Film scholarship is notoriously "feature-centric" in that much of its energies go to discussions of feature-length motion pictures. Standard film histories might acknowledge the variety of texts and practices that make up our experiences of cinema (that is, newsreels, animation, trailers and other promotional material, and so on) but they rarely devote significant time and space to that diversity. Given the economic dominance of feature films in the filmmaking industry, this bias is quite understandable. But an unfortunate side effect of this lopsided view of film history is its influence on film theory. Theory tends to echo history in its choice of examples; consequently, theorists' categories and assumptions are based generally on viewings of live-action, dramatic features films. However, close viewings of other types of cinematic texts, such as animation, reveal that the categories are not as readily applicable.

This is certainly true of recent work on film sound. Claudia Gorbman, for instance, outlines a set of "rules" for film music composition, mixing, and editing in her book *Unheard Melodies*. While she makes it clear that these rules apply only to dramatic, feature-length fiction films of the thirties and forties, and that they are by no means invariant, films that would systematically violate those rules (comedies and reflexively modernist films) are labelled "exceptions that prove the rule" (Gorbman, 70ff). But exceptions don't "prove" rules, they disprove them, challenging us to rework our assumptions about film sound.

Hollywood studio animation presents such a challenge. A history of the use of sound in these cartoons would be particularly interesting in that it could show how an ostensibly marginalized set of texts can stand at the very intersection of economics, technology, and art. The Warner Bros. cartoons of the early thirties are by no means unique in this respect, but
they do provide a strikingly clear example of the interrelatedness of these three terms, especially how economics and technology influenced the specific character of cartoon sound. But they provide us with more than mere illustration; a closer examination of the use of sound in these cartoons might encourage us to rethink our conceptions of how sound works in feature films, or at least rethink the categories we persistently use to classify sound. Our vocabulary for describing sound in film becomes increasingly inappropriate when confronted with certain aspects of these cartoons. The terminology does not quite fit the phenomena. Three common schemata—the image/sound hierarchy, the separation of the sound track into dialogue/music/effects, and the “diegetic/non-diegetic” distinction—are particularly unwieldy when dealing with animation, suggesting that we should reconceptualize our descriptions of film sound to include other types of film texts besides live-action features. This essay provides the beginning of such a project by pointing to the deficiencies in the current terminology and offering some alternatives, while exploring the economic and technological influences on the sound of the Warner Bros. cartoons.

The Warner brothers were relatively slow to establish an animation branch to their studio. It wasn’t until Disney’s success with *Steamboat Willie* in 1928 that they began to consider the possibility. Indeed, most of the original Warner Bros. animation staff—Hugh Harman, Rudolf Ising, Isadore “Friz” Freleng, Carmen “Max” Maxwell, Norm Blackburn, Paul Smith, and Rollin “Ham” Hamilton—learned their trade with Disney. Harman, Ising, and Freleng were with Uncle Walt as far back as 1922, when Disney was still in Kansas City. In 1928, just before the premiere of *Steamboat Willie*, an entrepreneur named George Winkler lured away much of Disney’s staff (a practice many rival studios adopted when they were short of personnel) with his plan to form a new studio in order to make “Oswald the Rabbit” cartoons. But when that fell through, Harman, Ising and the others were left without a job.

Later that year, Harman, Ising, and Freleng located a recording studio and made a pilot cartoon featuring “Bosko,” a robbery kid in blackface. They had trouble finding a distributor, but Leon Schlesinger, then head of Pacific Art and Title, expressed interest. Having been a backer of *The Jazz Singer*, Schlesinger was in a position to propose the series to Warner Bros. The success of the Disney sound cartoon encouraged them as did the prospect of reusing the popular songs from their music catalog. Warner Bros. began distributing the “Bosko” cartoons and set Schlesinger up as producer. The first of the series, christened “Looney Tunes,” was recorded in March 1930 and released in September 1930. Harman and Ising supervised, Freleng animated, and Frank Marsales directed the music. One cartoon was released every month for a year, at the end of which the contract was renewed to include the “Merrie Melodies,”
specifically designed to feature songs from the Warner collection (Maltin, 224).

