 3,500 analog cinema processors sold in fiscal 1995. CP500 digital cinema processor introduced at ShowEast in Atlantic City, combining playback electronics for both analog and digital Dolby encoded soundtracks.
December 1995	Dolby Digital prints struck worldwide in 1995 estimated at 400,000; more than 40,000 in circulation globally at any given time. Dolby Digital AC3 audio mandatory for NTSC countries, optional elsewhere, in final DVD specifications.
February 1996	Theatres worldwide equipped for Dolby Digital playback top 4,000, while released and announced Dolby Digital film titles surpass 400.
March 1996	Dolby Laboratories receives Scientific and Technical Award from Academy of Motion Picture Arts and Sciences for Dolby Digital film sound system.
April 1996	Dolby and Microsoft sign letter of intent to jointly develop PC surround sound technologies and specifications supporting use of Dolby Digital AC3 and Dolby Surround Pro Logic.
October 1996	Record 3,500 Dolby Digital processors sold in fiscal 1996 ending September 30. 500th Dolby Digital theatrical film, Shine, screened at ShowEast, Atlantic City.
November 1996	First DVD video players delivered to retailers in Japan.
December 1996	FCC adopts digital TV standard for US with Dolby Digital as multi-channel digital surround sound coding of choice.
January 1997	First automobile surround sound system with Dolby Pro Logic introduced by Volvo at Detroit Motor Show.
March 1997	The English Patient, released exclusively in Dolby Digital, wins Academy Award for Best Achievement in Sound.
May 1997	President Clinton names Ray Dolby recipient of National Medal of Technology.
July 1997	Sales of Dolby Digital cinema processors top 10,000; released

	and announced Dolby Digital film titles surpass 940 with more than 1,000 foreign language versions.
December 1997	Dolby Digital classified as mandatory audio coding for PAL/SECAM DVD and Video discs, same as NTSC discs, enabling worldwide release of discs with only Dolby Digital soundtracks.
January 1998	Number of Dolby cinema sound processors sold surpasses 50,000 worldwide.
February 1998	Dolby engineers Kirk Handley, Ray Meluch, Scott Robinson, Wilson Allen, and John Neary presented with Scientific and Technical Awards by the Academy of Motion Pictures Arts and Sciences for the design, development, and implementation of the Dolby CP500 Digital Cinema Processor.
March 1998	More theatres worldwide (13,037) equipped for Dolby Digital than any other digital film sound format.
May 1998	Dolby Model 737 Soundtrack Loudness Meter introduced at Cannes Film Festival. Number of theatres equipped for Dolby Digital tops 14,000 worldwide.
July 1998	Number of screens worldwide equipped with Dolby Digital surpasses 15,000, leading closest competitor by over 1,000 screens.
October 1998	Dolby Digital Surround EX, new 6.1_channel theatre surround sound format co-developed with Lucasfilm THX, announced and demonstrated at ShowEast in Atlantic City.
October 1998	Dolby Laboratories wins Emmy from National Academy of Television Arts and Sciences for "pioneering development of a multi-channel digital audio bit-rate reduction system, standardized for the ATSC high-definition and standard-definition television systems, and for worldwide Digital Versatile Disc."
December 1998	Dolby Headphone signal processor announced, developed by Lake DSP of Sydney, Australia, for cinema-like surround sound over conventional headphones.
March 1999	With 2,500 SA10 cinema processor adapters ordered, Dolby Digital Surround EX becomes most successful new format launch in cinema sound history.
May 1999	Singapore Airlines initiates cinema quality surround sound on in-flight entertainment using Dolby Headphone technology. First film with Dolby Digital Surround EX soundtrack, Star

	Wars: Episode I–The Phantom Menace, opens in US.
October 1999	Dolby Laboratories awarded Emmy for outstanding technological achievement for its part in developing DVD technology. 5.1-channel Dolby Digital audio streamed over Internet from Montreal to AES convention in New York.
November 1999	Dolby Digital Surround EX becomes most rapidly adopted format in cinema sound history, with over 4,600 SA10 adapters sold in introductory year.
January 2000	Number of screens equipped with Dolby Digital exceeds 25,000.
May 2000	First PC DVD player software with Dolby Headphone is shipped by MGI Software. First notebook PC with Dolby Headphone is released in Japan by NEC.
June 2000	Dolby CP650, new flagship digital cinema processor, debuts at Cinema Expo in Amsterdam.
July 2000	Number of digital TV set-top boxes incorporating Dolby Digital surpasses 10 million worldwide. Total of all products incorporating Dolby Digital tops 57 million worldwide.
January 2001	NYPD Blue becomes ABC's first regular drama series broadcast in HDTV with 5.1-channel Dolby Digital audio. First PlayStation 2 game with 5.1-channel Dolby Digital audio, The Bouncer, announced by Square Co., Ltd.
January 2001	Academy of Motion Picture Arts & Sciences announces Award of Commendation for Ioan Allen and Robin Bransbury of Dolby Laboratories, and Mark Harrah of the Walt Disney Co., for creating a new Trailer Loudness Standard for the Trailer Audio Standards Association (TASA).
March 2001	Number of cinemas equipped with Dolby Digital sound processors surpasses 30,000 worldwide. New state-of-the-art facility opened at 3601 W. Alameda Avenue, Burbank, CA.

3. The Look of Dolby

The success of Dolby technologies over the years has been marked by a remarkable degree of visibility on movie posters, film lobbies, movie prints and more recently, video cassettes, laserdiscs and DVDs. Indeed, Dolby's 'double-D' logo  is one of the most enduring symbols of the Dolby era. Below is the official documentation produced by Dolby Labs that specifies which logos need to be used and in what occasion. It testifies to Dolby's desire to provide continuity by employing the same company image logo for over 30 years, as well as establishing the Dolby logo as a 'prestige' logo easily recognisable around the world.

(The source of the following is an official Dolby document available at: http://www.dolby.com/tm/info/AdPromoGuidelines.pdf - Last accessed: 01/09/02)

Advertising and Promotional Guidelines for Cinemas

The Dolby name and trademark represent exceptional sound worldwide, and this instant recognition is a valuable asset to your cinemas that are equipped with cinema processors manufactured by Dolby Laboratories. Advertising and publicity inform the public of your Dolby sound system and promote your commitment to quality film presentation.

There are three sound formats available for Dolby equipped theatres: Dolby Digital Surround EX, Dolby Digital, and Dolby analog. Both Dolby Digital Surround EX and Dolby Digital prints also contain an analog soundtrack for theatres without a Surround EX adapter or Dolby Digital processor. Prints with Dolby analog only do not contain a digital soundtrack.

Representing the latest development in digital surround sound technology, Dolby Digital Surround EX adds a third surround channel to the rear speakers of the auditorium. The addition of this new surround channel allows a sound designer to create true "flyover" and "fly-around" effects that are smoother and more realistically placed, either directly behind or beside the audience.

Films released in Dolby Digital Surround EX do not require special prints. Dolby Digital Surround EX films are encoded in the same location on the film as Dolby Digital prints and are fully compatible. To take advantage of Dolby Digital Surround EX, theatres require a Dolby CP650 Digital Cinema Processor or SA10 Surround Adapter.

Auditorium, Marquee, Newspaper, and Internet Advertising

When advertising a film with the Dolby Digital Surround EX format, use this logo:

When advertising a film with the Dolby Digital format, use this logo:

When advertising a film with only the Dolby analog format (SR or A-type), use this logo:

Directory, Co-op, and Internet Advertising

Directory, co-op, and Internet advertising should flag the presentation in each theatre that is equipped for Dolby audio. Theatres would typically be flagged as follows:

or

or

Please use either of these logos when playing a Dolby Digital soundtrack through a Dolby Digital processor.

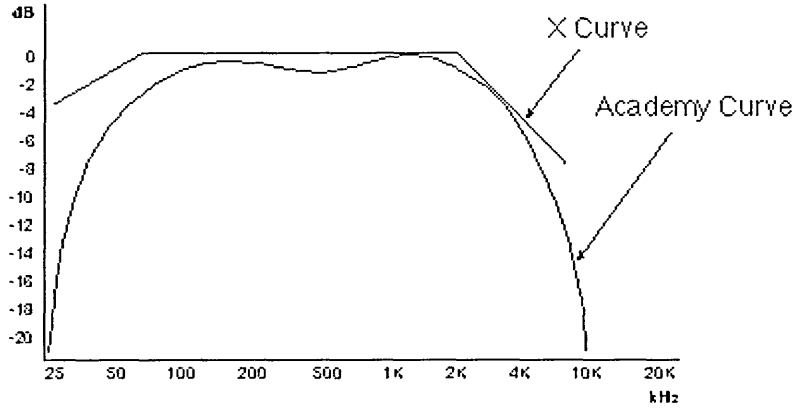
Please use either of these logos when playing a Dolby analog soundtrack through any Dolby processor.

