



Stretching Sound to Help the Mind See

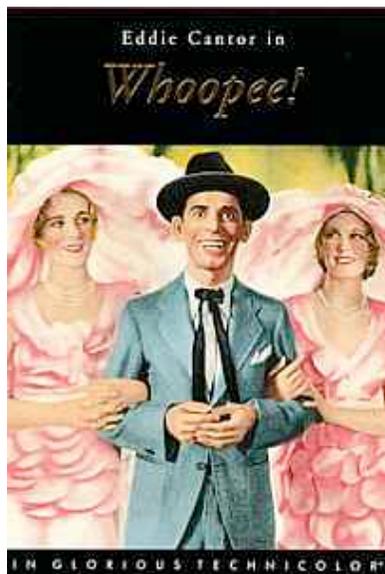
By WALTER MURCH

IT disappeared long ago, but in 1972 the Window was still there, peering through milky cataracts of dust, 35 feet above the floor of Samuel Goldwyn's old Stage 7. I never would have noticed it if Richard hadn't suddenly stopped in his tracks as we were taking a shortcut on our way back from lunch.

"That! was when Sound! was King!" he said, gesturing dramatically into the upper darkneses of Stage 7.

It took me a moment, but I finally saw what he was pointing at: something near the ceiling that resembled the observation window of a 1930's dirigible, nosing its way into the stage. Goldwyn Studios, where [Richard Portman](#) and I were working on the mix of "The Godfather," had originally been United Artists, built for Mary Pickford when she founded U.A. with Chaplin, Fairbanks and Griffith in the early 1920's.

By 1972, Stage 7 was functioning as an attic — stuffed with the mysterious lumbering shapes of disused equipment — but it was there that Samuel Goldwyn produced one of the earliest of his many musicals: "Whoopee" (1930), starring Eddie Cantor and choreographed by Busby Berkeley. And it was there that Goldwyn's director of sound, Gordon Sawyer, sat at the controls behind the Window, hands gliding across three Bakelite knobs, piloting his Dirigible of Sound into a new world . . . a world in which Sound was King.



Down below, Eddie Cantor and the All-Singing, All-Dancing Goldwyn Girls had lived in terror of the distinguished Man Behind the Window. And not just the actors: musicians, cameramen (Gregg Toland among them), the director, the producer (Florenz Ziegfeld) — even Sam Goldwyn himself. No one could contradict it if Mr. Sawyer, dissatisfied with the quality of the sound, leaned into his microphone and pronounced dispassionately but irrevocably the word "Cut!"

By 1972, 45 years after his exhilarating coronation, King Sound seemed to be living in considerably reduced circumstances. No longer did the Man Behind the Window survey the scene from on high. Instead the sound recordist was

usually stuck in some dark corner with his equipment cart. The very idea of his demanding "Cut!" was inconceivable: not only did none of them on the set fear his opinion, they hardly consulted him and were frequently impatient when he did voice an opinion. Forty-five years seemed to have turned him from king to footman.

Was Richard's nostalgia misplaced? What had befallen the Window? And were sound's misfortunes all they appeared to be?

There is something about the liquidity and all-encompassing embrace of sound that might make it more accurate to speak of her as a queen rather than a king. But was she then perhaps a queen for whom the crown was a burden, and who preferred to slip on a handmaiden's bonnet and scurry incognito through the back passageways of the palace, accomplishing her tasks anonymously?

There is a similar mystery hidden in our own biology: four and a half months after we are conceived, we are already beginning to hear. It is the first of our senses to be switched on, and for the next four and a half months sound reigns as a solitary Queen of the Senses. The close and liquid world of the womb makes sight and smell impossible, taste and touch a dim and generalized hint of what is to come. Instead, we luxuriate in a continuous bath of sounds: the song of our mother's voice, the swash of her breathing, the piping of her intestines, the timpani of her heart.