Indeed, the importance of the economic incentive to use material from the Warner-owned music publishers cannot be overlooked. In August 1929, anticipating the continued success of its talkies, Warner Bros. invested $8.5 million to buy up a number of publishers affiliated with Harms Music, Inc. Only months previously, the studio had spent $1 million in cash to acquire Witmark and Sons, "perhaps the oldest established popular music house" (Variety, August 21, 1929; 5). Such acquisitions meant considerable savings in royalties and taxes (by holding the copyrights to the songs used), and they also could be used as a bargaining chip for booking films in the theaters of rival studios.

Having acquired the rights to any given song, producers were eager to get as much mileage out of the tune as possible. The four featured songs from Mervyn LeRoy's hit musical 42nd Street (1933), for example, were included in at least six cartoons of the same year. Two of the six songs had their own Merrie Melodies: Young and Healthy and Shuffle Off to Buffalo, but both of these songs were also included in The Dish Ran Away with the Spoon and Bosko's Knight-Mare. Bosko's Knight-Mare also featured the tune "42nd Street" as did The Organ Grinder, while "You're Getting to Be a Habit with Me" found its way into Honeymoon Hotel, which took its title and theme song from another Warner Bros. feature, Footlight Parade (1933). The success of these musicals certainly played a role in the choice of music for the cartoons, but the practice was not limited to box office winners. Songs from obscure musicals such as Oh! Sailor Behave! (1930) and Manhattan Parade (1932) also spawned a number of early cartoons.²

The musical director of the cartoons was heavily encouraged to use compositions owned by the studio. By and large, Marsales adhered to these restraints by drawing from either the public domain or the largest of the publishers (Harms, Witmark, or DeSylva, Brown and Henderson) for his compositions. A typical cartoon of the early thirties would have anywhere from five to fifteen separate compositions (mostly partial usage, of course) requiring "application for domestic license"³ from as many as five different companies. In the first year of production, however, at least one of those companies (per cartoon) was "outside"—not one of the Warner Bros. acquisitions—much to the dismay of the studio accountants. An inter-office memo dated January 30, 1931 gives a hint of the type of pressure exerted on the musical director:

My dear Mr. Murphy,

Enclosed please find cue sheets [lists of the compositions used and companies owning the copyright] for Looney Tunes #9 [Dumb Patrol,
recorded January 22, 1931, released May 1931]. Also note that I have almost got them around to our way of thinking. Out of nine numbers—one outside number.

Hastily,
Arthur Frankl

Economics, then, had a clear influence on the musical director’s “way of thinking,” so to speak, and on the choice of music for the cartoons.

Economics might also have some influence on our way of thinking about sound in cartoons. For instance, why was it necessary to have two separate series? The usual explanation holds that the split was a compromise between image and sound. In this respect, the functions of the two Warner Bros. series duplicated that of Disney’s Mickey Mouse and Silly Symphony series, in which, supposedly, music followed action in the first and action followed music in the second. Legend has it that the split between the two series at Disney studios came about due to disagreements between Disney and his first musical director, Carl Stalling. Disney animator Wilfred Jackson tells the story this way:

Walt and Carl would time the pictures in Walt’s office. Timing them consisted of working out what the music would be and what the action would be. A lot of times Walt would want more time or less time for the action than could fit the musical phrase. So, there would be a pretty good argument going on in there. . . . But, finally, Walt worked out a thing with Carl. He said, “Look, let’s work it out this way. We’ll make two series. On the Mickey Mouse pictures you make your music fit my action the very best you can. But we’ll make another series, and they’ll be musical shorts. And in them music will take precedence and we’ll adjust our action the best we can to what you think is the right music.” (Barrier, 22)

Here the struggle between image and sound is played out as explicitly as any in classical Hollywood cinema. The image/sound hierarchy—in which sound is assumed to be motivated by the image and thus supplemental—has an almost allegorical status in the two series, where it holds true in one and is simply reversed in the other. But as an explanation and description of the split between the Warner Bros. series, the concept is not as tidy as it may seem. The economic considerations already mentioned hint at an alternative explanation, while examination of the actual production practices put the hierarchy in doubt.