The Dolby name and trademarks are associated with superior-quality audio recording and reproduction, including motion picture sound. Please call us with any questions regarding the correct use of our trademarks, or if you require camera-ready logo artwork.

For further information, visit us at *www.dolby.com.*

4. Academy Curve and X Curve Comparison

The diagram below shows clearly the limiting impact that the Academy Curve had on pre-Dolby movies with its curtailing of both low and high frequencies. In particular, notice how the curve dips in both sections and that frequency range it covers near 0 db (roughly 150kHz – 3K kHz) is little better than conventional telephone-quality sound. Dolby's X Curve, on the other hand, covers a much greater range (50kHz – 5k kHz) and with even power distribution.



Source: http://www.editorsguild.com/newsletter/sepOct01/ioan_allen_one.html (Last accessed: 01/09/2002)

5. Thom on Gump

The following is a short article written by Randy Thom, the sound designer on Forrest Gump, for the C.A.S. web site. More articles by Thom are available at: http://www.filmsound.org/randythom/

'A few notes on Forrest Gump - Mixing A Different Box of Chocolates'
(By Randy Thom, C.A.S.)

Working in Northern California, I'm lucky to be able to wear several movie-sound hats. I think it would slowly drive me nuts to be a rerecording mixer all the time or to edit or "sound design" all the time. So I try to alternate between these different jobs, trying to be facile enough in each while keeping a kind of useful innocence and naivete at the same time. Though all movies have some things in common, it is usually a big mistake to assume that what worked on the last one will work on the next one. Doing the sound for Forrest Gump may have been the most pleasant working experience I've had. Steve Starkey, the Line Producer of the film, approached me about working on it at the Lucasfilm July 4th picnic in '94. He knew I had grown up a Louisiana redneck and he figured I would know what kinds of sounds to put into this movie about a southern guy.

On Gump I began working pretty soon after principal photography finished. It was being edited in Santa Barbara, and I went down to help put together a temp track to be used for preview screenings. We used some sounds from the usual libraries, and recorded things on DAT in the neighborhood. We edited the temp dialog, sound effects, and music onan 8 channel ProTools system we had set up in the dining room of the house in Santa Barbara and did the temp mixes there as well, actually mixing inside ProTools. The temp mixes were mono, which obviously simplified bussing and monitoring. The picture was being cut on a KEM, so we slaved the ProTools set-up to a timecode track running on the KEM, and used the workprint on the KEM as our picture during the mixing.

My getting involved fairly early on the project helped me and the movie because by the time the real sound editing and mixing began I knew pretty well what Bob Zemeckis expected, and I had been able to influence the

editorial process a little bit by giving them examples of how sound effects could occasionally shoulder quite a bit of the storytelling responsibility. A good example of this is the Vietnam sequence, where there is a minimum of dialogue and music. I edited the final sound effects for this sequence and all of the ambiences for Gump on ProTools with the great help of my assistant, Phil Benson. The success of the battle scene in Gump has everything to do with the consistent and compelling point of view presented there. As soon as the first shot is fired all of the American soldiers hit the deck, and the camera goes there with them. Virtually every shot in the sequence strongly supports the point of view of either Forrest, or another soldier nearby, who are overwhelmed by the Vietnamese soldiers we never actually see. Since the camera is crawling around on the ground it is easy to justify hearing the bullets whiz by the ears of the audience. And since we are not constantly using camera reverses and jumping around the geography of the battlefield, it is easy to get a sense of distance when at first the mortars explode far away, then gradually closer and more intense until the Americans have no choice but to retreat.

I couldn't have done anything as interesting with the sound if the visuals hadn't been done the way they were. The same goes for the transitions between the bus stop where Forrest tells his story, and the flashbacks to the action he describes. Bob and Tom Hanks knew that when Forrest was telling his story on the bench he shouldn't be looking at the people he was talking to before or after the flashbacks. The fact that he is looking straight ahead at nothing in particular puts him into the action he is describing and reinforces the idea that what we are hearing is usually his point of view. That opens the door for the sound of the bench to blend a little bit into the beginning of the story he tells, and for the sound associated with those stories to bleed over onto the bench as well. The most obvious example is the helicopters flying over our heads in Vietnam and continuing their flyby over the city park where Forrest waits for his bus. In moments like that it becomes clear how powerfully picture and sound can work together.

Tom Johnson mixed the dialog, which was edited on mag, as were the sound

effects I hadn't cut myself. The music arrived at the mix on mag and ProTools. Dennis Sands had recorded the score by Alan Silvestri, and Steve Starkey and I wanted him to be the music rerecording mixer too. There were about fifty pop songs in the movie. Trying to integrate those and the score was tricky to say the least, and Dennis worked miracles. Gloria Borders was the Supervising Sound Editor; she also cut the hurricane effects as well as most of the effects in the scene where Forrest first loses his leg braces.

We mixed the film at Skywalker North, on an SSL 5000 console equipped with Flying Faders automation, which is very simple, powerful and doesn't require a professional typist. We premixed for three weeks and finaled for four weeks, including the Print Masters and the M and E. Gump was released in both Dolby Digital and DTS, with a Dolby SR analogue LT-RT. We monitored during most of the mix in Dolby Digital format. I don't think it is wise to release in Dolby "A" anymore. Any theater that still has only Dolby "A" equipment probably doesn't give a damn about sound anyway. I would rather the movie sound great in the best theaters than sound mediocre in every theater, so no Dolby "A" or simulated Dolby "A" for me if I have any say in the matter.

Surrounds were an interesting issue on Gump. What with Pro Logic and AC3 there has been a flood of interest in surrounds, and the tendency now is sometimes to put lots of stuff into the surrounds just for the sake of novelty. Some movies can benefit from heavy use of surrounds and some will suffer from it. Bob Zemeckis and I agreed that Gump was in the latter category, so we used surrounds sparingly. Most of the score was bled into the surrounds, some ambiences, a couple of aircraft fly-overs, some bullet-by's, and that's about it. I'm not against surrounds, but we thought there was a danger of distracting the audience from this particular story by feeding too much material into the rear of the theater.

Forrest Gump was a dream project for me. I feel very lucky to have had the chance to work on it. Receiving the CAS Award as best film mix of 1994 was a great honor for all of us on the sound crew. It was also a humbling experience, given the beauty of the sound in the other nominated movies.

6. Terminologies of Film Sound

(Source: www.filmsound.org)

- Michel Chion's Terminology

Acousmatic sound

- sound one hears without seeing their originating cause

Acousmêtre

- a kind of invisible voice-character with mysterious powers

Added Value

- the expressive and/or informative value with which a sound enriches a image

Audiovisual Contract

- an agreement to forget that sound is coming from loudspeakers and picture from screen

Anempathetic Sound

- music or sound effects that seems to exhibit conspicuous indifference to what is going on in the film's plot

Chronography

- the stabilisation of projection speed made cinema an art of time

Empathetic Sound

- music or sound effects whose mood matches the mood of the action

Extension (of sound space)

External logic

- the logic by which the flow of sound includes effects of discontinuity as nondiegetic interventions

Internal logic

- the logic by which the sound flow is apparently born out of the narrative situation itself

Magnetization (spatial)

- "mental pan" of the sound source

Materializing Sound Indices (M. S. I.)

- sonic details that "materialize" the sound source

Rendering

- the use of sounds to convey the feelings or effects associated with the situation on screen

Synchresis

- the mental fusion between a sound and a visual when these occur at exactly the same time

Temporalization

- influence of sound on the perception of time in the image

Vococentrism

- the privilege of the voice in audiovisual media

- Robert L Mott's Nine Components of Sound

Every sound has its own distinctive waveform.
Nine components must be considered to successfully reproduce or create new sounds.

