

Cinema Sound at the Crossroads: A Century of Identity Crises

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First, I will provide the widest possible historical context along with a clearly targeted theoretical investment and purpose in order to deal with the problems of sound as a whole. Second, I will be introducing ten key moments in the history of sound, and explaining why each deserves to be considered important. Together, they will give us a sense of the span of sound problems that we need to be dealing with. Third, I will here be testing a new approach to the historiography of sound that I have been working on for a number of years. Concentrating on a series of identity crises, this new approach may appropriately be term “crisis historiography.”

In order to think intelligently about new technologies, we are systematically condemned to considering multiple technologies at the same time – not just the one that we are ostensibly studying but also several other related technologies as well. Anyone who thinks about cinema before 1915 must always consider a dozen other forms of entertainment, exhibition venues, or industries. In order to deal with the conversion to sound in the late 1920s, it is impossible to avoid dealing with telephony, public address, phonography, and radio – a wide variety of technologies that today no longer seem directly related to cinema. But when technologies are young, nothing reveals that they will eventually become the technologies we know today.

Identity crises occur when a technology is presented as belonging to multiple media simultaneously, eventually precipitating a jurisdictional struggle among those media. Which of the many definitions and attributions of the new medium will in fact hold? I will use the term jurisdiction to mean a number of things. In its most literal sense, it designates the kind of jurisdiction that trade unions have. Who has the right in 1929 to operate the new sound systems? The electricians, who insist that the new sound system is electrical? The projectionists, who note that the new sound system is attached to their projectors? The stage workers, who belong to the International Association of Theater and Stage Engi-

neers (IATSE), traditionally responsible for sound effects and equipment? Or is it the American Federation of Musicians, whose members have been done out of jobs by the new technology? During the late 1920s, movie theaters in many countries played host to a literal jurisdictional conflict, with multiple trade unions fighting for the right to exercise jurisdiction over sound film jobs. The notion of jurisdictional conflict may also be taken as a useful metaphor for the broader jurisdictional question of which model will govern the development of sound film – the model provided by radio or the model derived from phonography, the model that comes from engineering or the model of live music for silent films?

Jurisdictional struggles may last only a short period of time, or they may go on for decades. Only at the point where a settlement is negotiated can any kind of standardization be achieved. This negotiated settlement almost always involves simultaneously meeting the demands of most unions or industries fighting over the new technologies. Satisfying only a single group leaves too much energy in the system, as it were. Eventually, the energy in the system must come back to haunt the apparent winner. Only by satisfying a maximum number of participating players can a negotiated settlement bring an identity crisis to a close.

Far from following a neat linear or teleological path, identity crises come back again and again, overlapping and interweaving. Instead of a clear progression from identity crisis to jurisdictional struggle to negotiated settlement, history offers us instead a complex fabric where all three processes are simultaneously at work. In order to understand the process by which new technologies sometimes succeed in achieving recognition and stability, we must catch them at the point where they have not yet succeeded. Only by studying sound's identity crises can we understand how sound technologies became the media that we know and recognize today.

Ironically, the best way to begin this study is by attending to the moments when sound sounds "wrong". Most historians operate retrospectively, identifying and defining the objects of their attention through a lens provided by later developments. For these historians, the only appropriate objects of study are those that closely match and apparently lead to a later version of the medium in question. I propose, on the contrary, to investigate the history of cinema sound prospectively, according special attention to moments when sound is used differently from the practices that eventually dominated. I will thus concentrate on moments when sound operates according to rules quite distant from those we are accustomed to, moments when sound serves purposes quite different from those we expect today, moments when sound reveals expectations derived from cultural forms other than cinema.

For each of ten identity crises, I will start with a date, approximate, to be sure, since we are dealing with problems, trends, and movements, rather than punctual events, but useful nevertheless for locating that particular crisis in relation to a larger context. Each unit begins and ends with an attempt to sum up the attendant identity crisis by distilling the peculiar and specific characteristics responsible for generating the phenomenon in question. This summary always takes the form of an unexpected equation, “unexpected” because its premises have since been abandoned by standard cinema sound practices. I will thus regularly use an equal sign (=) to suggest this equation, immediately followed by an exclamation point (!) to suggest that the equation in question is surprising, unforeseen, not in keeping with accepted logic. Indeed, it is essential to understand this equation as startling in order to grasp its importance.

I. 1897

film = ! slide

movement = ! stasis

Strikingly, we begin very far from sound practices. 1897 is the generally accepted year for the first of a series of projectors that are a far cry from today’s accepted notion of what constitutes a film projector. From 1897 until the 1910s, projectors were typically made up of two entirely separate pieces¹. The first part was a familiar magic lantern projector, including a light source and a slide transport. The second part, usually attached to the same board as the magic lantern projector, was an add-on device called a “motion head.” The motion head included a film supply reel (and later a take-up reel) along with a moving picture transport mechanism (see illustrations 1 and 2). Lacking a self-contained light source, the motion head would fail today’s tests for identification as a film projector.

Since our topic is sound, and not projection technology, how can the two-part nature of early projectors possibly be of significance to us? It is important because between the late 1890s and the mid teens cinema typically operated not as a separate medium but as an add-on to an existing medium. Not until the early teens were these two-part machines regularly replaced by projectors specifically dedicated to film projection. During the reign of the bipartite projector, programs typically alternated between a short reel of films and a series of lantern slides, or “views”, as they were usually called. Because they were projected by

¹ According to Musser, C., *High-Class Moving Pictures: Lyman H. Howe and the Forgotten Era of Traveling Exhibition, 1880-1920*, Princeton, Princeton University Press, 1991, p. 87. The combination lanternslide-moving pictures projector was first introduced in November 1897.

the same bivalent mechanism, the films themselves were often termed “views” as well. The early teens replacement of bivalent machines by a pair of dedicated film projectors thus corresponded with a move from multimedia slide-and-film programs to feature films, with alternation between reels of films replacing alternation between films and slides.

Starting in 1897, cinema thus traversed a period characterized by two surprising equations:

movement = ! stasis

and

film = ! slide

For many years the two media – today strongly differentiated – were conflated. Dependent on the same bivalent projector, lantern slides and moving pictures also shared trade publications (such as *Views* and *Films Index* and *Moving Picture World* and *View Photographer*). Like all new technologies, cinema was first perceived not as a new medium but as a new wrinkle on an old face, an extension of something that already existed.

II. 1905

film = ! illustrated song

music = ! language

Bivalent projectors were designed to produce what appears to us as a multimedia program. While some theaters alternated between moving pictures and the live acts of vaudeville, most found it more economical simply to alternate between the two parts of the projector. When a film came to an end – or broke – the slide transport portion of the projector was pressed into service. When the film was once again ready, the operator returned to the motion head. And so the entire program went, systematically alternating between slides and film. In addition to publicity and announcement slides (proclaiming, for example, that “Young ladies will please remove their hats – All others may keep them on” or “Remember the Johnstown flood, don’t spit on the floor”), nickelodeons regularly featured songs accompanied by slides illustrating each line of two verses and two choruses (see illustration 3). From the mid 1890s to 1913, these “illustrated songs” constituted an essential portion of the program not only in vaudeville, but also in theaters that modern scholars have mistakenly assumed to show films exclusively.