Ostensibly, the Warner Bros. series split worked on the same principle as Disney’s, that is, action taking precedence in the Looney Tunes and music guiding action in the Merrie Melodies. But the actual scoring of the cartoons (and close listening) blurs the distinction between them. With
regard to the Looney Tunes, for example, while most music was actually recorded after completion of the images, Harman and Ising would begin a film by deciding first on a beat with their music director, then timing the cartoons on sheets of written music, indicating so many frames for each action. This action was coordinated with the bars of music and the timing was then transferred from the music sheets to exposure sheets, from which animators drew and exposed the requisite number of pictures. Very often, the music directors would work from these exposure sheets, too, prerecording the music even before the drawings were committed to celluloid (Barrier, 24). To ensure precise synchronization, the music director would create a "click track" for his musicians. Invented by Carl Stalling (not Max Steiner) during his first years at Disney (1926–1933), the "click track" was a prerecorded rhythmic beat (sort of an electronic metronome) timed to the tempo of the images. The first click tracks were recorded on disk, but later holes were punched into black leader that would be read by an optical reproducer (Barrier 23, Handzo 410). The musicians would listen to these beats through headphones as they played the written music, and the finished product would be closely synchronized.

Song and dance numbers in all the cartoons, particularly important to the Merrie Melodies series, were treated a bit differently because of the need to synchronize voice and mouth. The vocals would be recorded beforehand without accompaniment; the artist would sing in time with the click track. The words and timing would then be read off onto exposure sheets, from which the music director would write the accompanying score (Barrier, 26).

These production methods—standard procedures for Warner Bros. cartoons—show that the image/sound hierarchy does not justify the existence of two separate series. If there were only slight production differences between them, the reason for the split remains unresolved. This division of output was not unusual for major animation studios, and given the success of Disney it is certainly reasonable to assume that their split would have been accepted as an industry norm. But there were also further compelling financial reasons. At Warner Bros., "in-house" music was used for all cartoons, not just the Merrie Melodies. It seems clear that the best way to showcase these songs would be to follow a successful formula: stage the numbers in song and dance routines. Indeed, most of the songs for the cartoons had been already featured in this way, either through Broadway shows or early Warner Bros. musicals, such as Gold Diggers of 1933, 42nd Street, or Footlight Parade. Lady, Play your Mandolin, for instance, a Merrie Melody released September 1931, features a stage show in a canteen. Three’s a Crowd (1933) is the usual toys-at-midnight romp with the songs performed on an impromptu stage. You Don’t Know What You’re Doin’! (1931) also features a mock vaudeville show. This
setting became standard for many Merrie Melodies: *Hamateur Night* (1939), *Rhapsody Rabbit* (1946), and *What's Up, Doc?* (1950) are just a few of the later examples. While bona fide stage settings are not typical of the early Bosko Looney Tunes, musical performance is still an important part of the action. In many of the Looney Tunes, such as *Sinkin' in the Bathtub* (1930), Bosko takes time out to serenade his girlfriend Honey with a version of a well-known contemporary melody. There are any number of reasons for the high incidence of musical performance in these early cartoons, including the close formal and economic ties to the musical genre and the desire to highlight synchronized sound. Perhaps the most immediate generic precedent was set by the Warner Bros. Vitaphone shorts of the late twenties and early thirties. The conventions established by these films for recording vaudeville acts were carried on in many of the cartoons. In the Vitaphone short *Elsie Janis in "Behind the Lines"* (1926) vaudeville entertainer Janis sings to a chorus of soldiers, who function as a surrogate audience in the space of the film. The same pattern occurs in many vaudeville-like Merrie Melodies. These narrative resemblances certainly had economic motivations: if Sam Warner hoped the Vitaphone system would be a substitute for expensive musicians at the theaters (Koszarski, 16), then the cartoons themselves, along with other live-action shorts, could have been seen as a substitute for vaudeville performances before films.