Musical components:

* Pitch

* Timbre
* Harmonics (overtones)
* Loudness
* Rhythm

Sound envelope components:

* Attack
* Sustain
* Decay

Record and playback component:

* Speed

- David Bordwell and Kristin Thompson's Terminology

Acoustic properties:

Loudness
- sound volume

Pitch
- the perceived "highness" or "lowness" of the sound

Timbre
- a sounds "color" or tone quality

Dimensions of Film Sound:

Rhythm
- sound's rhythmic qualities

Fidelity

- sound faithful to its source

Space

- sound's spatial dimension

Time

- simultaneous and non-simultaneous sound

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Dolby Laboratories Official Site, available at: www.dolby.com (Last accessed: 1/11/2002)

Filmsound.Org (online articles on film sound), available at: www.filmsound.org (Last accessed: 1/11/2002)

Lucasfilm THX Official Site, available at: www.thx.com (Last accessed: 1/11/2002)

Skywalker Sound Official Site, available at: www.skysound.com (Last accessed: 1/11/2002)

Sony Dynamic Digital Sound (SDDS) Official Site, available at: www.sdds.com (Last accessed: 1/11/2002)

Sound One Official Site: available at: www.soundone.com (Last accessed: 1/11/2002)

Soundstorm Official Site, available at: www.soundstorm.com (Last accessed: 1/11/2002)

The Widescreen Museum (online articles on widescreen processes and stereophonic sound), available at: www.widescreenmuseum.com (Last accessed: 1/11/2002)

Filmography

Title (all US, unless otherwise specified), (Year) **(SD)**= Sound Designer, **(SSE)**= Supervising Sound Editor, **(D)**= Director **(E)**= Editor

Please note: **n/a** denotes data that is either not credited or not available.

A Civil Action (1998) **(SD)** n/a, **(SSE)** Larry Kemp, **(D)** Steven Zaillian, **(E)** Wayne Wahrman

A Clockwork Orange (UK) (1971) **(SD)** n/a, **(SSE)** Brian Blamey, **(D)** Stanley Kubrick, **(E)** Bill Butler (II)

A Star is Born (1976) **(SD)** n/a, **(SSE)** n/a, **(D)** Frank Pierson, **(E)** Peter Zinner

Alien (US/UK) (1979) **(SD)** n/a, **(SSE)** Bill Rowe (I), **(D)** Ridley Scott, **(E)** Terry Rawlings

All the President's Men (1976) **(SD)** n/a, **(SSE)** Milton C. Burrow, **(D)** Alan J. Pakula, **(E)** Robert L. Wolfe

Apocalypse Now (1979) **(SD)** Walter Murch, **(SSE)** Richard P. Cirincione, **(D)** Francis F. Coppola, **(E)** Wlater Murch et al.

Arlington Road (1999) **(SD)** Randy Thom, **(SSE)** Phil Benson, **(D)** Mark Pellington, **(E)** Conrad Buff (IV)

Armageddon (1998) **(SD)** n/a, **(SSE)** George Watters II, **(D)** Michael Bay, **(E)** Mark Goldblatt et al.

Barton Fink (1991) **(SD)** Skip Lievsay, **(SSE)** Skip Lievsay, **(D)** Joel & Ethan Cohen, **(E)** Joel & Ethan Coen

Batman and Robin (1997) **(SD)** Lance Brown, **(SSE)** Bruce Stambler & John Leveque, **(D)** Joel Schumacher, **(E)** Dennis Virkler et al.

Batman Returns (1992) **(SD)** n/a, **(SSE)** Richard L. Anderson & David Stone, **(D)** Tim Burton, **(E)** Bob Badami et al.

Bird (1988) **(SD)** n/a, **(SSE)** Robert Henderson & Alan Murray, **(D)** Clint Eastwood, **(E)** Joel Cox

Blade Runner (1982) **(SD)** Bud Alper, **(SSE)** n/a, **(D)** Ridley Scott, **(E)** Terry Rawlings

Callan (UK) (1974) **(SD)** n/a, **(SSE)** n/a, **(D)** Don Sharp, **(E)** Teddy Darvas

Cast Away (2000) **(SD)** Randy Thom, **(SSE)** Dennis Leonard, **(D)** Robert Zemeckis, **(E)** Arthur Schmidt (I)

Clear and Present Danger (1994) **(SD)** Lance Brown, **(SSE)** Bruce Stambler & John Leveque, **(D)** Philip Noyce, **(E)** Neil Travis

Close Encounters of the Third Kind (1977) **(SD)** n/a, **(SSE)** Frank Warner, **(D)** Steven Spielberg, **(E)** Michael Kahn (I)

Das Boot (Germany) (1981) **(SD)** n/a, **(SSE)** Milan Bor, Trevor Pyke & Mike Le Mare, **(D)** Wolfgang Petersen, **(E)** Hannes Nikel

Dick Tracy (1990) **(SD)** n/a, **(SSE)** Dennis Drummond, **(D)** Warren Beatty, **(E)** Richard Marks (I)

Dinner at Eight (1937) **(SD)** n/a, **(SSE)** Douglas Shearer, **(D)** George Cukor, **(E)** Ben Lewis (I)

Don Juan (1926) **(SD)** n/a, **(SSE)** George Groves, **(D)** Alan Crosland, **(E)** Harold McCord

E.T. (1982) **(SD)** n/a, **(SSE)** Charles L. Campbell, **(D)** Steven Spielberg, **(E)** Carol Littleton

Erin Brockovich (2000) **(SD)** n/a, **(SSE)** Larry Blake (II), **(D)** Steven Soderbergh, **(E)** Anne V. Coates

Field of Dreams (1989) **(SD)** n/a, **(SSE)** Sandy Gendler, **(D)** Phil Alden Robinson, **(E)** Ian Crafford

Forrest Gump (1994) **(SD)** Randy Thom, **(SSE)** Gloria S. Borders, **(D)** Robert Zemeckis, **(E)** Arthur Schmidt (I)

Goodfellas (1990) **(SD)** n/a, **(SSE)** Skip Lievsay, **(D)** Martin Scorsese, **(E)** Thelma Schoonmaker

Halloween (1978) **(SD)** n/a, **(SSE)** William L. Stevenson, **(D)** John Carpenter, **(E)** Charles Bornstein et al.

Heartbreak Ridge (1986) **(SD)** n/a, **(SSE)** Robert G. Henderson et al., **(D)** Clint Eastwood, **(E)** Joel Cox

Indiana Jones and the Temple of Doom (1984) **(SD)** Ben Burtt, **(SSE)** Ben Burtt, **(D)** Steven Spielberg, **(E)** Michael Kahn (I)

Innerspace (1987) **(SD)** n/a, **(SSE)** Mark Mangini, **(D)** Joe Dante, **(E)** Kent Beyda

Jaws (1975) **(SD)** n/a, **(SSE)** John R. Carter (I) et al., **(D)** Steven Spielberg, **(E)** Verna Fields

Jurassic Park (1993) **(SD)** Gary Rydstrom, **(SSE)** Richard Hymns, **(D)** Steven Spielberg, **(E)** Michael Kahn (I)

King Kong (1933) **(SD)** n/a, **(SSE)** Murray Spivack, **(D)** Merian C. Cooper, **(E)** Ted Cheesman (I)

La Chienne (US/France) (1931) **(SD)** n/a, **(SSE)** Denise Batcheff & Marcel Courmes, **(D)** Jean Renoir, **(E)** Marguerite Renoir

Last Action Hero (1993) **(SD)** n/a, **(SSE)** Bob Beemer & Michael Minkler, **(D)** John McTiernan, **(E)** Richard A. Harris et al.

Letter from Siberia (France) (1957) **(SD)** n/a, **(SSE)** n/a, **(D)** Chris Marker, **(E)** n/a

Listzomania (UK) (1975) **(SD)** n/a, **(SSE)** n/a, **(D)** Ken Russell, **(E)** Stuart Baird

Magnolia (1999) **(SD)** Richard King (I), **(SSE)** Richard King (I), **(D)** Paul Thomas Anderson, **(E)** Dylan Tichenor

Malcolm X (1992) **(SD)** n/a, **(SSE)** Skip Lievsay, **(D)** Spike Lee, **(E)** Barry Alexander Brown

Nashville (1975) **(SD)** n/a, **(SSE)** Richard Portman et al., **(D)** Robert Altman, **(E)** Dennis Hill & Sidney Levin

Nell (1994) **(SD)** n/a, **(SSE)** Eddy Joseph, **(D)** Michael Apted, **(E)** Jim Clark (I)

Out of Africa (1985) **(SD)** n/a, **(SSE)** Tom McCarthy Jr., **(D)** Sydney Pollack, **(E)** Pembroke Herring et al.

