TEN

Sound

Technology forms the movie show. The introduction of silent, black-and-white 35 mm images drove the first experiments in showing films to mass audiences (chapter 1), the development of the nickelodeon (chapter 2), and the advance of the picture palace (chapter 3). But technological invention and innovation hardly stopped with the ideas of the first scientists. The coming of mechanical sound to the movies constituted the first major technological change in the history of film. Later came color and wide-screen images. The history of these two significant redefinitions of the movie show constitute this and the following chapters.

The greatest addition to the technology of the movie show emerged with the innovation of television. Indeed by the 1970s more people in the United States were watching motion pictures on television than in theatres. Historians too often ignore the impact of television on the movie show. To seek the economic and social impact of television on the presentation of motion pictures, chapter 13 will examine the effect of over-the-air television, chapter 14 will analyze the innovation of cable television, and chapter 15 will detail the enormous influence of the coming of home video.

This final section of *Shared Pleasures* moves beyond the usual definition of the presentation of motion pictures in a theatrical setting. We must accept that television, during the final third of the twentieth century, dominates as the means of movie presentation. To understand the influence of television forms the final chapters, in a continual process of technical change begun in the 1920s with the introduction of talkies.

THE COMING OF SOUND

As we have seen, film exhibition in the United States was a big business with set patterns and institutions by the mid-1920s. By 1925 some twenty thousand movie houses were operating in the United States. The exact number is impossible to pin down because many stayed open only a few months each year, as in resort towns, for example. On the margin of the industry, several thousand small theatres in neighborhoods and rural towns did the best they could, and hundreds went in and out of business in any one year. Although the trend was up, the best guess is that there were fifteen thousand full-time theatres, with five thousand more operating on the fringes.[1]

Three-quarters of America's twenty thousand movie theatres were located in small towns. They numbered nearly fifteen thousand but took in less than a quarter of the box-office dollars. They drew less (because of capacity) and charged less (thus collecting less proportionally of the money). The bigger, fancier picture palaces were all located in urban America. They totaled about a quarter of all theatres, but these five thousand houses (at most) accounted for three-quarters of the monies. By 1925 the movies had become an urban phenomenon as a business, and the picture palace set the ideal for the movie show.[2]

Picture palaces always presented more than "silent" movies. Music accompanied all films; the problem of how best to select music was widely discussed and debated. The biggest picture palaces had orchestras upwards of fifty or more, but all houses, however small, had some music, at a minimum one piano player. If there was an average for a neighborhood house, it was five to ten members of a small house orchestra. An overture to the show was common in picture palaces; selections surveyed the standard repertory from the *William Tell* Overture by Rossini to the *1812* Overture by Tschaikowsky.[3]

The house conductor, who doubled as an arranger, had to prepare a new score every time the program changed, at least once a week and more often twice a week. The largest of the picture palaces built up and maintained vast libraries of sheet music, and small-town house leaders had guidebooks to assist their selections. Work was indexed so that players could jump quickly from a First World War battle scene to an intimate meeting between two lovers. By the mid-1920s, movie theatres were the foremost employer of musicians in the nation, almost as many as all other live orchestras combined.[4]

Picture palaces also offered stage shows for one's admission price. Indeed, by the mid-1920s formulae had been established for live show presentations. There came to be certain accepted standards. The picture palace show, of about two- to two-and-a-half hours, opened with music from the house orchestra. Then came the live presentation of usually twenty minutes, followed by a series of shorts, almost always including a set of newsreels. Next came the climax of the show, the feature film. It was the job of the chain to establish the mixture of these shows (music and live acts) and film materials (shorts and features) to appeal to the audiences of that particular city.[5]

There existed three dominant stage show formulae. For the "pure presentation," the theatre would mount a revuelike spectacle with a troupe of female dancers and perhaps specialty vaudeville acts. This is what we associate today with the Radio City Music Hall. In the "prologue" the theme of the live show was linked to the feature film, so, for example, a nautical show (with singers costumed as divers suspended from cables) preceded Buster Keaton's *The Navigator* (1925). Finally there was the "vaudeville show" in which several acts of vaudeville were simply grouped together. This latter strategy survived into the 1930s with swing bands (Benny Goodman or Tommy Dorsey) and noted singers (Bing Crosby or Frank Sinatra).[6]