Yet to stage numbers exclusively in song and dance routines would have violated successful protagonist-centered narrative formulas. The cartoon series based on a single hero is an established convention of late silent cartoons. The Warner Bros. Bosko series followed a pattern established by such successful characters of the twenties as Max Fleischer’s Koko the Clown or John Randolph Bray’s Col. Heeza Liar. To showcase the songs themselves, as Warner Bros. was probably eager to do, required a narrative framework that did not emphasize plot and action, but rather privileged a play of movement without narrative urgency that is more at home in filmed musicals or musical theater. It would have been difficult to reconcile the two narrative patterns, and there were strong economic reasons not to try.

Economic and narrative influences can account for the choice of music, but not its particular character. For that, we must look to the technology of sound recording at the time. But again, a look at the contemporary practices shows that another common schema—the dialogue/music/effects trio—does not adequately describe the sound tracks. It becomes harder and harder to decide what is “dialogue,” what is “music,” and what are “effects.”

Warner Bros. initially recorded sound for their motion pictures with their sound-on-disk system, but by mid-1930 they began using a sound-
on-film process that recorded sound optically. During the transition from
disk to film, both processes were used and exhibitors equipped with disk
technology could buy special attachments to read optical sound tracks. By
the beginning of 1932, all the recording was done with the sound-on-film
process. The first Warner Bros. cartoons were made during the transition
period, and recorded on both disk and film. However, the Vitaphone
recording system in use until 1933 required that all elements of the sound
track be recorded at once. In the Warner Bros. live-action shorts, these
elements are usually separated for each film; Will Hays gives his speech
without accompanying music (which certainly would have been appro-
priate), the New York Philharmonic plays “Tannhäuser” without spoken
introduction. When orchestration of different sound elements was required
but proved to be too unwieldy, the “playback” system was used: prerec-
corded music was played on a phonograph while the dialogue was recorded
(Altman 1980b, 46).

The Vitaphone system’s sound recording practices directly influenced
the specific character of the music written for the cartoons. For instance,
there are no classical pieces in these cartoons; unlike the live-action shorts,
they contain only jazzy popular tunes such as “Smile, Dam Ya, Smile,”
and “You Don’t Know What You’re Doin’!” This difference could be
attributed to a high/low distinction; many of the live-action shorts sought
to be labelled “culture” (such as Giovanni Martinelli [in] the Temple Scene
from “Aida” [1930]), while the animated shorts sought to be nothing more
than “entertainment,” especially if they were to take the place of vaudeville
acts in theater programs. But why jazz? Obviously, if Warners wanted to
highlight their popular songs, they would naturally pick a popular style.
Yet this is not necessarily so, considering that by 1937 Carl Stalling was
drawing from the Warner Bros. stock using his famous neo-classical style.
To be sure, if fast-paced action had become the convention for animated
cartoons, almost to the point of becoming movement for its own sake,
then the accompanying music also required a quick tempo. Nevertheless,
this convention does not fully explain the particular orchestration and
arrangement we find in these early examples. It must be attributed to a
coincidence of musical structure, technological limitations, and generic
demands.