Pleasantville (1998) **(SD)** Lance Brown, **(SSE)** Bruce Stambler, **(D)** Gary Ross, **(E)** William Goldenberg

Raging Bull (1980) **(SD)** n/a, **(SSE)** Frank Warner, **(D)** Martin Scorsese, **(E)** Thelma Schoonmaker

Raiders of the Lost Ark (1981) **(SD)** Ben Burtt, **(SSE)** Richard L. Anderson, **(D)** Steven Spielberg, **(E)** Michael Kahn (I)

Robocop (1987) **(SD)** n/a, **(SSE)** Stephen Hunter Flick & John Popsil, **(D)** Paul Verhoeven, **(E)** Frank J. Urioste

Saving Private Ryan (1998) **(SD)** Gary Rydstrom, **(SSE)** Richard Hymns, **(D)** Steven Spielberg, **(E)** Michael Kahn (I)

Se7en (1995) **(SD)** Ren Klyce, **(SSE)** Patrick Dodd, **(D)** David Fincher, **(E)** Richard Francis-Bruce

Shine (UK/Australia) (1996) **(SD)** n/a, **(SSE)** Toivo Lember, **(D)** Scott Hicks, **(E)** Pip Karmel

Someone to Watch Over Me (1987) **(SD)** n/a, **(SSE)** n/a, **(D)** Ridley Scott, **(E)** Claire Simpson

Speed (1994) **(SD)** n/a, **(SSE)** Stephen Hunter Flick, **(D)** Jan de Bont, **(E)** John Wright (II)

Spartacus (1960) **(SD)** n/a, **(SSE)** Murray Spivack et al., **(D)** Stanley Kubrick, **(E)** Robert Lawrence (I)

Star Wars (1977) **(SD)** Ben Burtt, **(SSE)** Richard Hymns, **(D)** George Lucas, **(E)** Marcia Lucas

Star Wars: Episode 1 - The Phantom Menace (1999) **(SD)** Ben Burtt, **(SSE)** Ben Burtt, Tom Bellfort & Matt Wood, **(D)** George Lucas, **(E)** Ben Burtt & Paul Smith

Strange Days (1995) **(SD)** Gary Rydstrom, **(SSE)** Gloria S. Borders, **(D)** Kathryn Bigelow, **(E)** Howard E. Smith

Superman (1978) **(SD)** n/a, **(SSE)** Chris Greenham, **(D)** Richard Donner, **(E)** Stuart Baird et al.

Taxi Driver (1976) **(SD)** n/a, **(SSE)** Frank Warner, **(D)** Martin Scorsese, **(E)** Tom Rolf et al.

Terminator 2 (1991) **(SD)** Gary Rydstrom, **(SSE)** Gary Rydstrom & Gloria S. Borders, **(D)** James Cameron, **(E)** Conrad Buff IV et al.

The Conversation (1974) **(SD)** Walter Murch, **(SSE)** Walter Murch et al., **(D)** Francis F. Coppola, **(E)** Richard Chew

The Deerhunter (1978) **(SD)** n/a, **(SSE)** Richard Portman et al., **(D)** Michael Cimino, **(E)** Peter Zinner

The Empire Strikes Back (1980) **(SD)** Ben Burtt, **(SSE)** Ben Burtt, **(D)** Irving Kershner, **(E)** Paul Hirsch (I)

The English Patient (UK/US) (1996) **(SD)** Walter Murch, **(SSE)** Walter Murch et al., **(D)** Anthony Minghella, **(E)** Walter Murch

The Exorcist (1973) **(SD)** n/a, **(SSE)** Christopher Newman & Robert Knudson, **(D)** William Friedkin, **(E)** Norman Gay et al.

The Fugitive (1991) **(SD)** n/a, **(SSE)** Bruce Stambler & John Leveque, **(D)** Andrew Davis, **(E)** Dennis Virkler et al.

The Ghost and the Darkness (1996) **(SD)** Lance Brown, **(SSE)** Bruce Stambler, **(D)** Stephen Hopkins, **(E)** Roger Bondelli et al.

The Godfather (1972) **(SD)** n/a, **(SSE)** Richard Portman et al., **(D)** Francis F. Coppola, **(E)** W. Reynolds & P. Zinner

The Hunt for Red October (1990) **(SD)** Frank Serafine, **(SSE)** Cecelia Hall & George

Watters (II), **(D)** John McTiernan, **(E)** Dennis Virkler et al.

The Jazz Singer (1927) **(SD)** n/a, **(SSE)** George Groves, **(D)** Alan Crosland, **(E)** Harold McCord

The Karate Kid (1984) **(SD)** n/a, **(SSE)** Robert Knudson, **(D)** John G. Avildsen, **(E)** John G. Avildsen et al.

The Last Emperor (HK/UK/IT/ China) (1987) **(SD)** n/a, **(SSE)** Bill Rowe & Ivan Sharrock, **(D)** Bernardo Bertolucci, **(E)** Gabriella Cristiani

The Lion King (1994) **(SD)** Mark Mangini, **(SSE)** Richard L. Anderson & Mark Mangini, **(D)** R. Allers & R. Minkoff, **(E)** Tom Finan

The Matrix (1999) **(SD)** Dane A. Davis, **(SSE)** Dane A. Davis, **(D)** A. & L. Wachowski, **(E)** Zach Staenberg

The Remains of the Day (UK/US) (1993) **(SD)** n/a, **(SSE)** Robin O'Donoghue, **(D)** James Ivory, **(E)** Andrew Marcus (I)

The Right Stuff (1983) **(SD)** n/a, **(SSE)** Jay Boekelheide et al., **(D)** Philip Kaufman, **(E)** Glenn Farr et al.

THX-1138 (1971) **(SD)** Walter Murch, **(SSE)** Walter Murch et al., **(D)** George Lucas, **(E)** George Lucas

Titanic (1997) **(SD)** Gary Rydstrom et al., **(SSE)** Tom Bellfort et al., **(D)** James Cameron, **(E)** Conrad Buff et al.

Tommy (UK) (1975) **(SD)** n/a, **(SSE)** Bill Rowe & Ian Bruce, **(D)** Ken Russell, **(E)** Stuart Baird

Top Gun (1986) **(SD)** n/a, **(SSE)** Cecelia Hall & George Watters (II), **(D)** Tony Scott, **(E)** Chris Lebenzon et al.

Toy Story (1995) **(SD)** Gary Rydstrom, **(SSE)** Tim Holland (I), **(D)** John Lasseter, **(E)** R. Gordon & L. Unkrich

Traffic (2000) **(SD)** n/a, **(SSE)** Larry Blake (II), **(D)** Steven Soderbergh, **(E)** Stephen Mirrione

Under Siege (1992) **(SD)** Bruce Stambler, **(SSE)** John Leveque, **(D)** Andrew Davis, **(E)** Dennis Virkler

We Were Soldiers (2002) **(SD)** Lon Bender, **(SSE)** Lon Bender, **(D)** Randall Wallace, **(E)** William Hoy

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NOTES

Introduction.

[1] Oscar Wilde as quoted in Sontag, Susan Against Interpretation (London: Vintage, 1994) p.3.
[2] For a more detailed analysis of this bias in established film scholarship please refer to Chapter 2: Critical receptions of sound
[3] Interestingly, the period I am investigating has been dubbed by some as 'the second coming of sound; see Schreger, Charles *The Second Coming of Sound* in Film Comment (Vol. 14, Issue 5, 1978) pp.34-37.
[4] The increasing reliability of digital technologies means that a director like Spielberg could supervise the final mix of Jurassic Park – done at Lucas's Skywalker Sound near San Francisco whilst in Poland directing Schindler's List. Digital tie-in lines allowed full quality sound to be played back in real time to Spielberg across the ocean. See http://www.thx.com/skywalker/tieline.html for more information).
[5] Altman, Rick *The Material Heterogeneity of Recorded Sound* in Altman, R. (ed) Sound Theory, Sound Practice (New York & London: Routledge, 1992) p.16.
[6] One example: Larry Blake was the supervising sound editor for Steven Soderbergh's Oscar winning Traffic. Blake supervised also the 2.0 mix for home release on video, a separate 5.1 mix for DVD, the M & E (music & effects) version for the foreign markets, the version for airlines, as well as travelled to the key European markets to supervise the quality of the dubbing in multiple foreign languages)
[7] Levin, Tom *The Acoustic Dimension: Notes on Cinema Sound* in Screen (Vol. 25, Issue 3, May/June 1984) p.63.

Chapter One: The Dolby Phenomenon.