But there was also more than the feature film and the stage show. Most theatres presented shorts—comedies and newsreels. In the silent era, animated cartoons, travelogues, and other assorted shorts were commonplace. It was up to the theatre manager to program each house slightly different to maximize the appeal to that local audience. The feature film was only one part of the mix, and often it was run faster than normal or even cut to make sure the show included all the attractions and did not run too long. Indeed, until talkies it was not necessary to run a film at one constant speed.[7]

The innovation of sound by Warner Bros. and Fox Film was carefully planned. The film industry of the 1920s had millions invested in its system, and so it was not interested in simply adopting the unproven talkies. Any innovator had to sell a set of significant advantages for talkies vis-à-vis current movie house programming and make the argument that the innovation would be cost effective as well. That is, the innovation would be adopted only if the theatre owner could be convinced it might lead to greater profits. This is precisely what Warner Bros. and Fox demonstrated.

With the backing of Wall Street, Warner Bros. sought to use the new sound technology offered it by AT&T to tender *on film* the stage show attractions so vital to picture palaces. Warner Bros. recorded the great-

est vaudeville and musical talents on film and presented them as *substitutes* for the stage shows. Its initial targets were medium-sized theatres that could not afford the more expensive vaudeville performers as live attractions. With talkies substituting for vaudeville, exhibitors could program the best—albeit on film. In short, the medium-sized independent house could have afforded Al Jolson performing one or two of his hit songs on film, while it could never have paid the necessary thousands for Jolson to appear live on stage. Only a handful of theatres in the nation's biggest cities could afford Jolson's fee of several thousand dollars per week.

Warner Bros. never initially set out to make talkies as features but rather to provide one or two reel-length recordings of musical and vaudeville acts that theatre owners could offer as "stage shows." This innovation of sound was not easily accomplished, but after the 6 August 1926 successful premiere of *Don Juan*, with a package of sound shorts plus an orchestra on a recorded disc, Warner Bros. was able to convince theatre owners to try their sound film strategy. The centerpiece of the Warner Bros.' strategy was the regular production and release of vaudeville shorts. Warner Bros. paid Al Jolson twenty-five thousand dollars for his recordings and Eddie Cantor twice that amount. Indeed, the Warner Bros.' threat grew so real that the long-time vaudeville theatre operators began to insert clauses into agreements with stars preventing them from recording on Vitaphone.[8]

Warner Bros. set out to make its Vitaphone brand name as well known in its field as Victor's Red Seal was in the phonograph record business of the mid-1920s. *Variety*, then the leading vaudeville and movie trade paper in the United States, began to review the Vitaphone "acts" on 23 March 1927 and treated them as "canned" vaudeville. Warner Bros.' list of acts would have made any stage show entrepreneur proud. Even Weber and Fields, the comics, who for a time declared they were above Vitaphone, eventually signed up; the money was too good for simply performing a routine one had been doing all one's life.[9]

By April 1927, more than one hundred movie houses around the United States signed up; more than a third were in the East, but at least half of the then forty-eight states had at least one "Vitaphoned" movie house. And these were not minor league theatres; the Stanley circuit and Finkelstein and Rubin, from Minneapolis, both inked contracts. But the important news that spring was when Samuel Rothaefel (Roxy) signed up; exhibitors in all sectors took notice. Roxy was then the most famous movie house impresario in the nation.[10]

By April 1927 Warner Bros.' Vitaphone division had recorded all the

popular stars of the day. Nonscientific surveys found patrons preferred Al Jolson and operatic tenor Giovanni Martinelli. In turn, for the second set of recordings of these two stars Warner Bros. paid five thousand dollars each. Warner Bros. soon "ran out" of stars and had to devise something new. What the company did was add Vitaphoned segments to feature films. They believed that if Jolson did so well in short subjects, he could do even better in a feature film designed and written especially for him. The film would be silent as the necessary narrative moved along, but as soon as the Jolson character was required to break into song, the sound technology would be utilized. This strategy represented a merger of the new with the old, designed not to offend theatre owners or filmgoers but simply to attract new patrons.

The first such Vitaphoned feature was *The Jazz Singer* (1927), which opened the 1927–28 movie season, premiering early in October 1927. What Warner Bros. did over the summer months of 1927 was publicize *The Jazz Singer* and thus convince several hundred more theatres to install sound equipment.