Rick Altman neatly sums up the relevant limitations of the microphones
used for Vitaphone technology:

Simply put, the problem lay in the difficulties of producing a high
quality and complex sound track (including dialogue, music, effects)
with an unselective microphone at a time when the technology of
sound mixing practically forbade postmixing of multiple tracks without
audible loss of quality. In fact, until approximately 1933 it was ex-
tremely rare for music and dialogue to appear simultaneously on the sound track unless they were recorded simultaneously. The latter solution of course presents other difficulties. The amount of reverberation generally required for dialogue varies greatly from that which is appropriate for music . . . similarly, dialogue and music require different amplification and thus are difficult to record with the same microphone(s). (Altman 1980b)

A good example of the problems inherent in this setup occurs in *Hold Anything* (1930). The theme music plays at a constant level, but Bosko’s shouts to Honey are barely audible. The playback system, the usual solution to these problems, was unacceptable for the cartoons because the music was a central attraction and could not withstand the loss of sound quality. If dialogue and effects were going to be included without competing volume levels, the answer had to lie in the arrangement of the music itself. The abrupt starts and stops of these early arrangements made it possible to orchestrate the different sound elements without competing volume levels and still maintain a fairly constant musical background. More specifically, the arrangement of these early cartoons was defined and symmetrically constructed into eight-bar phrases. This highly ordered system allowed cartoonists to place significant action on the cadential accent at the end of every eighth measure. It also gives the orchestra an opportunity to pause for a second or two while dialogue is spoken or some other effect is sounded (Dahl, quoted in Prendergast, 171).

In another example from one of the very first Merrie Melodies, *Smile, Darn Ya, Smile* (1931), Foxy (a Mickey Mouse look-alike with long ears and a bushy tail) helps a large hippo onto his trolley. The volume levels for the music in this cartoon are constant, so while the singing is closely miked and compatible with the level of the instrumental music, the dialogue from secondary characters (presumably further from the microphone, or perhaps using the one calibrated for the orchestra) is often drowned out. The arrangement remedies the problem: the music plays gaily along as Foxy pushes, the beat stops at the end of a phrase, the hippo complains, and it resumes when her line is over.

This same pattern occurs very often with what we might call “sound effects.” Significant action (usually a blow to the head or some other sort of bodily harm) is accompanied by a sound effect. In the early cartoons, this effect is provided by the percussion section of the orchestra: a knock on wood, a cymbal crash, or a variable-pitch whistle. Produced by musical instruments, they become part of the music, entering at rhythmic breaks at a compatible pitch and volume. At the beginning of *You Don’t Know What You’re Doin’!* (1931), after an eight-bar intro over the credits, the singing begins to ¾ time, allowing a two-measure break at the end of the
sixth bar for a character to slap out a rhythm on another character’s behind. After another six-bar section, the second character echoes the first by tapping out the same rhythm at the break. Eight bars later, the hero of the story, Piggy, is riding his motor scooter down the street to the club; the clippity-clop of his engine is perfectly timed to the rhythm of the new refrain. As it arrives at its destination, the scooter backfires to the tune of “shave and a haircut, two bits.”

It’s clear that this particular arrangement is not unique to cartoons, but comes directly from silent film scoring practices. In fact, this “residual” practice certainly had a strong influence on the character of the music in these early cartoons. Mike Barrier quotes Carl Stalling, a former silent film accompanist, on this very topic: “I just imagined myself playing for a cartoon in the theater, improvising, and it came easier” (Barrier, 26). But we cannot attribute the features of early cartoon sound to either silent scoring practices or technology alone; they are due, of course, to both. The regular rhythm of the popular music and the conventions of silent film scoring made it easier to “orchestrate” the music, dialogue, and effects for the existing technology. What we have here, however, is an interesting paradox: the technology and the arrangement of the music work together to separate the various elements of the sound track; music, dialogue, and effects tend not to overlap. Yet the same technological limitations and the instrumentation of the orchestra also work together to blur the distinctions between the sound elements by using music as a sound effect and orchestrating all the elements into a continuous musical track, a practice that will become standard and emblematic of animated cartoons. Just as an examination of the actual practices upsets the strict division between the series, an investigation of the technological practices shows that the boundaries between sound elements are not that clear.