During this period, illustrated songs were such an important cultural phenomenon – after all, they constituted the most important form of publicity for the important sheet music and phonograph industries – that they inspired many films designed to compete with lantern slide illustrated songs. Publicity for Biograph’s 1905 film, *Everybody Works But*

Father, makes this connection abundantly clear (see illustration 4): “The great popularity of illustrated songs”, proclaims the **Biograph Bulletin** for 15 November 1905, “has led us to introduce a novelty in the form of a film which covers the entire action of the verses and choruses of a well-known song... No slides are necessary. Anyone can sing it, and if you sing it just as it is written you can’t get away from the pictures.” The prevalence of songs sporting comic or narrative lyrics during the nickelodeon period had a profound effect on contemporary accompaniment practices.

The extraordinary spread of the popular song business during the nickelodeon era spawned a tendency to base film accompaniment on the titles and lyrics of popular songs. Today it would strike us as a bad pun to play “Love Me Tender” during a scene showing a housewife tenderizing a steak; in storefront theaters, however, purely verbal matches to on-screen action were frequent. In March of 1910, for example, the Edison *Kinetogram* suggested a dozen popular songs to be played with the recent Edison release, *A Western Romance*. Repeatedly, it is the title of the song that matches the action, not the music. Musicians are urged to play “I’m Going Away” while the son is packing to go away, followed by “On the Rocky Road to Dublin” when he is on the train, then “Pony Boy” when he meets the girl on a horse. When Indians appear, “Wahoo” is recommended; when the villain arrives, “I’m a Bold Bad Man” is proposed, with “Everybody Works But Father” accompanying the hero’s eventual return home². That same year, Clyde Martin’s “Playing the Pictures” column made similar recommendations:

You can use several popular tunes during the showing [of Edison’s 1910 *The Valet’s Vindication*]. About the third scene in the picture is where Kirby, the valet, is awaiting the arrival of a number of friends... The table is well supplied with refreshments, cigars, poker chips, etc., and the audience will repeat the lines with you “It Looks Like a Big Night To-night”, you have won your first point. The next scene shows the Valet the morning after the party and asleep at the table. If you will play just a few strains from “The Morning After the Night Before” it will make every man in the audience, want to hand Kirby a cold towel and a pitcher of ice water [...] [When] Beekman and Miss Bradley have been married and are enjoying their first home breakfast... then play “The Waning Honeymoon” from “The Time, the Place and the Girl” until the close of the picture.³

A month later, Martin himself took the time to explain to his readers the danger of this approach to film accompaniment. Half of the country’s musicians, he says, “will pick up a publisher’s catalogue and get names of songs that correspond with the scenes portrayed and they

² in *Kinetogram*, n° 15 (March 1910), p. 11.

³ Martin, C., “Playing the Pictures”, in *Film Index*, n° 29 (October 1910), p. 7.

never consider that to make their point, the audience must know what they are playing”⁴. Shortly, Martin and his *Moving Picture World* colleague, critic Clarence E. Sinn, began to campaign actively and systematically against accompaniment by title and lyric, preferring the use of wordless light classical music to match on-screen emotion. Until their campaign succeeded later in the teens, however, film accompaniment would continue to be heavily marked by popular songs and their titles and lyrics.

Once again, we find ourselves in the presence of a strange equation. Instead of being associated with differing pitches and instruments, music is consistently considered in terms of its lyrics. In short:

music = ! language

because

film = ! illustrated song

When we think about the music used for silent film accompaniment, we usually think of emotion, of the evocative power of melody and harmony, of songs *without* words. But this is not Mendelssohn. The songs called for by Martin are appropriate only because they have titles and lyrics. In this situation, films are evidently being treated as illustrated songs.

III. 1907

film = ! vaudeville

music = ! sound effect

During the first decade of this century, film sound was often based on the assumption that film was just another form of vaudeville. In fact, it was often called “automatic vaudeville.” Attempts to capture live vaudeville acts for “automatic” presentation were many. It is relatively little known that many American theaters wired for sound between 1907 and 1909. Thousands of theaters projected synchronized sound films during this period, employing dozens of different locally developed or imported systems. Not in 1927, but in 1907. The earliest competitors were an American system, the Cameraphone, and a successful French import, Gaumont’s Chronophone, which would introduce improvements well into the teens. Other American sync sound systems included the Miles Brothers’ Picturephone (see illustration 5), Carl Laemmle’s Synchronoscope, and the novel Photophone, which projected the image right through the phonograph horn. While much discussed during this period, Edison’s Kinetophone would not be commercialized until 1913. Britain eventually contributed the Cinephone, Cecil Hepworth’s Viva-

⁴ Martin, C., “Playing the Pictures”, in *Film Index*, n° 19 (November 1910), p. 27.

phone, and the Synchrophone. Oskar Messter's Biophon(e) was imported from Germany. All were phonographic systems, some playing cylinders and others employing disks.

Almost without exception, the earliest films produced for sync sound systems slavishly reproduced live acts from vaudeville or the variety stage. Indeed, the desire for synchronization was so great that even live sound accompanying films during this period was measured by its ability to sync up with on-screen sound sources. Concentrating on sounds implied by film images, early commentators on film accompaniment rarely made clear distinctions between music and sound effects. Though historians have regularly assumed that film music derives directly from the musical practices of stage melodrama, it now seems likely that sound cues within films constitute an even more important – and far more complex – originary instance. The earliest reports of film music involve a characteristic mixing of music and non-musical sound effects, both serving cinematic realism rather than contributing the emotional overtones typical of later film music. For example, the *Philadelphia Record* reports a November 1897 film showing as follows:

Not content with showing the living picture, Manager Keith furnishes with every view the noises which accompany the scene... At the Bijou the roar of the waves, splashing of water, the playing of bands of music, a locomotive whistle, bell, stream, etc., are accompaniments that have played no small share in the 48 weeks success of the biograph.⁵

This is not musical accompaniment as we know it, but rather the production of what is now called “source music”. The list of “noises which accompany the scene” mixes music willy-nilly with what we now think of as something quite different, namely sound effects. During this period, even dialogue was treated as a form of sound effect required by the image.

As late as 1910, critics continued to conflate multiple types of sound under the general rubric of sound effects:

A character enters the picture, seats himself at a piano and runs his fingers over the keys, the pianist in the orchestra imitating him. This is a “sound effect” and is a part of the picture [...] Imagine the “Swan Song” or “The Violin Maker of Cremona” without the violin sound effects. Nearly every battle scene [...] needs trumpet calls.⁶

A year later, the *New York Dramatic Mirror* still defined cue music as “the bugle calls and other such loud alarms [*sic*] demanded by the

⁵ in *Philadelphia Record*, n° 23 (November 1897), p. 2; quoted in Musser, C., *The Emergence of Cinema*, New York, Scribner's, 1990, p. 178.