Birth, however, brings with it the sudden and simultaneous ignition of the other four senses, and an intense jostling for the throne that Sound had claimed as hers alone. The most notable pretender is the darting and insistent Sight, who blithely dubs himself King and ascends the throne as if it had been standing vacant, waiting for him.

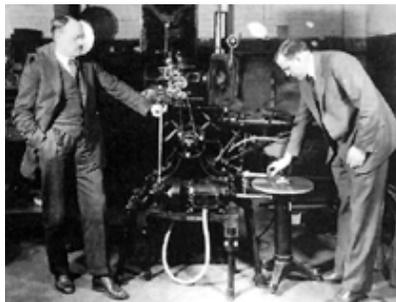
Surprisingly, Sound pulls a veil of oblivion across her reign and withdraws into the shadows.

So we all begin as hearing beings — our four and a half month baptism in a sea of sound must have a profound and everlasting effect on us — but from the moment of birth onward, hearing seems to recede into the background of our consciousness and function more as an accompaniment to what we see. Why this should be, rather than the reverse, is a mystery: why does not the first of our senses to be activated retain a lifelong dominance of all the others?

Something of this same situation marks the relationship between what we see and hear in the cinema. Film sound is rarely appreciated for itself alone but functions largely as an enhancement of the visuals: by means of some mysterious perceptual alchemy, whatever virtues sound brings to film are largely perceived and appreciated by the audience in visual terms. The better the sound, the better the image.

What in fact had given film sound its brief reign over the film image was a temporary and uncharacteristic inflexibility. In those first few years after the commercialization of film sound, in 1926, everything had to be recorded simultaneously — music, dialogue, sound effects — and once recorded, nothing could be changed. The old Mel Brooks joke about panning the camera to the left and revealing the orchestra in the middle of the desert was not far from the truth.

Clem Portman (Richard's father), Gordon Sawyer, Murray Spivack and the other founding fathers of film sound had the responsibility for recording Eddie Cantor's voice, and the orchestra accompanying him, and his tap dancing all at the same time, in as good a balance as they could manage. There was no possibility of fixing it later in the mix, because this was the mix. And there was no possibility of cutting out the bad bits, because there was no way to cut what was being chiseled into the whirling acetate of the Vitaphone discs. It had to be right the first time, or you called "Cut!" and began again.

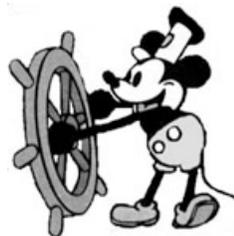


Sound on disc - Vitaphone

POWER on a film tends to gravitate toward those who control a bottleneck of some kind. Stars wield this kind of power, extras do not; the director of photography usually has more of it than the production designer. Film sound in its first few years was one of these bottlenecks, and so the Man Behind the Window held sway, temporarily, with a kingly power he has never had since.

The true nature of sound, though — its feminine fluidity and malleability — was not revealed until the perfection of the sprocketed 35-millimeter optical sound track (1929), which could be edited, rearranged and put in different synchronous relationships with the image, opening up the bottleneck created by the inflexible Vitaphone process. This opening was further enlarged by the discovery of re-recording (1929-30), where several tracks of sound could be separately controlled and then recombined.

These developments took some time to work their way into the creative bloodstream — as late as 1936, films were being produced that added only 17 additional sound effects for the whole film (instead of the many thousands that we have today). But the possibilities were richly indicated by the imaginative sound work in Disney's animated film "Steamboat Willie" (1928) and de Mille's live-action prison film "Dynamite" (1929). Certainly they were well established by the time of Spivack and Portman's ground-breaking work on "King Kong" (1933).