As the technology changes, however, so does the arrangement and character of the sound. By 1933, it was possible to separately record various tracks, mixing and synchronizing them after editing. This allowed easier handling of multiple tracks and volume levels (Salt, 43). The most notable change in the sound of these cartoons after this period is the continuous music. In earlier cartoons there were a number of rhythmic breaks in the music, but in Petting in the Park (1934), for instance, the same sort of jazzy music is played continuously and the volume levels are lowered to make room for other sound elements. The ability to record the effects on a separate track at least partially relieved the orchestra of the task of providing the effects. While the musical instruments would still match the action and even serve as effects, others would be added separately. In this cartoon, two lovebirds sing along to the theme tune and then embrace, the sound of their kiss coming through loud and clear, even though the volume of the music has not lowered. The trend toward
continuous background music would continue through the Carl Stalling period (1936–1956) as silent scoring methods were left behind.

Even as the music of the Warner Bros. cartoons took on a different style under Stalling’s musical direction, certain conventions of cartoon sound were set, such as the use of music as a sound effect. It is difficult to make strict divisions between the different elements of the sound track and this difficulty extends to the sound/image relationships as well. It is not too surprising that the close marriage of music and image results in certain formal patterns on the image track. Given that the tempo of the music has already been decided upon in any given cartoon, the “mise-en-scène” enacts that tempo in a variety of ways. The characters sing and dance, of course, but buildings also sway, the horizon line rocks, and nearly every object “comes alive” to the beat of the music. This reversal of the image/sound hierarchy is also common in musicals; indeed, Rick Altman argues that it is one of the defining features of that genre (Altman 1987, 62–73).

Most conspicuous in animation, though, is the way in which images are repeated in order to fit the music. Repetition is one of the hallmarks of studio animation, both in terms of representation and actual construction. Thousands of drawings—the same effects repeated again and again—are required for a single cartoon. In the cartoons themselves, backgrounds are repeated as characters chase one another, even in finite spaces: the inside of a house may be elongated to fit the duration of the chase. Characters repeat actions over and over again: the motif of the assembly line is especially exemplary. “Assembly lines” of all sorts show up throughout the history of Hollywood studio animation. In Hold Anything, a group of mice work together in assembly line fashion while helping Bosko lay bricks. In Baby Bottleneck (1946), for instance, Daffy and Porky Pig work on an elaborate assembly line designed to create, well, babies. In Buddy the Woodsman (1934), the lumberjacks come in for dinner, but not before passing through, one by one over and over again, an elaborate face washer and dryer. The theme of mechanization and repetition metaphorically reminds us of the routine of image generation in an animation studio. The assembly line motif echoes the rhythm of the work image generation, but it is also a more particular instance of the larger patterns of repetition in a cartoon. This repetition, occurring at discrete intervals and in distinguishable units, is the visual equivalent of the repeated patterns of the music. The actions, mise-en-scène, and motifs of the animated cartoon’s image track duplicate and are determined by the sound track.

But how do we think about the relationship between sound and image when the entire shape of a cartoon is complemented and determined by the music? The relationship certainly points to the inadequacy of the “diegetic/nondiegetic” distinction that functions so centrally in most dis-
cussions of film sound. The term “diegetic” refers to that which is accessible to the characters of a film, and yet buildings in cartoons sway to music that has no source in the diegesis. Even when there is a source, animators play with the notion of diegesis and the audiences’ acceptance of the convention. In Red-Headed Baby (1931) the characters are dancing in time with the music, but it is only after a couple of minutes have passed that the protagonist turns on the radio from which the music supposedly emanates. That a diegetic orchestra will occasionally provide sound effects for diegetic action further complicates this issue. The “diegetic/non-diegetic” distinction does not even apply to the image track of the cartoon if we consider that elongated space and time in chase scenes are more closely related to musical rhythm than to a fictionally unified space. Thus, the traditional “diegetic/non-diegetic” categorization, when applied to even the most ordinary cartoon, is rendered practically useless. The relationship between music and image in animated cartoons can be better described by distinguishing between what might be called isomorphic and iconic uses of sound.