⁶ Sinn, C. E., “Music for the Picture”, in *Moving Picture World*, n° 10 (December 1910), p. 1345.

action on the stage”⁷. Only later would the term “cue” begin to refer more generally to any call for film accompaniment music, whether triggered by on-screen sound sources or not.

To us it may seem strange to treat music as nothing more than a sound effect, but contemporaries saw nothing strange in the following equation:

music = ! sound effect

in part because current exhibition strategies were based on the notion that

film = ! vaudeville

And in vaudeville the production of sound effects was one of the most important things that could be done with a drum, a violin, or a trombone. Catching the falls – making the sounds implied by the people on the stage – is how musicians made money with vaudeville sound.

IV. 1909

film = ! midway

inside = ! outside

The early nickelodeon years present an enormous challenge to film scholarship, because such a large proportion of contemporary film sound was located outside the theater – a topic that deserves far more attention than it has received⁸. The accompanying photographs of nickelodeon facades from New York to Nebraska demonstrate the extent to which early film theaters depended on audible publicity (see illustrations 6-9). Each one of these theaters sports a phonograph horn pointed onto the street, with the phonograph itself located in the projection booth where the projectionist could start it playing whenever it would not interfere with an illustrated song inside the theater. Other theaters placed automatic instruments right next to the ticket booth or at the back of the auditorium, as close as possible to the street (see illustrations 10 and 11).

The fact that musical instruments were so often placed far from the screen in storefront theaters suggests that their major function was not to accompany films but to attract clients. In fact, *Film Index* music columnist Clyde Martin recounts that he was fired from his first job because the boss said that passers-by couldn't hear his piano-playing in the street⁹. Borrowing from an established tradition of travelling carnivals

⁷ in *New York Dramatic Mirror*, n° 30 (August 1911), p. 3.

⁸ I have recently discussed this problem in an article entitled “Film Sound – All of It”, in *Iris*, n° 27 (spring 1999), pp. 31-48.

⁹ Martin, C., “Playing the Pictures”, in *Film Index*, n° 22 (October 1910), p. 13.

and the amusement park midway, nickelodeons depended heavily on this “ballyhoo” to attract their audiences. “When music was first introduced in the picture theater”, says *Moving Picture World* columnist Clarence E. Sinn, “they ‘whooped ’er up’ until the music could be heard out on the street.” This is why, according to Sinn, drums were first introduced into nickelodeons¹⁰.

Contrary to everything that has been said about silent film accompaniment, it would appear that music was often present in early theaters not to accompany the film, but to provide publicity or to offer entertainment in between films, often in conjunction with lantern slides. As early as 1900, Biograph distributed music to be used between films – but not to accompany the films this music was sent with. A letter sent by the production firm to potential customers declares:

We will furnish you with a Biograph and either thirty-six or forty-eight views, whichever you may prefer, including our religious views, arranged on reels of 12 pictures each. The charge for the Biograph for one evening is \$50. The only other charge will be for music to be given during the time that the reels are being changed. The Biograph views and music will give an entertainment lasting about two hours.¹¹

By 1909, the process was fully codified in a listing of the nickelodeon projectionist’s duties, first published in *Nickelodeon* and quoted extensively in David Hulfish’s influential *Cyclopedia of Motion Picture Work*:

What, then, are the total duties [...] which are required of the operator? [...] In the intermission the pianist is on duty. The operator, having his picture film in readiness,

- 1) lights his arc and
- 2) rings for the singer.
- 3) He then turns out the lights in the auditorium,
- 4) turns off the ventilating fans,
- 5) turns off the automatic “barker” and
- 6) projects the song slides in proper order and at the proper instant for each.
- 7) At the conclusion of the song he shifts to the motion head and begins to turn the crank of the kinetoscope, and
- 8) at the same time, with his free hand turns on the ventilating fans and
- 9) turns on the automatic “barker.” This is the time for the accompanist’s period of rest, and as the operator nears the end of the reel of film
- 10) he rings for the accompanist to be in readiness for the intermission.

¹⁰ Sinn, C. E., “Music for the Picture”, in *Moving Picture World*, n° 20 (December 1913), p. 1396.

¹¹ Niver, K., *Biograph Bulletins, 1896-1908*, Los Angeles, Locare Research Group, 1971, p. 53.

- 11) At the end of the motion pictures he projects the "Please Remain" slide;
- 12) then turns on the auditorium lights,
- 13) cuts off the current from his arc light,
- 14) rewinds the film and
- 15) adjusts the carbons of his arc. Now, last but by no means least
- 16) the operator decides the length of the intermission before repeating his routine of sixteen separate duties.¹²

As many a contemporary text demonstrates, the only music playing during films was often the ballyhoo phonograph, typically located in the projection booth, with its horn extending through the wall above the ticket booth so that the music could be heard in the street. Strikingly, and in contradiction to decades of film scholarship, it would appear that early "film music" was often distanced from the film either in time – played between films rather than during them – or in space – played outside rather than inside the theater¹³.

Early storefront theaters were thought to need a barker, just like any other carnival attraction, because

film = ! midway

For this reason – entirely contrary to current understanding of theatrical space – the managers of early film theaters treated the inside and outside of the theater as a single continuous space:

inside = ! outside

Not until ballyhoo music outside the theater was silenced, concentrating attention on the theater's interior soundscape, would carefully chosen film accompaniment come of age.

V. 1911

film = ! opera

producer = ! exhibitor

From 1905 to 1910, exhibitors maintained full control over film sound. During this crisis period many competing sound strategies were practiced: ballyhoo music outside the theater, sound-effects-oriented accompaniment limited to on-screen cues, accompaniment by song title or lyric, recorded synchronized sound, behind-the-screen live voices synchronized to on-screen action, and even dead silence. The extent of exhibitor control during this period was a substantial embarrassment for

¹² Gardette, L., "Conducting the Nickelodeon Program", in *Nickelodeon* (March 1909), p. 79; quoted in Hulfish, D., *Cyclopedia of Motion Picture Work*, Chicago, American Technical Society, 1911, I, pp. 136-37. Instructions reformatted for clarity.

¹³ For more evidence that early silent films were often projected in silence, see Altman, R., "The Silence of the Silents", in *Musical Quarterly*, n° 80/4 (1997), pp. 648-671.

film producers, who regularly found their filmic intentions betrayed by inadequate, inappropriate, or even ironic accompaniment. During the first half of the teens, an intense producer campaign thus sought to wrest control of sound practices by proposing and exemplifying new accompaniment standards¹⁴.