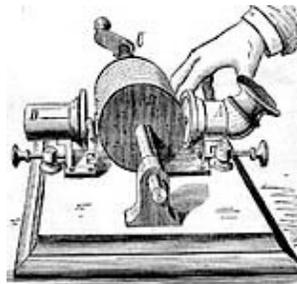
In fact, animation — of both the "Steamboat Willie" and the "King Kong" varieties — has probably played a more significant role in the evolution of creative sound than has been acknowledged. In the beginning of the sound era, it was so astonishing to hear people speak and move and sing and shoot one another in sync that almost any sound was more than acceptable. But with animated characters this did not work: they are two-dimensional creatures who make no sound at all unless the illusion is created through sound out of context: sound from one reality transposed onto another. The most famous of these is the thin falsetto that Walt Disney himself gave to Mickey Mouse, but a close second is the roar that Murray Spivack provided King Kong.



There is a symbiotic relationship between the techniques that we use to represent the world and the vision that we attempt to represent with those same techniques: a change in one inevitably results in a change in the other. The sudden availability of cheap pigments in flexible metal tubes in the mid-19th century, for instance, allowed the Impressionists to paint quickly out of doors in fleeting light. And face to face with nature, they realized that shadows come in many other colors than shades of gray, which is what the paintings of the previous "indoor" generations had taught us to see.

Similarly, humble sounds had always been considered the inevitable (and therefore mostly ignored) accompaniment of the visual — stuck like an insubstantial, submissive shadow to the object that "caused" them. And like a shadow, they appeared to be completely explained by reference to the objects that gave them birth: a metallic clang was always "cast" by the hammer, just as the village steeple cast its shape upon the ground.

Prior to Edison's astonishing invention of the phonograph in 1877, it was impossible to imagine that sound could be captured and played back later. In fact, sound was often given as the prime example of the impermanent: a rose that wilted and died as soon as it bloomed.



tin foil phonograph

Magically, Edison's discovery loosened the bonds of causality and lifted the shadow away from the object, standing it on its own and giving it a miraculous and sometimes frightening autonomy. According to an account in "Ota Benga," a 1992 book by P. V. Bradford, King Ndombe of the Congo consented to have his voice recorded in 1904 but immediately regretted it when the cylinder was played back: the "shadow" danced on its own, and he heard his people cry in dismay: "The King sits still, his lips are sealed, while the white man forces his soul to sing!"

The optical film soundtrack was the equivalent of pigment in a tube, and sound's fluidity the Impressionist's colored shadow.

Neither Richard Portman nor I had any inkling, on that afternoon when he showed me the Window, that the record-breaking success of "The Godfather" several months later would trigger a revival in the fortunes of the film industry in general and of sound in particular.

Three years earlier, in 1969, I had been hired to create the sound effects for, and mix, "The Rain People," a film written, directed, and produced by Francis Ford Coppola. He was a recent film school graduate, as was I, and we were both eager to make films professionally the way we had made them at school. Francis had felt that the sound on his previous film ("Finian's Rainbow") had bogged down in the bureaucratic and technical inertia at the studios, and he didn't want to repeat the experience.



Rainpeople

He also felt that if he stayed in Los Angeles he wouldn't be able to produce the inexpensive, independent films he had in mind. So he and a fellow film student, George Lucas, and I, and our families, moved up to San Francisco to start American Zoetrope. The first item on the agenda was the mix of "The Rain People" in the unfinished basement of an old warehouse on Folsom Street.

Ten years earlier, this would have been unthinkable, but the invention of the transistor had changed things technically and economically to such an extent that it seemed natural for the 30-year-old Francis to go to Germany and buy — almost off the shelf — mixing and editing equipment from K.E.M. in Hamburg and hire me, a 26-year-old, to use them.

Technically, the equipment was state of the art, and yet it cost a fourth of what comparable equipment would have cost five years earlier. This halving of price and doubling of quality is familiar to everyone now, after 30 years of microchips, but at the time it was astonishing. The frontier between professional and consumer electronics began to fade away.

In fact, it faded to the extent that it now became economically and technically possible for one person to do what several had done before, and that other frontier — between sound-effects creation and mixing — also began to disappear.