[1] Extract from Why should you install Dolby Digital pamphlet produced by Dolby Laboratories.
[2] They are: Best Sound, and Best Sound Effects Editing.
[3] Data available from Dolby's official web site at: http://www.dolby.com, last accessed August 2002.
[4] Despite this success, Dolby has remained a relatively small company with 550 employees worldwide and with annual revenues of around $120 million.
[5] Hepworth, Cecil *Preface* in Scotland, John The Talkies (London, 1930)
[6] All films are U.S. productions, unless otherwise stated.
[7] For a fuller account of the coming of sound see Gomery, Douglas *The Coming of Sound: Technological Change in the American Film Industry* in Belton, John and Weis, Elisabeth (eds.) Film Sound: Theory and Practice (New York: Columbia University Press, 1985) pp.5-24.
[8] This should not detract from the undisputable success of the Shearer two-horn system that became a blueprint for future generations of speakers. For more information on the Shearer and Altec Lansing the best resource is at http://www.audioheritage.com The site contains a remarkable amount of historical and technical data on the development of cinema loudspeakers both at Altec Lansing and JBL.
[9] Interestingly, it is only at the beginning of the new millennium that telephone technology is finally being developed to handle wider frequencies, especially in the field of mobile telephony.
[10] The rather peculiar experiment of the multi-language talkies, whereby the same script was filmed in three or more languages using the same sets and props, but different actors, was unsurprisingly short-lived.
[11] A new standard frequency response curve was eventually approved as a direct consequence of the introduction of Dolby technologies, the ISO 2969, also known as the 'X-curve'. For more information, see the ISO web site at www.iso.org.
[12] Belton, John *1950s Magnetic Sound: The Frozen Revolution* in Altman, Rick, op. cit. (1992) p.155.
[13] Paradoxically, it was the supremacy of mono in the late sixties and early seventies that finally killed off so many of the old, 1,000 plus seat auditoria and paved the way for new, more sound friendly cinemas.
[14] From *A History of Dolby Laboratories - 11. The Dolby film program* available at: http://dolbysearch.dolby.com/company/is.ot.0009.History.html, last accessed: August 2002.
[15] The best resource for investigating historical and technological issues concerning all widescreen formats is the American Widescreen Museum, available at: http://www.widescreenmuseum.com (last accessed: August 2002). The site has also a rather comprehensive area dedicated to the sound systems employed in the various formats.

[16] The player Nakamigi built became available under the guise of three manufacturers: Advent, Fisher and Harman-Kerdan, who still continue the relationship with Dolby by manufacturing home cinema products featuring Dolby Surround technology.
[17] As it was the case with the rise of multiplex cinemas, it is interesting to note that this detail has regularly been overlooked in accounts of the 1950s' Television vs. Cinema 'war'. Widescreen processes have traditionally been discussed only in terms of screen size.
[18] For more information on magnetic stereo and widescreen cinema, see www.widescreenmuseum.com (Last accessed: 01/09/2002).
[19] It is perhaps useful here to point out that Ray Dolby was never a part of the youth movements that were responsible for most of the changes that were taking place. He was an interested witness, but one who remained firmly a businessman by formation and mindset.
[20] I have not been able to ascertain the extent to which Dolby, Kodak and RCA shared information and cooperation. Dolby's own literature 'curiously' fails to mention any such involvement.
[21] It is perhaps one of the many surprising peculiarities of sound that background noise should be associated not with loudness, as many assume, but rather with the quieter moments of a recorded programme.
[22] I am obviously popularising what is actually a rather sophisticated process.
[23] Arick, Michael *In Stereo! The Sound of Money* in Sight & Sound, Vol. 57, Winter 87-88, p.39.
[24] Hilliard, John K. *Conference presentation to the SMPTE* (Los Angeles, May 1, 1953) – available at http://www.widescreenmuseum.com/widescreen/53streo.htm, last accessed August 2002.
[25] Hilliard, John K., ibid, 1953.
[26] Hilliard, John K., ibid, 1953.
[27] Indeed, when Lucasfilm detailed its recommendations for speakers to be approved under the THX system program it specified that surround speakers ought to be dipole, i.e. emanating sound in a non-directional manner to emphasise a generic sound field rather than a directional one.
[28] From *A History of Dolby Laboratories - 11. The Dolby film program* available at: http://www.Dolby.com/is.ot.0009.history.html, last accessed: August 2002.
[29] See also Dolby Laboratories Licensing Information available at www.dolby.com/trademark/co.ot.0204.LicInfo.pdf (Last accessed: 01/09/2002).
[30] The VCR is, again, a good example. Matshushita and JVC licensed VHS technology to several other manufacturers, but continued to manufacture VHS video recorders themselves.
[31] Dolby publicity material, see also www.Dolby.com
[32] The latter two locations clearly indicate China as one of the future key markets for film sound.
[33] Although Close Encounters of the Third Kind was also in production at virtually the same time as Star Wars in 1977, the latter's approach to sound was more comprehensive, especially in organisational terms.
[34] Neale, Steve *Hollywood Corner* in Framework (Issue 19, 1982) p.37.
[35] Allen, Ioan *The Dolby Sound System for Recording Star Wars* in American Cinematographer (Vol. 58, Issue 6, July 1977) p.748.
[36] Mancini, Mark *Sound Thinking* in Film Comment (Issue 19, 1983) p.45.
[37] As a result, he was awarded an unprecedented Academy Award for Special Achievements in Sound.
[38] Mancini, Mark, op. cit. (1983) p.45.
[39] Neale, Steve op. cit. (1982) p.38.
[40] This 'pioneering' role has been further qualified during the years by decision such as to base his operations outside Hollywood (in San Rafael, near San Francisco), to create what has become the most important sound facility in the world, Skywalker Ranch, and to initiate the THX and TAP programs.
[41] For a more in-depth analysis of the rise of a 'new', contemporary Hollywood see Hillier, Jim The New Hollywood (London: Studio Vista, 1992)
[42] Lucas, George Star Wars: Episode I~ A New Hope (screenplay), Revised fourth draft (Jan. 1976) Lucasfilm Ltd.
[43] Berman, Robert Fade In: The Screenwriting Process (Studio City, CA: M. Wiese Productions, 1988) p.22.
[44] Morgan, Jane *Review of Star Wars* in Film Review (Vol. 28, Issue 7, Aug./Sept. 1977) p.437.
[45] For two excellent examples of modern use of surround, see the opening sequence of The Fugitive (1993) and Speed (1994).
[46] Mancini, Mark op. cit. (1983) p.45.
[47] Chion, Michel *Revolution douce... et dure stagnation* in Cahiers du Cinema (Issue 398, July/August 1987) p.28 (my translation).
[48] Dolby and Lucasfilm have in the past referred to an audience survey revealing a direct link between box office success and the use of Dolby sound, but I have not been able to find a copy of it, despite

contacting Dolby Labs directly. The closest I have ever come across a survey of this kind was a survey of Parisian cinemas, published in the entertainment weekly Pariscope, the equivalent of London's Time Out, which had polled cinema exhibitors and had found that those cinemas equipped with THX performed vastly better than those without.

[49] La Polla, Franco *Steven Spielberg* in Il Castoro Cinema (Issue 99, May/June 1982), p.8.

[50] Extract from Cook, Christopher *Dancing Shadows* a BBC - Radio 4 production (2000) part 3 of 4.

[51] The Academy awarded Dolby the first of seven special Oscars for their contribution to the advancement of the art of motion pictures. Ray Dolby and Ioan Allen were personally awarded an Oscar in 1989 for their 'continuing contributions to motion picture sound through the research and development programs of Dolby Laboratories'.

[52] This new standard, codified as ISO 2969, is called X-curve (X stands for 'Extra') to distinguish it from the Academy Curve (also known as 'Normal Curve'). For more information, see the ISO official web site at www.iso.org.

[53] At the time, Sony owned Columbia Pictures and Matshushita owned MCA.

[54] For more information see www.Dolby.com (Dolby Digital), www.dtsonline.com (DTS), and www.sdds.com (SDDS).

[55] The difference between the two can obviously be heard, and felt, by audiences, especially in terms of frequency and dynamic range, but it is deemed understandably to be of less inconvenience to audiences than having to stop and start the film.

[56] This mirrors Lucas's overall preoccupation with standards of theatrical presentation as exemplified by his THX sound system and TAP (Theatre Alignment Program) evaluation.

[57] It is worth noting that this is eerily similar to Sony's Betamax disaster and confirms the importance of establishing a substantial share of the market early on in order to survive in the long term.