These proposals took many different forms. Trade press publications (some of which were directly financed by production companies) increasingly sponsored film music columns featuring prescriptive discourse regarding acceptable accompaniment practices. Starting at the very end of 1910, Clyde Martin wrote “Playing the Pictures” for *Film Index* and Clarence E. Sinn penned “Music for the Picture” in *Moving Picture World*; soon *Moving Picture News* would inaugurate “Our Music Page”, renamed “Picture Music” when Ernst Luz took over in 1912. Independently, but with extremely similar programs, these three writers for many years twisted exhibitors’ arms in favor of specific musical practices respectful of producer intentions. Concurrently, several producers used their own in-house publications to suggest specific music appropriate for individual films. Though Edison was the first to offer musical suggestions, in September 1909, the *Kinetogram* soon discontinued the practice, whereas the *Vitagraph Bulletin of Life Portrayals* continued for many years to suggest appropriate music for every Vitagraph release.

Other producers provided special music with all their important films. Pathé’s American branch, for example, began by distributing music to accompany opera films like the 1911 *Il Trovatore* and later offered scores for all their prestige products (see illustrations 12 and 13). As the accompanying illustration shows, these scores were provided free of charge, as an incentive to handle the musical side of exhibition according to Pathé’s standards. At first aimed only at the piano, starting in the mid teens scores offered by producers would increasingly be arranged for orchestra. “Whether you have a full orchestra or only a piano, the specially arranged music will add greatly to the effectiveness of each feature”, affirms a 1916 Paramount advertisement (see illustration 14). Soon, both producers and independent entrepreneurs would distribute cue sheets recommending carefully timed musical selections to accompany each scene of every major film released in the United States. After 1917, when a landmark case extended copyright protection to music used to accompany films, these cue sheets would often offer for each scene both tax-free and taxable (i.e., copyright-protected) selections.

¹⁴ On this topic, see Altman, R., “Naissance de la réception classique: la campagne pour standardiser le son”, in *Cinémathèque*, n° 6 (1994), pp. 98-111.

During Hollywood's golden years, until the postwar Paramount decision, the same company typically controlled both production and exhibition, but in 1911 the equation of

producer = ! exhibitor

was a novel idea, a basic tenet of the early teens campaign to standardize sound practices. Within a decade, the musical selections and scores distributed by film producers would turn into the pressbooks used by production companies throughout the studio years to control exhibition practices. All of this because Pathé and other producers had accepted the notion that

film = ! opera

and thus requires musical accompaniment.

VI. 1925

film = ! public address

recording = ! amplification

Scholarship on the coming of sound has been far too concentrated on cinema itself. In order to understand film sound developments in the 1920s, we must look carefully at several other sound technologies and their development. Immediately after World War I, Bell Laboratories turned their attention to public address, developing new microphones in support of several large public events in the postwar era. In 1924-25, Bell applied these insights to a new phonograph which they dubbed "Orthophonic". Not only was the man supervising this project, Joseph P. Maxfield, eventually put in charge of the sound-on-disc Vitaphone initiative, but the success of the Vitaphone system depended heavily on the developments that it borrowed from the Orthophonic Victrola. Originally a telephone company, Bell was especially interested in amplification questions. If you are speaking in New York and you want to be heard in Los Angeles, then your voice signal must be amplified multiple times between east and west coasts. Hollywood would never have converted to sound had Bell not needed to develop new amplification systems for its long-distance lines.

In the mid twenties, recording was still done acoustically. That is, the recording mechanism was entirely driven by the energy available in the sound itself. As illustration 15 reveals, instrumentalists had to cluster around the collecting horn, and relatively low-energy instruments like violins had to amplify their sound by attaching a megaphone to the bridge of the instrument. Common in the recording industry at the time, but virtually never seen today, these instruments were called "Stroh" violins (see illustration 16). With electronic amplification borrowed from the telephone industry, the situation was radically modified. As illustration 17 demonstrates, electronic recording made it possible to

play traditional instruments in a normal fashion. Instead of playing directly into a recording horn, the instruments are picked up by the double-button carbon microphone developed by Bell Labs engineers for public address purposes.

For many years, the identifying feature of the new sound film technology would be this ability to amplify sounds in ways never previously possible. The earliest Vitaphone films thus regularly make what may seem to us today strange decisions about which sounds to record and which to represent by intertitles. Shot in June 1927, Warners' *The First Auto*, for example, offers several strange alternations between sync sound and intertitle dialogue. During the opening trotting race, we hear the crowd repeatedly yell "Come on, Hank", but when Hank retreats to a bar to celebrate his victory, his conversation with the mayor is reproduced entirely through intertitles. The reason for this distinction grows directly out of a perception that the new technology was primarily an amplification technology. When characters raise their voices, they are recorded; when they speak normally, their dialogue is printed. This sense is confirmed several times during the course of the film. When Hank's mare dies, he goes to report the bad news to his son, who is sleeping. In order to awaken him, Hank has to raise his voice, using what we might call "megaphone sound". His single cry – "Bob!" – is recorded, but the rest of his report is given in an intertitle. Throughout the film, megaphone sound becomes part of the sync soundtrack, while ordinary dialogue must make do with old-fashioned intertitles.

Once again, our understanding of contemporary sound depends on recognition of a seemingly anomalous equation:

recording = ! amplification

While surprising to us, this equation was of course not in the least unexpected by contemporaries, who always used the term "*loudspeakers*" for the objects that we now call simply "speakers". In this crisis, as they had twenty years earlier, audiences once again identified film with another medium:

film = ! public address

Indeed, nearly every one of the period's many films demonstrating synchronized sound (later parodied in *Singin' in the Rain*'s famous recorded presentation of the new technology) is presented by a lecturer whose synchronized words provide the first example of the technology he is describing.

VII. 1927

sound film = ! silent film

recorded sound = ! live sound

If Vitaphone technology had been available in the early nickelodeon days, where would they have put the loudspeakers? Undoubtedly, they would have placed the loudspeakers in the entryway, to serve ballyhoo purposes. A different period brings new models and a new logic. In 1927, where should the loudspeakers go? In a move that today seems wrong-headed and perhaps even silly, sound engineers in 1927 decided to split their speakers between two locations. While the speakers destined to reproduce dialogue were located behind the screen, the speakers responsible for playing music were placed in the orchestra pit (see illustration 18). Just as megaphone speech reveals the tendency to identify the new sound technology with amplification and public address, so pit placement of loudspeakers infallibly indicates that synchronized recorded sound was perceived as taking the place of the silent film orchestra. By locating the sound source in the orchestra pit, technicians sought to equate the new “canned” sound with its live predecessor.

Once again, we find two unexpected equations at work. In terms of cinema’s identity,

sound film = ! silent film

whereas, in terms of sound practices,

recorded sound = ! live sound

It is fascinating to note the strong similarities between cinema’s nickelodeon and conversion-to-sound crises. While the models for sound – and thus for the very medium itself – differ markedly between the 1905-1910 and 1925-1930 periods, the process operates in a virtually identical manner. Deriving their early identities from other media, “cinema” (in 1905-1910) and “sound cinema” (in 1925-1930) traverse a substantial period when they remain undefined – or rather when they are defined so multiply that no single definition stands out. With such complex subjects, jurisdictional conflicts are not rapidly transformed into overdetermined solutions.