The success of *The Jazz Singer* (including accompanying vaudeville shorts) encouraged the brothers Warner and their financial advisors, Wall Street's Goldman Sachs, to exploit their innovation further. By the spring of 1928 *The Jazz Singer* package was being held over in certain theatres for an extraordinary four weeks. (One week during the 1920s was considered normal; a two-week stay usually set a house record.) Warner Bros. followed up *The Jazz Singer* with *Glorious Betsy*, and, for example, during the summer of 1928 the eight-hundred-seat Tudor Theatre in New Orleans broke all house records with this partial talkie.[11]

But the feature that convinced all doubters did not come until September 1928 with Warner Bros.' *The Singing Fool*. From opening day (20 September 1928) on, *The Singing Fool* moved quickly to the top of the box-office charts. The premiere, held in a rented Broadway theatre, the Winter Garden, gave a hint of what was to come. Eleven-dollar opening night tickets (the equivalent of more than fifty dollars today) were being scalped for well in excess of twenty-five dollars (more than one hundred dollars today) by Broadway sharpies outside the doors of the Winter Garden.[12]

By Thanksgiving Day of 1928 Warners knew that *The Singing Fool* had broken some seventy box-office records throughout the United States. In New York City, the movie registered the heaviest business in Broadway history. The advance sales exceeded more than one hundred thousand dollars (more than a half million dollars in present currency) *before* the film had

played three full weeks. *The Singing Fool* reached such proportions that every big ticket agency in Manhattan departed from their strict policy of not handling movie shows to broker blocks of seats.

Throughout the United States theatres owned by Warner Bros.' rivals (such as Paramount and Loew's) scrambled to book the film. They ignored the fact that they were making business for a rival producer. Theatres by the dozens ordered sound equipment just to play *The Singing Fool.* The manager of the Great Lakes Theatre in Buffalo, New York, reported that more than 150,000 patrons saw *The Singing Fool* during the first two weeks it was booked.

In Mansfield, Ohio, *The Singing Fool* played to capacity for two weeks, when four days had been the town's previous record for a motion picture. In Menominee, Michigan, the equivalent of one and one-half times the entire population of the town paid to see *The Singing Fool* at one of the town's smaller theatres during its week run. In Albany, New York, the film exceeded the record box-office take of both *The Big Parade* and *Ben Hur.*[13]

The Warner Bros.' strategy of replacing the stage show with vaudeville shorts did not represent the sole innovation of sound meant to tempt exhibitors. Fox Film brought to the marketplace a sound-on-film system by creating newsreels with sound. By adding this realistic touch to a core part of the program in theatres, Fox made its newsreel operations the top in the film business. Indeed Courtland Smith, head of Fox Newsreels in 1926, pushed the company to innovate sound news.[14]

Initially, William Fox's coupling with the experimental work of scientist Theodore Case and patent's power AT&T commenced as a minor part of Fox's attempt to vault into the top echelons of the American motion industry. In 1925 Fox increased the budgets of its feature films, began building a chain of impressive picture palaces in America's major cities, and also started to experiment with talking newsreels. Two years later Fox had a chain of theatres that dominated the West Coast, and he had achieved important footholds in such cities as St. Louis, Detroit, and Milwaukee.

The premiere of Fox Movietone News came on 30 April 1927 at the Fox-owned Roxy Theatre in the form of a record of marching West Point cadets. Lasting but four minutes, this first newsreel with sound drew enthusiastic response from commentators in the mainstream New York press as well as the trade papers of the motion picture industry. Within a month Fox was able to exploit the flight of Charles Lindbergh to thrill the audiences at the Roxy with a newsreel of Lindbergh's takeoff and tumultuous reception upon returning to the United States.[15]

Theatre owners clamored to obtain the equipment that could play such footage. But Fox at first provided only "exclusives" to Fox-owned theatres, as it built up regular releases and soaked the advantages they offered theatre managers. At the same time, Fox purchased and constructed more theatres to milk the advantage it had fully. As competitors switched to talkies in 1928, Fox took the lead with Movietone News, increasing its releases to two per week. As indicated in chapter 7, Fox opened the first newsreel theatre in the United States and sat back and watched the profits roll in.[16]

TRANSFORMING THEATRES TO TALKIES

With the successes of Warner Bros. and Fox the major Hollywood movie companies, and their attendant theatre chains, rapidly shifted to talkies in order to maintain their profits and reap the maximum return from their sizable investments. Paramount, Loew's/MGM, and United Artists, followed quickly by the other Hollywood companies, signed up for sound in May 1928. The diffusion of the technology was on. The conversion shook the movie exhibition business during the remainder of 1928 and was completed by the end of 1930.[17]

Since immediate access to the new "talkies" nearly guaranteed greater profits for the chosen theatre, the Hollywood companies as part of their initial agreements with Western Electric penned guarantees that their houses would be wired first. And they were. This hurt the status of the wavering independent theatre, which had to struggle to float a bank loan. Chain-owned movie houses, in contrast, easily absorbed the costs of wiring and even saved money by jettisoning live acts and using the newfound savings to help with the costs. Daily operation costs, without the stage shows, actually went down.