From Zoetrope's beginning, the idea was to try to avoid the departmentalism that was sometimes the byproduct of sound's technical complexity, and that tended too often to set mixers, who came mostly from engineering — direct descendants of the Man Behind the Window — against the people who created the sounds. It was as if there were two directors of photography on a film, one who lighted the scene and another who photographed it, and neither could do much about countermanding the other.

We felt that there was now no reason — given the equipment that was becoming available in 1968 — that the person who designed the soundtrack shouldn't also be able to mix it, and that the director would then be able to talk to one person, the sound designer, about the sound of the film the way he was able to talk to the production designer about the look of the film.

At any rate, it was against this background that the success of "The Godfather" led directly to the green-lighting of two Zoetrope productions: George Lucas's "American Graffiti" and Francis Coppola's "Conversation" — both with very different but equally adventuresome soundtracks, where we were able to put our ideas to work.

Steven Spielberg's "Jaws" soon topped the box office of "The Godfather" and introduced the world at large to the music of John Williams. The success of "American Graffiti" led to "Star Wars" (with music by the same John Williams), which in turn topped "Jaws." The 70-millimeter Dolby release format of "Star Wars" revived and reinvented magnetic six-track sound and helped Dolby Cinema Sound obtain a crucial foothold in film post-production



and exhibition. The success of the two "Godfather" films would allow Francis to make "Apocalypse Now," which broke further ground in originating, at the end of the 1970's, what has now become the standard film sound format: three channels of sound behind the screen, left and right surrounds behind the audience, and low-frequency enhancement.

Almost all of the technical advances in sound recording, manipulation and exhibition since 1980 can be summed up in one word: digitization. The effect of digitization on the techniques and aesthetics of film sound is worth a book in itself, but it is enough to say at this point that it has continued forcefully in the direction of earlier techniques to liberate the shadow of sound and break up bottlenecks whenever they begin to form.

The Window is long gone, and will not now return, but the autocratic temporal power that disappeared with it has been repaid a hundred — a thousand — times in creative power: the ability to freely reassociate image and sound in different contexts and combinations.

This reassociation of image and sound is the fundamental pillar upon which the creative use of sound rests, and without which it would collapse. Sometimes it is done simply for convenience (walking on cornstarch, for instance, happens to record as a better footstep-in-snow than snow itself); or for necessity (the window that Gary Cooper broke in "High Noon" was made not of real glass but of crystallized sheeted sugar, the boulder that chased Indiana Jones was made not of real stone but of plastic foam); or for reasons of morality (crushing a watermelon is ethically preferable to crushing a human head). In each case, our multi-million-year reflex of thinking of sound as a submissive causal shadow now works in the filmmaker's favor, and the audience is disposed to accept, within certain limits, these new juxtapositions as the truth.

But beyond any practical consideration, I believe this reassociation should stretch the relationship of sound to image wherever possible. It should strive to create a purposeful and fruitful tension between what is on the screen and what is kindled in the mind of the audience. The danger of present-day cinema is that it can suffocate its subjects by its very ability to represent them: it doesn't possess the built-in escape valves of ambiguity that painting, music, literature, radio drama and black-and-white silent film automatically have simply by virtue of their sensory incompleteness — an incompleteness that engages the imagination of the viewer as compensation for what is only evoked by the artist.

BY comparison, film seems to be "all there" (it isn't, but it seems to be), and thus the responsibility of filmmakers is to find ways within that completeness to refrain from achieving it. To that end, the metaphoric use of sound is one of the most fruitful, flexible and inexpensive means: by choosing carefully what to eliminate, and then adding back sounds that seem at first hearing to be somewhat at odds with the accompanying image, the filmmaker can open up a perceptual vacuum into which the mind of the audience must inevitably rush.

Every successful reassociation is a kind of metaphor, and every metaphor is seen momentarily as a mistake, but then suddenly as a deeper truth about the thing named and our relationship to it. The greater the stretch between the "thing" and the "name," the deeper the potential truth.