VIII. 1931

film = ! everyday experience

film sound space = ! pro-filmic sound space

One of the major sound-oriented problems of the early thirties involved apparently anodyne decisions regarding appropriate dialogue volume. While practical producers argued for uniformly high dialogue levels, Bell Labs scientist Joseph P. Maxfield – developer of the Ortho-

phonic Victrola and eventual head of Electrical Research Products, Incorporated (Western Electric's cinema sound distribution subsidiary) – insisted that film sound must follow the rules of human hearing. Since real world faces that look large produce sound that sounds large, and faces that look small produce small sound, film close-ups should be accompanied by relatively loud, non-reverberant sound, Maxfield reasoned, while long shots should be matched by lower sound levels and proportionately more reverberation.

Maxfield's insistence on sound "perspective" is clearly revealed in articles on appropriate microphone placement that he published in 1931 and 1938. Though similar, the articles are fascinatingly different; over the course of seven years something had apparently changed. According to Maxfield, the microphone placement graph in the 1931 article (illustration 19) provided an accurate record of contemporary practice, produced from actual data collected on "several pictures with which the writer was associated"¹⁵. In 1938, however, Maxfield attributed an entirely new function to a similar graph (illustration 20).

It has been the authors' experience, and that of some of the microphone men with whom they have discussed the problem, that unless some such guide is used there is a tendency to set the close-up takes correctly and to make the microphone positions for the long-shot and semi-long-shot takes decidedly too close. The use of the curve, of course, helps to keep the judgment of the operator calibrated.¹⁶

Whereas the 1931 chart was derived from actual experience, at a time when sound men tended to respect an apparent need for sound perspective derived from everyday experience, the 1938 article clearly admits that the graph is needed to control and rectify technicians' current tendency to produce close-up sound for all speech¹⁷. In part, this change can be explained by a change in technology. During the twenties, sound was typically collected by a heavy condenser microphone suspended from above like a theater prop, while thirties sound men were able to follow speakers closely, thanks to the ubiquitous sound boom capable of bringing a lighter, more powerful microphone close enough to actors to obtain a good close-up sound record. Still more important, however, is the tendency to abandon everyday experience as the most appropriate model for film sound in favor of radio, theater, and other models dependent on clear, foregrounded speech.

¹⁵ Maxfield, J. P., "Some Physical Factors Affecting the Illusion", in *Sound Motion Pictures, Journal of the Acoustic Society of America*, n° 3/1 (July 1931), p. 74.

¹⁶ Maxfield, J. P., Colledge, A. W. & Friebus, R. T., "Pick-up for Sound Motion Pictures (including Stereophonic)", in *Journal of the Society of Motion Picture Engineers* (June 1938), p. 672.

¹⁷ For further analysis of this topic, see Altman, R., "Sound Space", in *Sound Theory/Sound Practice*, New York, Routledge, 1992, pp. 46-64.

Maxfield's approach derives from a now abandoned assumption:

film = ! everyday experience

His dedication to sound perspective may be represented in the following manner:

film sound space = ! pro-filmic sound space

Maxfield's insistence on replicating pro-filmic space on the film soundtrack may reasonably surprise us, because for many decades cinema has not followed his precepts. Films have since the thirties privileged dialogue to such an extent that we no longer expect sound scale to match image scale exactly. Maxfield would have been scandalized by our ability to follow the conversations of actors riding in a car shown in long shot, whereas we, quite to the contrary, would be shocked to have their speech represented in accurate perspective, thereby depriving us of the ability to understand every word.

IX. 1954

film = ! real world

film sound location = ! pro-filmic location

We often forget how many times film sound changed or was improved during the thirties and forties. After all, the soundtrack was during this period right on the film, so sound was affected by every change in film stock. Not until the postwar introduction of magnetic recording and stereo sound, however, would film sound enter a new crisis. Not surprisingly, it is once again contradictions among diverse sound models that help us to understand just what was going on as the industry made its first tentative forays into stereo recording and reproduction. Early stereo involved full left-to-right panning of the sound. An actor on the left side of the screen would be heard from the lefthand speaker only. If the actor walked across the full width of the screen, the sound would follow him, eventually being heard from the righthand speaker only.

Problems arose when this directional arrangement – apparently respectful of normal hearing – confronted such cinematic conventions as shot/reverse-shot sequences. When Hollywood shoots dialogue, the editing constantly moves actors from one margin of the frame to the center and back. Should the sound follow them? It is one thing to pan stereo sound from one side to another as an actor crosses the screen in a single shot, but as soon as several shots are edited together, slavish adherence to stereo location would require the sound to ping-pong around in an effort to remain close to the character. Just as thirties technicians rapidly rallied around continuous dialogue levels, carried throughout a scene in spite of differing distances from the camera, so fifties technicians quickly abandoned full panning in favor of centrally

located dialogue throughout. Selected sound effects might be located on the far left or right to show off the system, but eccentric location of dialogue tended to show up the system rather than show it off. Soon, panned dialogue was systematically replaced by central-channel dialogue. Even hard-line stereo proponent Fox abandoned the practice. Full-width stereo was increasingly reserved for music and a few sound effects. Stereo recording progressively gave way to systems like Perspecta Sound that could create a stereo-like sound from monophonic recordings, without ever having to pass through the complex – and now useless – process of full stereo recording.

The logic adopted by early stereo now appears quite unacceptable to us:

film = ! real world

as do the stereo practices generated by that assumption:

film sound location = ! pro-filmic location

What thirties technicians eventually decided about sound's front-to-back dimension, fifties technicians soon concluded regarding sound's left-right orientation: cinema works best when it develops and accustoms spectators to its own rules, independent of real world models.

X. 1995

?

As we have seen, film sound's successive identity crises regularly involve diverse demands placed on film sound by multiple masters. At various points, film sound must be both ballyhoo and accompaniment, music and language, emotion and economics. It must respect real space and provide clear dialogue, imitate both the human body and a complex set of film conventions. Nowhere are these multiple needs more audible than in the technology developed by Ray Dolby in the seventies and expanded by Tom Holman and others to the entire industry in the eighties and nineties. It is fascinating to note how these technologies have carried into the home theater decades of solutions to film sound crises (see illustration 21). Together, the six speakers of the now familiar surround sound configuration assure respect of the many conventions that sound has developed over the years. Because dialogue is concentrated in the center speaker, its volume can easily be kept nearly constant and its reverberation characteristics controlled independently of the other channels. Music, which for maximum effect requires far more reverberation than dialogue, is shunted to the left and right channels, while ambient sound arises all around the audience, through the surround speakers. Using an incorporated amplifier to boost the lowest sounds, a subwoofer completes the system by furnishing the ultimate

megaphone sound, shaking the floor to the point where we can easily believe that Armageddon – or at least a rock concert – is near.