In the short run, the independent movie house had little to do but wait. For a time in 1929 some took up more vaudeville talent in order to differentiate their products. That is, while the biggest theatres were moving from live to recorded talent, many independent theatres took on more live shows. But they could not continue for long and in time, when it finally became their turn to get installations, they converted to talkies as well.

In this transitional era the biggest problem for the small-town exhibitor was the owners of the new model T automobiles driving on new roads in the Midwest and South. These persons, invariably better off than their neighbors and usually bigger movie fans, began to drive to the nearest city,

with its wired theatres, rather than stay at home and enjoy the fare at the local theatre. For example, in Paris, Texas, made immortal by Wim Wenders more than fifty years later, the local Chamber of Commerce even lent money to the owner of the local theatre, the Dent, so that he could install a Movietone sound system rather than wait for the loan to be approved. Folks were driving to Dallas to see the show and this was hurting the Paris economy.[18]

Indeed Paris, Texas, proved typical and so, with many complaints, Hollywood began to take notice of what could become an embarrassing public relations fiasco. Through their trade association, the Motion Picture Producers and Distributors Association, they established a committee to arbitrate disputes over which theatre was wired in what order. Since they could not force Western Electric to make the necessary equipment any faster, the committee served principally to listen to complaints and act as if real decisions were being made. In fact, the majors were still wired first and competitors later.[19]

For most of the more than fifteen thousand theatres in the United States, the selling season in the spring of 1929 proved the most complicated of times. Hollywood had some talkies and some silent films; exhibitors who were wired wanted only the talkies while the others had to be satisfied with silent motion pictures, at least until they were wired. By late in 1929 and into 1930 the transition was by and large completed, although a small number of theatres continued to use the disc system until some months into 1931. Talkies had become the norm, and sound on film systems were even replacing the sound on disc systems installed earlier. Warner Bros., the last holdout, gave up on discs in 1930.[20]

A number of small companies, risking patent suits, tried to perfect sound apparatus quickly, which they offered to small theatres at low cost. Nearly all were sound on disc. There were at least thirty such companies with names like Biophone, Dramaphone, Qualitone, and Filmfone. A few (Biophone and Dramaphone, in particular) had national sales forces. Most only operated in regional markets; for example, the sales force for Han-O-Phone prowled only in upper New York State, those for Paratone invaded only southern Illinois, the Syncrotone sales staff was active in Louisiana, and only theatres in Iowa were sold Talkaphone equipment. Even the most successful could not legitimately claim more than twenty-five real installations.[21]

Some theatres, principally in the smallest markets, the last in line, became desperate, and turned to nonsynchronous sound equipment. This

was a simple record player with a loudspeaker system, which to the uninitiated could present the illusion of talkies. Their cost was a fraction of the monies the major theatres had to pay out to Western Electric. The most widely selling of this type was the Theatrephone, which also provided a range of Columbia phonograph music discs with its installations. Most were promoted by fly-by-night technicians looking to make money off the lack of knowledge in the field.[22]

Western Electric and RCA dominated the field for exhibitors' equipment. Nonetheless other companies tried to compete, and their efforts afford illuminating insights into the process of theatre transformation.

Lee DeForest's Phonophone technology was ready in 1923 in the laboratory—before the apparatus of Western Electric and RCA. But DeForest was no businessman, and by 1927 he was far behind installations of the pioneering Vitaphone and Movietone systems. Despite deals with Powell Crosley, who would later make his name in the radio industry, and Pat Powers, who had made a name in the movie business a decade earlier, Phonofilm, even with a newsreel of Charles Lindbergh's historic flight, was out of business before the May 1928 contract was signed.[23]