An “isomorphic” use of sound occurs when the sound and image have the same “shape.” Over the years, this convention has become familiar to everyone: a character’s wide-eyed blinks are accompanied by a couple of light, sprightly notes, buildings sway to the music, characters dance to the tempo, or a glissando accompanies a “pan” across an animated landscape. For example, in Big Man from the North (1930) Bosko rides his dogsled over a series of steep mountains and a variable-pitch whistle sounds with each descent into a valley. As Bosko’s sled descends, its speed matches the rate at which the whistle’s pitch varies. Throughout the cartoon, the tempo of the music and the image match, as when bass strings are plucked or wood blocks are tapped with each step. “Isomorphic,” then, refers to the close matching of image and sound—that is, a relationship based on rhythm in both the action and the music. The term “isomorphic” recognizes not only specific features of the sound, but also the inseparability and equality of sound/image relationships. Thus, sound is not reduced to its role in the space of the fiction.

The practice of synchronizing music and image to a very precise degree is traditionally referred to as “mickey-mousing,” so named because it was used in Disney’s cartoons (although silent film music also used it to a great extent). But mickey-mousing seems to carry a pejorative meaning, both because of the lower status animated cartoons have traditionally held in film studies and because of the implication that exact illustration is a rather tedious and silly way to relate music and image. The term is also imprecise. It tells us nothing about the rhythmic relations between sound and image. Indeed, it implies, like “diegetic/non-diegetic,” an image/sound hierarchy that is simply untenable. And there are other instances of
synchronized action and music that are not normally considered mickey-mousing. For instance, when one character slaps another on the head and we hear a cymbal crash. This would normally be called a "sound effect" even though an instrument from the orchestra created the sound.

Moments such as these, when the orchestra provides the (diegetic?) "sound effects," might be called "iconic." In *Big Man from the North* the villain pounds his fist on the bar and we hear a cymbal crash and a blare of horns. Or, considering Bosko's dogsled again, the "highness" or "lowness" of the variable-pitch whistle matches the peaks and valleys of the mountains. After C. S. Peirce, it could be argued that, with respect to the sound and the image in this case, "there is no sensuous resemblance between it and the object, but only an analogy between the relations of the parts of each" (105). The relationship between the sound effect and its visual representation is not one of fidelity, but of analogy. Short, violent, and surprising, the pounding fist and the cymbal crash have certain matching, yet not necessary, components. The advantage of the terms "isomorphic/iconic" is that they are not mutually exclusive, as are "diegetic/non-diegetic," and they can describe multiple sound variables. In another, completely different example, Oskar Fischinger's *Motion Painting No. 1*, the bass line of Bach's Brandenburg Concerto broadens as the circles in the image broaden and deepen in hue. This seems to be isomorphic in that the rhythm of bass and the movement of the circles coincide, but it is also iconic in that the change of colors matches the deepening pitch. If isomorphic relations refer to those governed by rhythm and movement, then iconic relations pertain to analogous relationships between visual events and the timbre, volume, pitch, and tone of the accompanying sound.