Through a series of separate but interlocked systems, THX and other so-called 5.1 sound systems incorporate many of the solutions negotiated over the years in response to film's repeated identity crises and jurisdictional conflicts. A single system can produce clear dialogue, a "big" music sound, atmospheric or directional sound effects, and room-rattling, body-shaking tremors. Generated by a century of sound crises this multi-speaker arrangement today seems so well designed that it can easily appear natural. Like other systems before it, multichannel technology is currently enjoying a period of grace when its contradictions have not yet surfaced. Cobbled out of several different prior technologies, each with its own history not only as a technology but as an object of audience attention, multichannel sound currently not only capitalizes on its clever interlocking of techniques and technologies previously deployed separately, it also benefits from our temporary inability to recognize the contradictions that it embodies.

In terms of our broader purpose to establish a theoretical framework for analyzing the history of film sound, the multitrack example is particularly instructive, for it exemplifies the ways in which film sound's identity crises, through longterm jurisdictional conflict, can finally reach a negotiated settlement in which most parties and models find satisfaction. Indeed, longterm solutions always depend on the ability to satisfy multiple masters simultaneously. In order to understand the history of film sound – or of anything else, for that matter – we must understand the many and changing forces that require satisfaction in order for the system's energy to be dissipated.

SEARS, ROEBUCK & CO., Cheapest Supply House on Earth, Chicago. CATALOGUE No. III.

DEPARTMENT OF MOVING PICTURE OUTFITS.

MOVING PICTURE APPARATUS, although used in combination with the stereoscope, must be provided with the stationary picture with which all have been familiar for years...

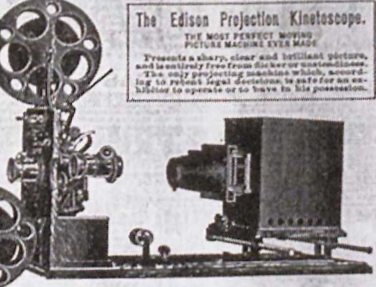
MOVING OR ANIMATED PICTURES

THE MOVING PICTURE OUTFIT of three periodical issues outside of the small extra material presented there are, first, The moving picture machine or apparatus itself, upon which the most depend and in the choice of which the franchise and most careful advice is offered to our customers...

WE GUARANTEE EVERY MACHINE. We have an established reputation in this line for over 25 years who have dealt with us do not say anything of this, but to those who have not, we say that any...

THE EDISON 1901 KINETOSCOPE. (IMPROVED MODEL)

WE shall handle the Edison Kinetoscope for projecting moving pictures exclusively. The moving picture apparatus known as one of the greatest of the Edison inventions, and which originally has spent much time in the perfection of the type of machine, embodying every improvement and every...



The Edison Projection Kinetoscope. MOST PERFECT MOVING PICTURE MACHINE EVER MADE. Presents a sharp, clear and brilliant picture, and is entirely free from flicker or motion.

- No. 212400 1901 Edison Projecting Kinetoscope and Combined Storage, furnished with acetate film lamp and rheostat for reducing current. Price, \$105.00
No. 212401 1901 Model Kinetoscope and Combined Stereoscope, with latest type of cellulose burner and rubber adjustment to make connections for incandescent light. Price, 100.00
No. 212402 Kinetoscope Frame for holding the Edison moving picture film, with its stereoscopic or professional single lantern. Price, 75.00
No. 212403 Improved Kinetoscope, for projecting film. Price, 10.00

WE ARE EXCLUSIVE DEALERS IN THE EDISON MACHINE AND FILMS. THREE REASONS which now make it more than ever before the most popular of all the Edison inventions...

FRAMING DEVICE. This is new to the machine, it simplifies and entirely obviates the use of a separate mechanism which formerly was used.
QUALITY OF CONSTRUCTION. The machine is constructed at the factory, under the immediate supervision of the inventor...

FILMS FOR PROJECTION OF MOVING PICTURES.

NEXT TO THE INSTRUMENT for projecting moving pictures, the film which contains the pictures themselves is the most important element. The film is a long cellulose tape secured to a reel...

WE CARRY SO LARGE A STOCK of these films on hand that all orders will be promptly filled as promptly as received, that it is never an urgent matter to give a detailed list to this paper. We publish, however, a small booklet containing names and descriptions of the latest films...

SEE NEXT PAGE for description of various lights used in Moving Picture Work.

Fig. 1: 1901 Edison Kinetoscope with separate motion head

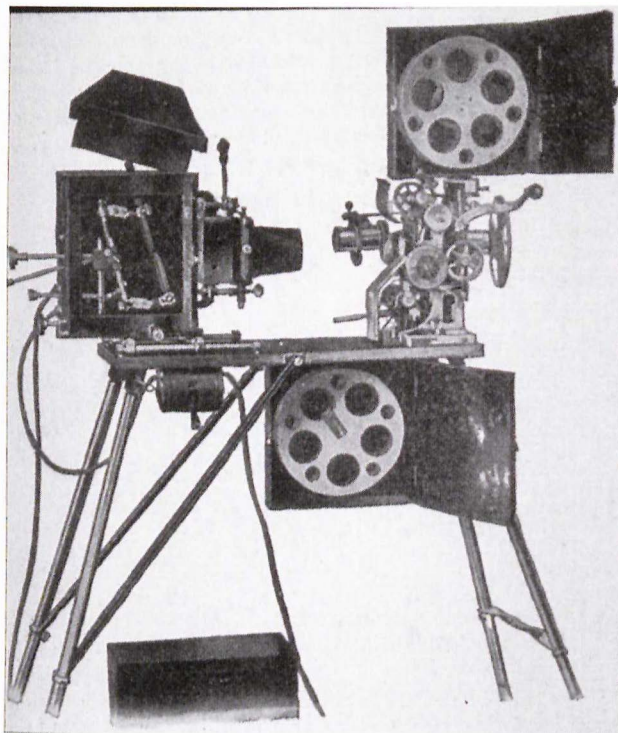


Fig. 2: 1909 Powers No. 6 Cameragraph with separate motion head

"I'M GLAD I MET YOU, MARY."
(LIFE SCENES FROM THE SONG.)
THE MOST NATURAL AND BEAUTIFUL SLIDES EVER MADE.
(COPYRIGHT BY THE CHICAGO TRANSPARENCY CO.)

THESE STEREOPTICON VIEWS IN COLORS 50¢ EACH, NO MORE, NO LESS. WINDSOR MUSIC • 266 WABASH
+ + AVE. CHICAGO

Fig. 3: Back cover for sheet music of "I'm Glad I Met You Mary"

"Everybody Works But Father"

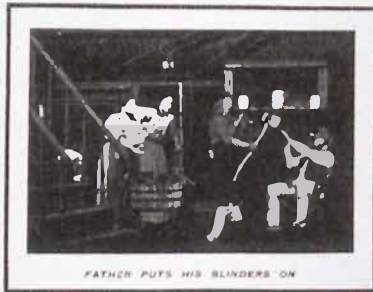
Lew Dockstader's Enormous Song Hit

(Helf & Hager Co. Edition)

IN BIOGRAPH MOTION PICTURES

Copyright, 1905, by the American Mutoscope & Biograph Co.