There was an attempt to save the company from outside. The Schlesinger family interests, representing among other things a large theatre combine in South Africa and the United Kingdom, took over the company in August 1928. Schlesinger formed from the DeForest assets the General Talking Picture Company, but with more than two million dollars in backing the new company was still only able to convince four exhibitors in the United States to take on the equipment. It made an inroad by tendering a "junior" system, at five thousand dollars total cost, for the whole package. While the system could show all types of Hollywood films, it never proved truly reliable, and in the end General Talking Pictures became much more famous for its patent suits, challenging the hegemony of Western Electric's monopoly patent position.[24]

Bristolphone did not lack the necessary financial resources. Millionaire industrialist William H. Bristol first demonstrated his sound-on-disc system at Philadelphia's prestigious Franklin Institute late in 1927. He claimed a number of superior features, including automatic synchronization to make operations much simpler for projectionists. Moreover, Bristolphone was portable; equipment unpacked and set up in an afternoon. Best of all, it cost only one thousand dollars.[25]

Even with these advantages for the small-time exhibitor waiting patiently for a Western Electric installation, Bristol was unable to interest exhibitors.

He formed an alliance with the small-time Gotham Pictures Company in September 1928 and announced twenty features and more than fifty shorts for the 1929–30 season. The one-thousand-seat Academy Theatre in downtown Hagerstown, Maryland, installed the first Bristolphone in October 1928. Still, within a year the whole operation was bankrupt; Bristol's millions were not enough against giants RCA and AT&T. When William Bristol died in June 1930, his heirs refused to revive the failing operation.[26]

Engineer/businessman Louis Gerard Pacent also targeted the small exhibitor with a cheap (only twenty-five hundred dollars) system, announced in January 1929. Equipped for both sound on film and sound on disc, the Pacent system was backed by Pacent's electrical companies and Warner Bros. Indeed, in 1929 Warner installed ninety systems in its expanding theatre operation. Pacent was, with this alliance, able to convince more than four hundred independent theatre owners to sign up and install Pacent equipment during the first six months of 1929. Finally a competitor to Western Electric and RCA emerged. Pacent was so successful that Western Electric sued on 1 April 1929 for eight particular patent violations. Pacent was identified as a significant economic threat, and the case dragged on well into the 1930s, when it did not matter who won since Western Electric had already made its millions installing its sound equipment.[27]

What Western Electric tried to do was force exhibitors into a box by requiring producers not to rent films to theatres with non–Western Electric equipment. But exhibitors balked. In July of 1928 many booked Pathé's *King of Kings* (directed by Cecil B. DeMille) with a soundtrack recorded on RCA Photophone equipment. The two major systems were compatible. Indeed, many of the smaller systems noted also did a fine job playing back movies made by Western Electric. The issue of interchangability would fester, but the damage was already done. The Western Electric and RCA systems had such a head start that few conservative theatre owners were willing to do anything but wait their turn to install one or the other.[28]

A greater set of transitional problems for theatres came with unions, particularly those representing the projectionists and the musicians. The International Alliance of Theatrical and Stage Employees and Moving Picture Operators (hereafter labeled simply IA) demanded more jobs for the talkies. In part they were justified and in part this was a ploy to gain more employment opportunities. Through pressure and threatened theatre closings, the projectionists were able to double the number of union-required jobs and substantially increase their earnings. There is no doubt that projectionists benefited from the coming of sound.[29]

The struggle was more protracted, and far less successful, for the musicians. One of the sales pitches to theatre owners by Western Electric and RCA was that part of the cost of installing sound could be instantly covered by eliminating house orchestras. Even before the majors signed for sound in the summer of 1928 there had been isolated labor disputes. For example, in St. Louis the local chapter of the American Federation of Musicians demanded that a newly constructed theatre, the Grand Central, hire fifteen musicians even though it was built for and would only present talkies. After protracted negotiations, the theatre agreed to hire five featherbedders.[30]

Late in June 1928, the American Federation of Musicians held its annual convention, and nearly the only item of discussion was the loss of jobs due to talkies. The more than 150,000 members contributed $1.5 million for a "defense fund." A position paper declared the nation's culture was in jeopardy from the "mechanization" of the live art of music with silent films.[31]

But the lack of true power by the Musicians Union became apparent in the summer of 1928. In case after case the union saw jobs eliminated, salaries lowered, and contractual guarantees reduced. The union took its stand in Chicago, a powerful union community and one of the strongest American Federation of Musicians chapters. Contracts expired Labor Day of 1928; Balaban & Katz, the heart of the nationwide Paramount Publix theatre chain, refused to give in; all geared up for a protracted strike.[32]