[58] A 'Top' channel has recently been tested by Dolby for We Were Soldiers (2002). For more information see http://www.dolby.com/press/mp_pr_0209_Soundelux.html

Chapter 2: Critical Receptions of Sound.

[1]. Altman, Rick *The Evolution of Sound Technology* in Weis, Elisabeth op. cit. (1985) p.45.

[2] Schreger, Charles *The Second Coming of Sound* in Film Comment (Vol. 14, Issue 5, 1978) pp.34-37.

[3] For the record, 7,000+ titles featuring the word 'film' and 2000+ titles featuring the word 'cinema'.

[4] The web site www.filmsound.org is a case in point because it currently attracts over 30,000 discrete visitors every month, a huge figure given the specialised nature of the site.

[5] Arnheim, Rudolph *Foreword* in Film as Art (Berkeley, Los Angeles & London: University of California Press, 1971).

[6] Arnheim, Rudolph Film (London: Faber & Faber, 1933) p.33.

[7] Arnheim, Rudolph op. cit. (1971) p.199.

[8] Indeed, synchronicity of sound and image was identified early on by some theorists one of the most threatening aspects of sound.

[9] Bazin, Andre What is Cinema (Berkeley, Los Angeles and London: University of California Press, 1967), p.23, translation by Hugh Gray.

[10] Balasz, Bela Theory of the Film (New York: Arno Press and the New York Times (reprint of 1952 original) 1972.

[11] Balasz, Bela op. cit. (1972) p.197.

[12] Balasz, Bela op. cit. (1972) p.218.

[13] Balasz, Bela op. cit. (1972) p.194-195.

[14] Nelmes, Jill Introduction to Film Studies p.113

[15] Hayward, Susan Cinema Studies – The Key Concepts (London: Routledge, 2000).

[16] Gorbman, Claudia *Film Music* in Church Gibson, P. and Hill, J. (eds.) The Oxford Guide to Film Studies (Oxford: Oxford University Press, 1998) pp.43-50.

[17] Cook, Pam The Cinema Book (London: British Film Institute, 1999) pp.2-57.

[18] Buckland, Warren Teach Yourself Film Studies (London: Hodder & Stoughton Educational, 1998) pp.19-20.

[19] Monaco, James How to Read a Film (Oxford: Oxford University Press, 2000).

[20] Monaco, James ibid, p.125.

[21] Monaco, James ibid, p.213.

[22] Phillips, William H. Film: An Introduction (Boston and Bedford/St. Martin's Basingstoke: Palgrave, 2002).

[23] Perkins, Victor Film as Film (New York: Penguin Books, 1972).

[24] Perkins, Victor ibid, p.95.

[25] Perkins, Victor ibid, p.37.
[26] Bordwell, David & Thompson, Kristin Film Art: An Introduction (New York: McGraw Hill, 1993).
[27] Bordwell, David & Thompson, Kristin, ibid, p.29-34.
[28] Bordwell, David & Thompson, Kristin, ibid, p. 433.
[29] Bordwell, David & Thompson, Kristin, ibid, p.295.
[30] The other two films they discuss, Meet Me in St. Louis (1944) and Tout va Bien (1972) also have interesting soundtracks, which, at least in the latter case, Bordwell and Thompson actually mention, but their account of sound remains marginal).
[31] In this sense, most writing on the coming of sound served the double purpose of both celebrating the birth of sound whilst emphasising in the same breath the subordinate nature of sound to the image.
[32] Walter Murch is a multi-Oscar winner sound designer (The Conversation, Apocalypse Now, The English Patient) and one of the fathers of contemporary film sound. He has also published a number of theoretical pieces on sound and it is under this guise that I am including him in this list.
[33] Belton, John and Weis, Elisabeth, op. cit. (1985).
[34] For an excellent critique of the 'visual bias' present in most French theorists, such as Comolli and Metz, see Armes, Roy *Entendre,c'est comprendre: In Defence of Sound Reproduction* in Screen (Vol.29, Issue 2, Spring 1988) pp.8-22.
[35] Doane, Mary Ann *Ideology and the Practice of Sound Mixing* in Belton, J. & Weis, E. (eds.) op. cit. (1985) pp.54-62.
[36] Belton, John *Technology and Aesthetics of Film Sound* in Belton, J. & Weis, E. (eds.) op. cit. (1985) p.61.
[37] Belton, John, ibid, p.63.
[38] Belton, John, ibid, pp.64 & 66.
[39] Belton, John, ibid, pp.67.
[40] Altman, Rick op. Cit. (1992) p. 37.
[41] Altman, Rick ibid, p. 38.
[42] Chion, Michel, Op. Cit. (1994) p. 144.
[43] Chion, Michel, Op. Cit. (1994) p. 155.
[44] Murch, Walter *Foreword* in Chion, Michel Audio-Vision, Sound on Screen (New York: Columbia University Press, 1994) p.XIX.
[45] Murch, Walter ibid, p.XIX.
[46] Chion, Michel op. Cit. (1994) p.32.
[47] In the case of Walter Murch, the appropriation of discourses of art typically reserved to more established areas of filmmaking could be seen as a political attempt to 'talk up' the importance of his job as sound designer.
[48] Weis, Elisabeth *Synch Tanks – The Art and Technique of Post-production Sound* in Cineaste (Vol. XXI, Issue 1-2, 1995) - supplement 'Sound and Music in the Movies', pp. 56-61. The article is also available online at: www.geocities.com/Hollywood/Academy/4394/sync.htm (Last accessed: 1/10/2002).
[49] Weis, Elisabeth ibid, p.61.
[50] Two excellent examples in this sense are Mancini, Mark's *Sound Thinking* (Film Comment, Vol. XIX, Issue 6, Nov/Dec 1983, pp.40-47) that included interviews with some key sound men - such as Frank Serafine, Ben Burtt and Jimmy MacDonald, and the special issue of Film Comment (Vol. XXIV, Issue 5, Sept.-Oct. 1978) which had a special section to sound.
[51] Salt, Barry Film Style and Technology: History and Analysis (London: Starword, 1983).
[52] Neale, Steve Cinema and Technology: Image, Sound, Color (London & New York: MacMillan, 1985).
[53] LoBrutto, Vincent Sound-on-Film: Interviews with Creators of Film Sound (Westport, CT: Praeger Publishers, 1994).
[54] LoBrutto, Vincent Selected Takes: Film Editors in Editing (New York. London. Praeger. 1991).
[55] LoBrutto, Vincent By Design: Interviews with Film Production Designers (New York and London: Praeger, 1992).
[56] LoBrutto, Vincent op. cit. (1994) p.XI.
[57] Altman, Rick op. cit. (1992).
[58] La Polla, Franco op. cit. (1982), p.8.
[59] Altman, Rick op. cit. (1992) p.45.
[60] A greater appreciation of the condition under which a film is seen/heard would, for example, draw attention to the practice of reviewing new films in substandard theatres or on video. This practice has been one of the most important factors contributing to film criticism's virtually complete lack of attention to sound, with the noticeable exception of music.
[61] Altman, Rick op. Cit. (1992) p.5.