Synchronous speech in live-action film illustrates an indexical sound/image relationship. An index is "a sign which refers to the Object that it denotes by virtue of being really affected by that Object" (Peirce 102). A footprint is the sign of a person who left it, as a film is a photographic record of the action it records. Through live-action sync speech, the actors leave their indexical mark on the sound track; there is a necessary connection between sound and image that is missing from cartoons. This fact might answer a question we have all asked at one time or another: why do cartoon characters always have funny voices? Certainly, it is because they have funny bodies: following the pattern of indexical relationships in live-action film, the voice matches the body. But given that indexicality is impossible in a cartoon, no match between sound and image is required except by analogy, that is, iconically. Iconic relations obtain in cartoons especially with regard to voice and body: the "distorted" voices of cartoon characters are analogous to their "distorted" and "elastic" bodies.
Of course, isomorphic and iconic sound/image relationships are not limited to cartoons. Even a casual look and listen to any Three Stooges short will confirm this. Dramatic films also exhibit these uses of sound: a fight scene from a fifties noir might be accompanied by blaring horns and excited drums. Indeed, the point is not that cartoons are different—it is exactly that they should not be treated as an entirely separate category of cinema. Separating cartoons and other shorts or “untypical” cinematic texts from mainstream film histories does a disservice to those histories, especially when it becomes apparent that cartoons can be exemplary. The way in which economics and technology influenced narrative and stylistic conventions is indicative of Hollywood studio animation’s “typicality” with respect to classical Hollywood cinema. But more importantly, close study of cartoons allows us to reconsider what is “typical” in classical Hollywood cinema. The dividing lines between types of texts and practices are too easily set in film studies. Serious attention to animation may lead to a reexamination of these cinematic boundaries: between the different elements of the soundtrack, between the sound and image, between features and shorts, or between comedy and drama. The first step is a history that will lead to further theoretical considerations.
7. It has also been pointed out that the film does not directly address contemporary Vietnamese political issues either, including the invasion of Cambodia, the boat people, and their exploitation by pirates. The latter may indeed be alluded to by the slow motion, grainy black-and-white footage of people in boats that recurs throughout the film and is especially privileged by being placed near the beginning and the end. The ambiguous beauty of these images situates them in the realm of poetry (where they are undeniably powerful) but at the same time limits their ability to serve as references to specific political events.

8. This argument takes Rick Altman's concept of "ventriloquism" (synchronization's illusion that the image produces the sound) a step further (1980c). To quote Edward Branigan, in this film synchronization itself forms the foundation for "a staging of a documentary about voices and bodies which are absent" (my emphasis). At once we move into the realm of Metz's "imaginary signifier" where the essential cinematic illusion of presence signifies a profound absence. I would argue that Trinh rewrites this absence as a political absence—of the exile, of those left behind, and of the exclusion from historical consciousness of women's experience of both exile and abandonment. I am also indebted to Kaja Silverman for her provocative reading of the film's presentation of the body, raised in discussion at the Sound Symposium, Iowa City, April 1990.

10. The Sound of the Early Warner Brothers Cartoon

1. I would like to thank Rick Altman, Jennifer Barker, and Steve Wurtzler for their valuable comments on an earlier draft of this essay, and I would also like to extend my appreciation to Leith Adams of the Warner Bros. Archive at USC.


3. This refers to the process of acquiring permission to use copyrighted material.

4. Memo from the Warner Bros. Music Legal Files, Box No. 1109.

5. This method is certainly not limited to animation. Ernst Lubitsch did the same thing for the wedding march at the beginning of The Love Parade (1929).

6. Charles Wolfe discusses the issue of vocal performance in the Vitaphone shorts at length in "On the Track of the Vitaphone Short."

7. Thanks to Bob Gitt of the UCLA Archives for this information.

11. Imaging the Sound(s) of Shakespeare

1. Techniques not discussed here, but which could preserve the sense of "centripetal" space, might include limiting sound-off during a shot but allowing sound bridges between shots, de-emphasizing non-diegetic and subjective sound, and using only sync sound.

2. Even though Henry is turned from us in this scene, the sound of his voice does not of necessity have to be any less direct than were he facing the camera. A different mike placement could lead to an entirely different effect. Also, recall that reverb and other sound qualities can be simulated, altered, or removed in postproduction. In this scene and others like it, Oliver, by design, matches a spatial proportion on the sound track to a visual space.

3. It should be noted that in writing this essay I listened to an unrestored version of Macbeth. UCLA Film Archives and The Folger Shakespeare Library, Washington, D.C., have recently released a restored version of the film. This "restoration"