The strike commenced on 4 September 1928 and the whole film industry looked to Chicago, knowing the results of this action would probably set precedents for the nation's theatre circuits. By 5 September Chicago's theatres had no music for the silent films that still formed the core of the offerings. Projectionists prepared to honor the picket lines. The walkout lasted but three days, and both sides claimed victory. It had been agreed that on average only four musicians had to be employed in a theatre (depending on size and run status) and then only for a year henceforth at lower, not higher, wages. Only the power of the support by IA's projectionists guaranteed that much. The end was in sight for musicians playing en mass with motion pictures.[33]

Soon moviegoers saw orchestras disappear. In November 1928 Loew's in New York City eliminated all orchestras and organists. By May 1929 only one theatre in Minneapolis and St. Paul, Minnesota, for example, had any live music. Thousands of musicians had lost their jobs, moving into radio and even journeying to the West Coast to try their luck in movie production. An era was over. Only the elite theatre used live music at all.[34]

INNOVATION TO DOLBY SOUND

The *coming* of sound in the late 1920s did not end changes in theatrical film sound. Indeed, through the following decades innovations were tested constantly. For example, in 1940, when the Disney studio (with RCA) released *Fantasia*, Disney picked the occasion to introduce the first stereophonic sound in specially equipped theatres with ninety-six separate speakers. When the movie unspooled in theatres, there were actually two pieces of film running in synchronization, one with the picture and the other with the four-track stereo sound. Dubbed "Fantasound," this was not a success and did not change the optical theatrical sound.[35]

Optical sound recording was state of the art until after World War II. With technology adapted from German scientific work, Hollywood filmmakers innovated magnetic tape for sound recording in moviemaking by 1950. But because of the tremendous transformation cost involved, in an era when business was declining in the 1950s, the film industry did not, over the long haul, introduce and absorb magnetic sound for use in theatres.[36]

The patron did not, on a consistent basis, experience stereo sound of magnetic quality because of the limitations at the level of the theatre. In particular, high costs of prints and sound track maintenance kept the range of theatre sounds limited. But there were attempts at innovation. In the 1950s magnetic tape was applied to film, with the possibility of films being played back in theatres on projectors equipped with magnetic sound heads. Magnetic sound provided high fidelity and stereo sound, which were not possible at the time with optical sound. With *This Is Cinerama* (1952) came six discrete magnetic tracks. There were five sources behind the screen as well as speakers throughout the auditoria for "surround" effects. But with four separate projectors (three for the picture and one for the sound) CineramaSound was no long-term solution to providing stereo in every American movie house.[37]

Of the various magnetic systems introduced, two received wide adoption. The six-track Todd-AO system for 70 mm films was first used with *Around the World in Eighty Days* (1956). Todd-AO was a spectacular widescreen 70 mm system, with its six sound tracks placed directly on the print. The other, the four-track CinemaScope system for 35 mm films first used with *The Robe* (1953), was much ballyhooed. The four small magnetic tracks were placed directly on the theatrical print of the film, just outside the picture frame. This system offered tracks for right front, center, left

front, and surround, similar to the Dolby system of the 1980s. But since most theatres were still mono-optical, most prints went out in "normal" fashion.[38]

The other film companies fought back. For example, Warner Bros. resurrected the Disney-RCA system of 1940, replacing the four optical tracks with magnetic ones, for its WarnerPhonic in 1953. For *House of Wax* (1953) advertisements read: "3-D Action! 3-D Color! 3-D Sound!" Thousands of theatres were equipped in the 1950s, although the playback equipment was expensive. A significant number of films were released in magnetic formats, although such release prints cost about twice as much as a conventional optical print. In the end, the relative expense did not seem worth it. The cost, the comparatively short life of each print, plus the extra investment for installation and maintenance of equipment caused magnetic sound tracks to be coupled only with big road show releases—a handful, each year.

There were experiments. For example, in the 1970s, into a nearly completely optical sound track world of theatrical exhibition, came Sensurround. With *Earthquake* (1974), Universal decided to add to the seven-minute sequence in which Los Angeles is destroyed. By adding low-frequency sound waves to the sound track during the dubbing process engineers produced a rumblelike effect. Theatre owners rented (for five hundred dollars per week) special speakers and an amplifier to add the effect. Sixty units were built, and they helped the film be one of the top box-office attractions of that year. The Sensurround system won a special Academy Award, and through the 1970s the system was used for such films as *Midway* (1976), *Rollercoaster* (1977), and *Battlestar Galactica* (1979).