[62] Altman, Rick ibid, p.6.
[63] Clearly, this is true for virtually any topic available in any walk of life: from pregnancy to terminal diseases the Internet has given a voice to an apparently limitless resource of information providers.
[64] A collection of his essays can be found in what is probably the largest single recipient of articles on film sound, a web site run by a Swedish academic, Sven Carllson, http://www.filmsound.org
[65] Thom, Randy *Designing a Movie for Sound* available at www.filmsound.org/articles/designing_for_sound.htm (Last accessed: 01/09/2002).
[66] Coffey, John *An Open Letter from Your Sound Department* available at: www.soundspeedmovie.com/resources/articles/coffey/openletter.html (Last accessed: 01/09/2002).
[67] Coffey, John ibid.
[68] It is worth pointing out that his all-powerful concept of employing sound in an 'invisible' way to avoid distracting the audience continues to be the governing principle in contemporary sound design. It is also one of the principle notions informing critical writing on film sound, as employed by scholars such as Mary Ann Doane and Claudia Gorbman.
[69] These artists were not an impromptu, disorganised bunch. The sound effects trade was a profitable one at the beginning of last century with troupes of sound effects makers touring the country providing effects for plays and silent movies. For an interesting account of this early stage of sound effects in the cinema, see Bottomore, Stephen *An International Survey of Sound Effects in Early Cinema* in Film History (Vol.11, Issue 4, 1999) pp.485-498.
[70] Smith, Jeff The Sounds of Commerce - Marketing Popular Film Music, (New York: Columbia University Press, 1998) p.6.
[71] Dyer, Richard *Introduction to Film Studies* in Hill, John & Church Gibson, Pamela (eds.), The Oxford Guide to Film Studies (Oxford & New York: Oxford University Press, 1998) p.5.
[72] Gorbman, Claudia *Film Music* in Hill, John. & Church Gibson, P. (eds.), op. cit. (1998) p.43.
[73] It makes perfect commercial, of course, to have a music score to market as a distinct and 'fuller' entity than the music as heard in the movie. This can translate in a crucial differentiation of the product (i.e. something 'original') whilst retaining some of the elements that appealed to the general public in the first instance (e.g. a central theme).
[74] The blurring of the difference between the two roles of the sound designer and supervising sound editor suggests that it is acceptable to use the term sound designer for indicating both.
[75] LoBrutto, Vincent op. cit. (1994) p.232.
[76] I do not wish to discount the rather creative use of text in the opening credits of both Superman and Star Wars, rather to emphasise the impact that sound has on the opening first few minutes of those movies.
[77] I do not mean to discount the complexity of media synergies, but there is little doubt about this point nonetheless.
[78] Darby, William & DuBois, Jack American Film Music (Jefferson, North Carolina & London: MCFarland & Company, Inc. Publisher, 1990) p. XIV.
[79] Exert from Chapter 4: Interview with Bruce Stambler. The interview took place at 'Soundstorm', Los Angeles in July 1998. Bruce Stambler has been nominated for five Academy Awards and has won one for The Ghost and the Darkness (1996).
[80] Michel Chion's book The Voice in the Cinema (New York: Columbia University Press, 1998) deals with this issue in depth.
[81] LoBrutto, Vincent op. cit. p.245.
[82] Chernoff, Scott *Interview with John Williams* in Star Wars – The Official Magazine (Issue 21, JulyAugust 1999), pp.24-28.
[83] Needless to say, what exactly the term 'romantic' means to each listener can vary considerably.
[84] Animation sound is the one noticeable exception to this rule. This is true especially about the work carried out at Disney and Warner Brothers by legendary figures such as Mel Blanc.
[85] This has consequences also in the way film music audiences are regarded as 'less sophisticated' than the more cultured audiences of opera and classical music
[86] Burlingate Jon & Crowous, Gary *Music at the service of Cinema – An Interview with Ennio Morricone*, Cineaste (Vol. XXI, Issue 1-2, 1995) - supplement 'Sound and Music in the Movies', p.80.
[87] Gorbman, Claudia *The State of Film Music Criticism*, Cineaste (Vol. XXI, Issue 1-2, 1995) - supplement 'Sound and Music in the Movies', p.74.
[88] Altman, Rick op. cit. (1992) p.16.

Introduction to Section 2

[1] USC is the abbreviation with which the University of Southern California in Los Angeles is commonly known, for more information see www.usc.edu.
[2] UCLA is the abbreviation with which the University of California at Los Angeles is commonly known, for more information see www.ucla.edu.
[3] The influence that USC film school graduates in particular have had on contemporary Hollywood cinema at large is often referred to, not always in affectionate terms, as the 'USC mafia'.
[4] As Gary Rydstrom points out in the interview in Chapter 3, this is an ongoing struggle. This is true in particular in relation to the Directors' Guild of America's stubborn refusal to acknowledge that sound is worthy of more than the 'technical' credit status is given at present. This is an important issue, because it pushes sound credits to the tail end of a movie's credits as technical credits that are not allowed to be 'head' credits on a movie.
[5] For more information on TMH Corporation and aforemetioned developments, see www.tmhlabs.com.
[6] Indeed, it is worth pointing out they they all know each other and often exchange ideas and views.
[7] For more on Skywalker Sound see www.skysound.com (Last accessed: 01/090/2002).

Chapter 6: The Role of Sound in Movie-Making: The Case of The Fugitive.
[1] At the time of writing, The Fugitive (1993) is Warner Brothers' fifth largest box office hit in the history of the studio.
[2] Ebert, Roger *Review of The Fugitive* in Chicago SunTimes (6/8/1993).
[3] Ebert, Roger ibid.
[4] Howe, Desson *Review of The Fugitive* in Washington Post (6/8/1993).
[5] Kempley, Rita *Review of The Fugitive* in Washington Post (6/8/1993).
[6] This extract is from a conversation I had with Bruce Stambler about The Fugitive and other sound matters at Soundstorm (Burbank, California) in July 1999 (see Chapter 4 for full interview). Wherever possible, I have chosen to leave interview extracts exactly as from the original interview to keep intact Stambler's train of thoughts.
[7] Available at: http://www.thx.com/skywalker/skywalker.html Last accessed: 1 September 2001.
[8] The main difference is one of location: Scott's movie is set in New York.
[9] To 'massage' a sound is to change its natural qualities by mixing other sounds with the original recording to obtain something that approximates its original but also takes on a new level of expressiveness. It is not a matter of loudness. There are countless examples scattered throughout contemporary soundtracks. To name but a few in *The Fugitive* alone, the gun shot, the camera flash, Ford's voice when chased in the forest, the sound of the struggle with the one-arm man are all good examples of this common practice.
[10] This is a well established 'trick of the trade' and has been used in many films: camera flashes, typewriters, and even musical notes are often mixed with gunshot sounds to convey a more aggressive tone. One of the most effective examples can be found at the end of All the President's Men (1976) when the sound of the two reporters' typewriters slowly changes its aural characteristics and becomes the sound of gunshots, literally audilising the popular saying that the pen is mightier than the sword. The film won an Oscar for sound.
[11] For more please my interview with Bruce Stambler in the previous section.
[12] Interview with Bruce Stambler, ibid.
[13] For more please my interview with Bruce Stambler in the previous section.
[14] The availability of multi-channel technology from the mid-seventies onwards has allowed filmmakers to explore off-screen sound both in the front and rear of the auditorium expanding narrative space dramatically.
[15] Interestingly, a good example of a 'less refined' approach can be found in the rescue mission of the sequel to The Fugitive, U.S. Marshals (1998), after a plane crash this time. In that instance, the filmmakers seem content to use sound to simply confirm the visuals by mapping images and sound as conventionally as possible.
[16] A 'sound signature' can be best understood as a specific sound that is either associated to a specific character or a narrative theme. Its main aim could be summarised as that of 'suggesting much, using little'.
[17] Stambler acknowledges this directly in my interview with him in the previous section.
[18] For an overview of the impact that sound has had on Hollywood filmmaking in the past 30 years see Sergi, Gianluca *A cry in the dark: the role of postclassical film sound* in Neale, Steve & Smith, Murray (eds.) Contemporary Hollywood Cinema (London & New York: Routledge, 1998) pp.156-165.

Chapter 7 - The Sonic Playground: Hollywood Cinema and its Listeners.

[1] See Lacan, Jacques *The Mirror Stage as formative function of the I* in Lacan, Jacques Ecrits: a Selection (London: Tavistock Publications, 1977).

[2] See Mulvey, Laura *Visual Pleasure and Narrative Cinema* in Screen (Vol.16, Issue 3, Autumn 1975) and Mulvey, Laura *Afterthoughts on "Visual Pleasure and Narrative Cinema" inspired by Duel in the Sun* in Framework (Issue 15/16/17, Summer 1981).

[3] Ellis, John Visible Fictions (London & New York: Routledge & Kegan Paul, 1982), p.41.

[4] Hugo Mauerhofer as quoted in Austin, Bruce Immediate Seating A Look at Movie Audiences (Belmont, CA: Wadsworth Publishing, 1988), p. 46.

[5] It is worth remembering that where the image is two-dimensional, sound is a three-dimensional construct.

[6] Cecelia Hall has been responsible for some of the most innovative soundtracks of the last twenty years, including Beverly Hills Cop (1984), Top Gun (1986), and The Hunt for Red October (1990) for which she won an Oscar.

[7] LoBrutto, Vincent *Interview with Cecilia Hall*, in LoBrutto, Vincent op. cit. (1994) p.191-192.

[8] Schreger, Charles *Altman, Dolby and The Second Sound Revolution* in Weis, E. & Belton, J. (eds.) op. cit. (1985) p. 349.

[9] It is interesting to note that regardless of the advances made in the past few years by large screen televisions, the depth, width and quality of the cinema image stands virtually unchallenged by any consumer products.