A Decided Novelty for Illustrated Song Singers



FATHER PUTS HIS BLINDERS ON

The great popularity of illustrated songs has led us to introduce a novelty in the form of a film which covers the entire action of the version and choruses of a well-known song. This film—175 feet in white face and 179 feet in black face—we sell at 12 cents per foot. No slides are necessary. Anyone can sing it, and if you sing it just as it is written you can't get away from the pictures.

Produced and Controlled Exclusively by the

American Mutoscope & Biograph Co.

11 East 14th Street, New York City.

Fig. 4: Biograph Bulletin for *Everybody Works But Father* (1905)

HERE IT IS!



We are now prepared to make immediate deliveries of

PICTUREPHONE

Complete with specially
wired Phonograph **\$550.00** ORDER NOW
F. O. B. New York

BE THE FIRST IN YOUR CITY

— The sounds of music are reproduced simultaneously and
— synchronously with the action of your picture.

To insure your satisfaction of picture and sound, we have a complete stock of picture
— and sound films in our rental library of films and disks.

ELECTRIC EXPENSE KILLER

Our Rhenatoxide
is guaranteed to effect
a saving of from 50%
to 75% in your M. P.
current expenses



Our Rhenatoxide
is guaranteed to effect
a saving of from 50%
to 75% in your M. P.
current expenses.

CLASS "A" FILMS: Six copies will permit you to see all the world's famous, thrilling, and
— interesting pictures and to enjoy them in your home. All films are made by the
— best picture makers of the world, and are guaranteed to give you the most
— enjoyable and profitable entertainment you can have.

MINIFAX: An excellent "TALKING" picture which is a real "talker" and is
— guaranteed to give you the most enjoyable and profitable entertainment you
— can have.

WALK, WRITE OR WIRE TO

MILES BROS. Hub Theatre
Boston

210 York Street
San Francisco

MILES BROS. BLDG.
259-261-263 SIXTH AVENUE, NEW YORK
1319 MARKET STREET, PHILADELPHIA

Fig. 5: 1907 ad for Miles Bros. Picturephone

YOUR MONEY WILL BE IMMEDIATELY RETURNED TO YOU FOR ANY GOODS NOT PERFECTLY SATISFACTORY. 751377

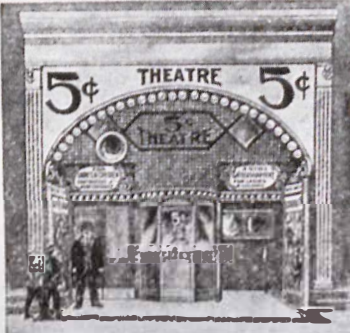
MOVING PICTURES

WE FURNISH COMPLETE OUTFITS

FOR

- 5-CENT THEATERS
- TRAVELING EXHIBITORS
- STREET ADVERTISING
- LODGE WORK
- CHURCH ENTERTAINMENTS
- PUBLIC SCHOOLS

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AND **FULL LINE OF SUPPLIES**

THE NEW 1908 MODEL MOTIOGRAPH

THE NEW MOTIOGRAPH MOTION PICTURE MACHINE




Fig. 6: 1908 Sears catalogue ad for Motiograph projectors



Fig. 7: Façade of Grand Theatre, Buffalo (NY)



Fig. 8: Façade of Bijou Theatre, Attica (NY)



Fig. 9: Façade of Star Theatre, Broken Bow (NE)



Fig. 10: Automatic piano in entryway of Electric Vaudeville Palace, Lancaster (PA)

WURLITZER

World's Largest Mfrs Established 1850



Wurlitzer PianOrchestra and Mandolin Sektet in Royal Theatre, Lima, O.

Write for 32-page booklet, showing
Wurlitzer Automatic Musical Instrument
 in the leading picture theatres of the country.

The Wurlitzer Instruments furnish better music than musician
 and reduce expenses. 50 different styles; time payments; big
 catalog free. If you can't call, write to our nearest branch.

The Rudolph Wurlitzer Company

CINCINNATI	NEW YORK	CHICAGO	PHILADELPHIA
117-121 E. 4th	25-27 W. 82d	876-881 S. Wabash	1885 Chestnut
ST. LOUIS	CLEVELAND	BUFFALO	LOUISVILLE
1100 Olive St.	600 Huron Road	701 Main	426 W. Green
			57 E. Main

Fig. 11: 1910 Wurlitzer ad for automatic instruments, showing a PianOrchestra and a Mandolin Sextet located at the rear of the auditorium of the Royal Theatre, Lima (OH)

PATHE FRERES
FILMS

Release of Saturday, Jan. 14

The Battle at Redwood
 A fine story of the settlers and how the soldiers saved them from the Indians.

Release of Wednesday, Jan. 18

Trailed by an Indian
 Another great Western picture. Thrilling and exciting, with great scenery.

January 14 is the last day upon which we can take orders for our great colored Film D'Art

IL TROVATORE
 Insist upon your exchange giving you a definite booking for this tremendous money getter.

Piano score to fit scene for scene with the picture can be obtained from your exchange.

26 Pages, 50c.

Fig. 12: 1911 Pathé Frères ad for *Il Trovatore*, with special music for sale

The advertisement is a vertical poster for the film 'Via Wireless'. At the top, it says 'PATHE Presents' in a stylized font. Below this, the title 'VIA WIRELESS' is written in large, bold, slanted letters across the center. To the left of the title, there is an illustration of a ship at sea and a globe. To the right, there is a circular portrait of a man in a suit, identified as 'BRUCE MCRAE'. Below the title, there is a scene from the film showing a large antenna or radio structure on a ship's deck. The main text block in the center reads: 'The second Gold Rooster play in 5 parts Adapted from the famous Broadway success by PAUL ARMSTRONG and WINCHELL SMITH. Featuring GAIL KANE and BRUCE MCRAE. Produced by GEORGE FITZMAURICE. A superb drama played by real stars. Special musical program for all Gold Rooster plays FREE.' At the bottom, a box contains the text: 'THE PATHÉ EXCHANGE, INC. EXCLUSIVE OFFICE 25 West 45th Street, New York'.

PATHE Presents

VIA WIRELESS

GAIL KANE

BRUCE MCRAE

The second Gold Rooster play in 5 parts

Adapted from the famous Broadway success by PAUL ARMSTRONG and WINCHELL SMITH. Featuring GAIL KANE and BRUCE MCRAE. Produced by GEORGE FITZMAURICE.

A superb drama played by real stars.

Special musical program for all Gold Rooster plays FREE.

THE PATHÉ EXCHANGE, INC.
EXCLUSIVE OFFICE
25 West 45th Street, New York

Fig. 13: 1915 Pathé ad for *Via Wireless*, with special music provided free

Paramount Pictures

Music

Specially arranged music for each feature beginning with release of April 7, 1916, is available at a small rental. Whether you have a full orchestra or only a piano, this specially arranged music will add greatly to the effectiveness of each feature.