In 1977 Universal president Sidney J. Sheinberg declared: "Sensurround is as big a star as there is in the movie business today." He was wrong. The problem was that Sensurround worked best in a stand-alone theatre. In multiplex situations the rumble poured through the walls into the other auditoria. Moreover, the latter three films were hardly major box-office attractions, and thus the added expense and trouble seemed wasted. The system was abandoned, although Universal still held onto the patents.[39]

In the 1970s came more interest in theatre sound. This was a way theatre owners could compete with television since most sets at that point had tinny, four-inch speakers. The introduction of new sound coalesced around Dolby sound, first introduced in 1975. Dolby is a high-fidelity stereo sound that provides clear, lifelike reproduction of the entire musical range and accurate reproduction of the volume range.

Dolby-release prints have 35 mm stereo optical tracks. The optical system was maintained because Dolby prints cost no more to produce; they last the needed time under the wear and tear of constant use; and the theatre equipment requires little in the way of special upkeep. Dolby noise reduction is a means of electronically reducing the background noise inherent in all recording media while not disturbing the sounds one is supposed to hear. Dolby noise reduction is at the heart of the Dolby stereo process because it paved the way for improvements in the range of sound.[40]

Dolby Laboratories was founded in 1965 by physicist Ray M. Dolby to develop noise reduction techniques for the music industry. Through the late 1960s, Dolby developed noise reduction techniques for the record industry that eventually made their way to improved home tape recorders, cassette decks, and FM receivers. Indeed Dolby helped bring about high-fidelity cassettes, which were hampered by problems inherent in low recording speeds.[41]

Dolby turned to the film industry in the 1970s. Although Stanley Kubrick did all the premixes and masters of his *A Clockwork Orange* (1971) with Dolby noise reduction, the film was released on conventional optical sound systems. With *Callan* (1974) came the first Dolby-encoded mono sound track in general release. The first true Dolby stereo came with the release of the rock opera *Tommy* in 1975. The sound track in that multisensuous experience impressed the young audience, but Ken Russell was hardly the household name to impress moguls in Hollywood. Indeed in the first years, the films with Dolby seemed relegated to musicals: Ken Russell's *Lisztomania* (1975), Robert Altman's *Nashville* (1976), and John Badham's *Saturday Night Fever* (1978).

It was with George Lucas's megahit, *Star Wars* (1977), and Steven Spielberg's *Close Encounters of the Third Kind* (1978) that filmmakers took advantage of the new recording techniques. The films scored at the box office, in part, because of this improved vital sound. In a survey reported in July 1977, the month after *Star Wars* opened, 90 percent of those phoned claimed that Dolby sound made a difference. By 1979 there were twelve hundred equipped theatres in the United States.[42]

The cost to convert a theatre in the late 1970s, depending on how sophisticated the owner wanted the house to be, was under ten thousand dollars. By late in 1984, Dolby could claim some six thousand installations in forty-five countries around the world, with the bulk in the United States. In other words, about one-quarter of theatres in the United States in the mid-1980s had this special advantage, principally all first-run, suburban

theatres, often in the center and biggest auditorium in a sixplex or eightplex. In the mid-1980s nearly 90 percent of all Hollywood films were being released in Dolby, with the common four channels of left front, center, right front, and surround.[43]

In the 1980s improvements in film sound took place on a number of fronts. First, theatre speakers featuring more robust construction, wide sound range, and smoother response were installed, especially in the thousands of new auditoria opened in the late 1980s. Lucasfilm's THX system combined these attributes with specific installation configuration. The THX system is a patented design incorporating auditorium acoustics, a special screen speaker installation, an improved surround system, and other technical improvements. THX promises better audience coverage, improved dialogue intelligibility, and increased dynamic range of sound. In addition, solid state power amplifiers, capable of reproducing a wide volume range, became universal. Finally, there was an increased effectiveness in surround techniques so that audiences felt they were in the middle of the movie.[44]

Sound in movie theatres will surely continue to be improved and transformed. Digital sound systems will make movie theatre sound the equal of any; multi-directional sound systems will make the theatre superior to home systems. Many experts argue today that the sounds in a multiplex auditorium are too good; the sound is superior to reproduction of images and often spills into adjacent auditoria. But this problem will only be solved as a new generation of multiplexes are constructed.