[10] George Lucas, in Young, John *Sound Revolution* in Hollywood Reporter, (June 22, 1993) p.T12.

[11] I am aware that it would be virtually impossible to conduct a meaningful empirical study of the many kinds of audiences of Hollywood cinema. These considerations are more based on Hollywood's own perception of audiences needs, with all the risks and omissions that this inevitably entails.

[12] LoBrutto, Vincent *Interview with Walter Murch* in LoBrutto, Vincent op. cit. (1994) p.99.

[13] LoBrutto, Vincent *Interview with Tomlinson Holman*, in Vincent LoBrutto, op. cit. (1994) p.204.

[14] Obviously, conditions of reception can vary widely from cinema to cinema, but I am mainly referring here to today's most popular place of fruition of Hollywood films, the multiplex cinema.

[15] LoBrutto, Vincent *Interview with Walter Murch* in LoBrutto, Vincent op. cit. (1994) p.92.

[16] LoBrutto, Vincent *Interview with Juno Ellis* in LoBrutto, Vincent op. cit. (1994) p.218.

[17] There had been famous examples of sound systems like Sensurround that self-consciously tried to take advantage of this feature. However, ultimately none succeeded for the usual reasons: costs were too high, sound bled into adjacent theatres and software was scarce (in the case of Sensurround only three movies used the system: Earthquake (1974), Midway (1976) and Rollercoaster (1977).

[18] LoBrutto, Vincent *Interview with Cecilia Hall* in LoBrutto, Vincent op. cit. (1994) p.195.

[19] THX has become a 'lucky pendant' for George Lucas. It appeared first in his first major film, THX 1138 (1971), he subsequently used it in his movies, including American Graffiti (1973) (the number plate of a car) and Star Wars (1977) (the 'number' of one of the Imperial Stormtroopers). Sometimes it has been referred to as the Tomlinson Holman eXperiment, as homage to its creator, Tomlinson Holman (see Chapter 5 for my interview with Tom Holman. More information on THX and TAP can be found at: www.thx.com/ (Last accessed: 1-9-2002).

[20] James Cameron, quoted in TAP publicity material Aligned Success (Lucasfilm, 1992), available from LucasArts Entertainment Company THX Division P.O. Box 2009 San Rafael, California 94912, or at THX web site: www.thx.com

[21] Obviously, television is perfectly aware of this issue and has attempted to incorporate, at least partly, the audience soundtrack in their programmes by giving it an institutional role. The best example of this is to be found in the use of audience 'canned' laughter in sitcoms.

[22] Michael Cimino, in Charles Schreger, op. cit., 1985, p. 351.

[23] Indeed, Lucasfilm's THX program has now a set of image quality tests, as well as the more established sound quality checks that a cinema must pass to gain THX certification.

[24] Audiences are active also in the sense of demanding regulation on issues like sound levels. Following audience complaints about sound level in film trailers, Dolby Laboratories have now designed a loudness meter to prevent trailers from being too loud.

Chapter 8 - Tackling sound: suggestions for sound analysis.

[1] To name but one famous example: despite the original aim of Truffaut and other French filmmakers/critics, it would be difficult to imagine auteurism today without textual analysis.

[2] Chion, Michel op. cit. (1994) pp. 185-213.

[3] Chion, Michel ibid, p.188.
[4] As we have seen, although early signs of an impending sound revolution were noticeable in the early/mid Seventies, they did not become apparent to the general public until the late Seventies with the success of films like Star Wars, Close Encounters of the Third Kind, and Apocalypse Now.
[5] Murch, Walter *Dense Clarity, Clear Density*, available at: www.ps1.org/cut/volume/murch.html (Last accessed: 1/9/2002).
[6] This should not be taken to be a 'mark of expertise' separating those who know about sound from those who do not. Despite listening to the movie several times in preparation for a conference and a book, I had never noticed this effect until the supervising sound editor of the movie, Larry Blake, pointed it out in a presentation at a conference on sound.
[7] I do not wish to discount the inevitable problems inherent to talking to Hollywood practitioners. However, today's means of communication mean that it is not necessary anymore to jump on a plane and travel thousands of miles to ask a few questions: email and telephone exchanges can prove just as fruitful.
[8] It is important to remember that a good post-production sound facility in Hollywood can cost $1,000 upwards per hour, thus time IS money in sound terms as much as it is for any other aspect of film production.
[9] To quote but one example, Gary Rydstrom in 2002 followed work on movies such as Star Wars – Attack of the Clones and Minority Report with designing sound for Amandla! A Revolution in four Part Harmony, a documentary about the role of music in South Africa during apartheid.
[10] For a good example, see Altman, Rick *24-Track Narrative? Robert Altman's Nashville* in Cinema (Vol. 5, Issue 1.3, 1991).
[11] See Chapter 3: Interview with Gary Rydstrom.
[12] Weis later wrote a book on sound in Hitchcock's movies, The Silent Scream - Alfred Hitchcock's Soundtrack (Rutherford Fairleigh: Dickinson University Press, 1982).
[13] Weis, Elisabeth *The Sound of One Wing Flapping* in Film Comment (Vol. 14, Issue 5, 1978) pp.42-48.
[14] See the Directors Guild of America web site at: www.dga.org (Last accessed: 1/9/02).
[15] I accept the view that both sound and image are 'photographed', but I believe it is more important to focus on the conceptual dimension at this stage. For an excellent discussion of this ontological problem see Tom Levin's *The Acoustic Dimension* in Screen (Vol.25, Issue 3, May/June 1984) pp.55-68.
[16] I should specify here that silence as a filmic term is not too dissimilar from the concept of silence in real life. When I use the word silence, I do not mean complete absence of sound (nigh impossible to achieve in any case), but rather a minimal presence of sound, for example a mountain top on a clear day will be devoid of everyday sounds, especially loud sounds. Despite some low level sounds, like a gentle breeze or a distant rustling of leaves, most of us would identify that as 'silence'.
[17] The most famous account on this is Michel Chion's The Voice in the Cinema (New York: Columbia University Press, 1999).
[18] Bresson, Robert in Belton, J. & Weis, E. (eds.) op. cit. (1985) p.149.
[19] Walter Murch has given the best definition of 'layer' when he says: 'Let's define a layer as a conceptually-unified series of sounds which run more or less continuously, without any large gaps between individual sounds. A single seagull cry, for instance, does not make a layer' Extract from Murch, Walter *Dense Clarity, Clear Density*, available at: www.ps1.org/cut/volume/murch.html
[20] Murch, Walter ibid.
[21] Extract from Cook, Christopher *Dancing Shadows* a BBC - Radio 4 production (2000) part 3 of 4.
[22] For full interview, see Chapter 3.
[23] The other relevant designed sound in the fight sequences, the photographers' flash, works to highlight this contrast between private and public.
[24] For more see Serafine, Frank *Creating the Undersea Sounds of Red October* in American Cinematographer (Vol. 71, Issue 9, September 1990) pp.67-72.
[25] Murch, Walter *Dense Clarity, Clear Density*, available at: www.ps1.org/cut/volume/murch.html
[26] Thom, Randy *Mixing A Different Box of Chocolates – A Few notes on Forrest Gump*, available at: www.filmsound.org/randythom/forrest.htm (Last accessed: 20/9/2002). See Appendix – Thom on Gump for full text.
[27] Thom, Randy ibid.

Notes for Conclusion.
[1] More information on Dolby E, Dolby NET and Dolby Headphone can be found at www.Dolby.com
[2] In big budget movies such as Speed and The Fugitive the number of sound men and women involved in the creation of a soundtrack can often reach the forty mark in post-production alone.
[3] Official web site available at: www.skysound.com (Last accessed: 01/09/2002).

[4] Official web site available at: www.soundstorm.com (Last accessed: 01/09/2002).
[5] Official web site available at: www.soundone.com (Last accessed: 01/09/2002).
[6] Dolby and Lucasfilm openly recognise Rydstrom's role in developing EX in their literature, see www.dolby.com/press/m.pr.9812.lucasfilm.html (Last accessed: 01/09/2002).
[7] The THX programme is arguably the most comprehensive attempt at approximating B chain reproduction to A chain quality. In other words, it is an attempt to ensure that audiences hear what filmmakers heard when the film was made and not a sub-standard version of it. For more information, see the official THX site at: www.thx.com (Last accessed: 01/09/2002) and my interview with Tomlinson Holman, the creator of the THX sound system, in Chapter 5.