Ask our exchange.

WEEK'S RELEASES

Daniel F. [unclear] presents
**DONALD BRIAN in
THE SMUGGLERS**
produced by
Famous Players Film Co.

Jesse L. Lasky presents
**BLANCHE SWEET in
THE DUPE**
produced by
Jesse L. Lasky Feature Play Co.

**PARAMOUNT-BURTON HOLMES
TRAVEL PICTURES NO. 22**
"Music, the Magnificent."

**PARAMOUNT PICTOGRAPHS
NO. 22.**

Don't Cheat Yourself—How Many Families Can Save \$10 a Year?
Better Education—Education of the Slaves
Psychological Tests—Can you recognize her names and faces?
Working Out With the Police Dog
A Moment in India.

**PARAMOUNT-BRAY ANIMATED
CARTOONS NO. 27.**
"Farmer Al Fall's Watermelon Patch."

Write Our Exchange Today



Paramount Pictures Corporation
FOUNDED 1912
NEW YORK, N.Y.

Fig. 14: 1916 Paramount ad featuring special music



Fig. 15: Mid 1920s acoustic recording session

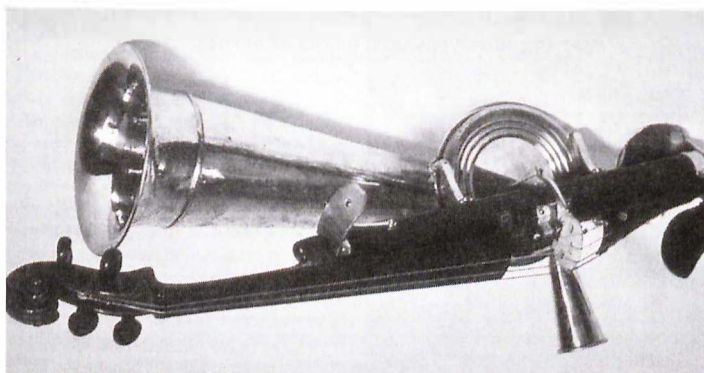


Fig. 16: Stroh violin



Fig. 17: Mid 1920s electronic recording session

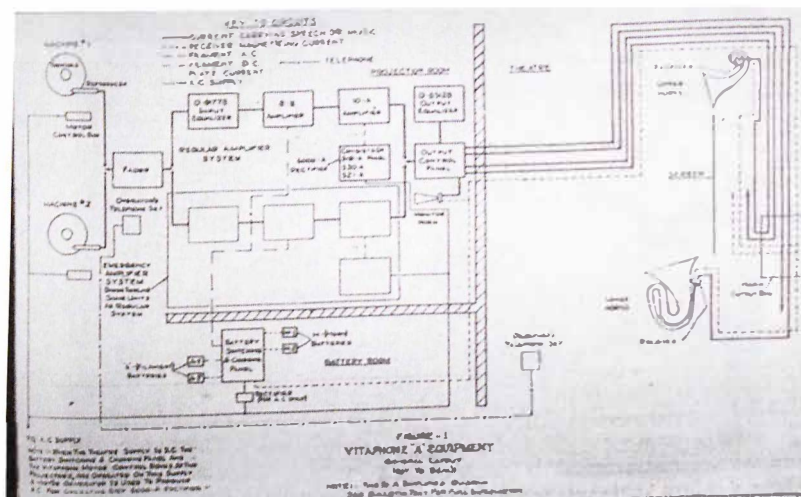


Fig. 18: 1927 Vitaphone "A" Equipment schematic, showing lower speaker horns in orchestra pit

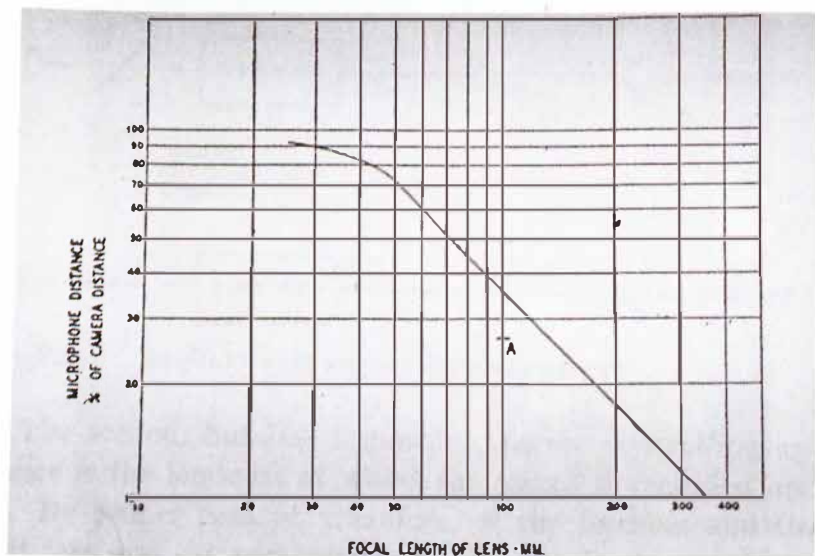


Fig. 19: 1931 Maxfield microphone distance graph

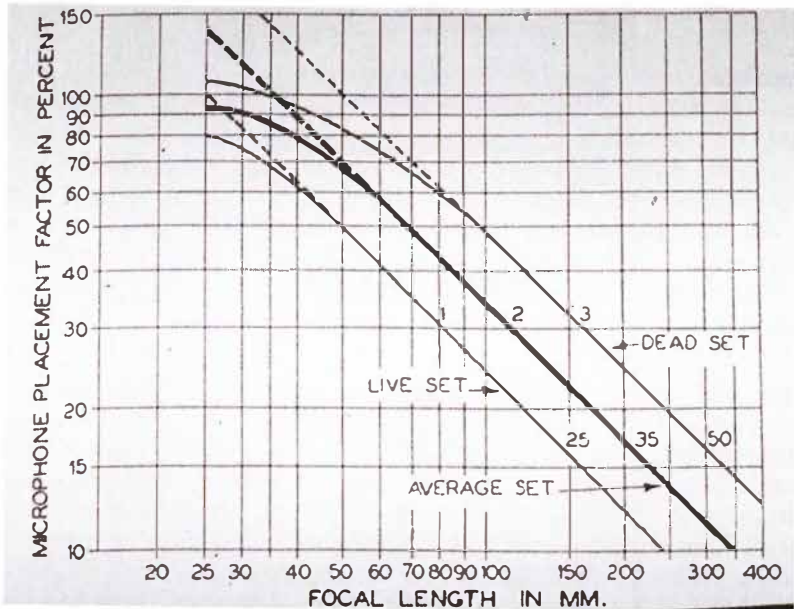


Fig. 20: 1938 Maxfield microphone placement graph



Fig. 21: 1990s Yamaha home theater diagram