The tension produced by the metaphoric distance between sound and image serves somewhat the same purpose as the perceptual tension generated by the similar but slightly different images sent by our two eyes to the brain. The brain, not content with this close duality, adds its own purely mental version of three-dimensionality to the two flat images, unifying them into a single image with depth added.

There really is, of course, a third dimension out there in the world: the depth we perceive is not a hallucination. But the way we perceive it — its particular flavor — is uniquely our own, unique not only to us as a species but in its finer details unique to each of us individually. And in that sense it is a kind of hallucination, because the brain does not alert us to what is actually going on. Instead, the dimensionality is fused into the image and made to seem as if it is coming from "out there" rather than "in here."

In much the same way, the mental effort of fusing image and sound in a film produces a "dimensionality" that the mind projects back onto the image as if it had come from the image in the first place. The result is that we actually see something on the screen that exists only in our mind and is, in its finer details, unique to each member of the audience. We do not see and hear a film, we hear/see it.

This metaphoric distance between the images of a film and the accompanying sounds is — and should be — continuously changing and flexible, and it often takes a fraction of a second (sometimes even several seconds) for the brain to make the right connections. The image of a light being turned on, for instance, accompanied by a simple click: this basic association is fused almost instantly and produces a relatively flat mental image.

Still fairly flat, but a level up in dimensionality: the image of a door closing accompanied by the right "slam" can indicate not only the material of the door and the space around it but also the emotional state of the person closing it. The sound for the door at the end of "The Godfather," for instance, needed to give the audience more than the correct physical cues about the door; it was even more important to get a firm, irrevocable closure that resonated with and underscored Michael's final line: "Never ask me about my business, Kay."

That door sound was related to a specific image, and as a result it was "fused" by the audience fairly quickly. Sounds, however, that do not relate to the visuals in a direct way function at an even higher level of dimensionality, and take proportionately longer to resolve. The rumbling and piercing metallic scream just before Michael Corleone kills Solozzo and McCluskey in a restaurant in "The Godfather" is not linked directly to anything seen on screen, and so the audience is made to wonder at least momentarily, if perhaps only subconsciously, "What is this?" The screech is from an elevated train rounding a sharp turn, so it is presumably coming from somewhere in the neighborhood (the scene takes place in the Bronx).

But precisely because it is so detached from the image, the metallic scream works as a clue to the state of Michael's mind at the moment — the critical moment before he commits his first murder and his life turns an irrevocable corner. It is all the more effective because Michael's face appears so calm and the sound is played so abnormally loud. This broadening tension between what we see and what we hear is brought to an abrupt end with the pistol shots that

kill Solozzo and McCluskey: the distance between what we see and what we hear is suddenly collapsed at the moment that Michael's destiny is fixed.

THIS moment is mirrored and inverted at the end of "Godfather III." Instead of a calm face with a scream, we see a screaming face in silence. When Michael realizes that his daughter Mary has been shot, he tries several times to scream — but no sound comes out. In fact, Al Pacino was actually screaming, but the sound was removed in the editing. We are dealing here with an absence of sound, yet a fertile tension is created between what we see and what we would expect to hear, given the image. Finally, the scream bursts through, the tension is released, and the film — and the trilogy — is over.

The elevated train in "The Godfather" was at least somewhere in the vicinity of the restaurant, even though it could not be seen. In the opening reel of "Apocalypse Now," the jungle sounds that fill Willard's hotel room come from nowhere on screen or in the "neighborhood," and the only way to resolve the great disparity between what we are seeing and hearing is to imagine that these sounds are in Willard's mind: that his body is in a hotel room in Saigon, but his mind is off in the jungle, where he dreams of returning. If the audience members can be brought to a point where they will bridge with their own imagination such an extreme distance between picture and sound, they will be rewarded with a correspondingly greater dimensionality of experience.

The risk, of course, is that the conceptual thread that connects image and sound can be stretched too far, and the dimensionality will collapse: the moment of greatest dimension is always the moment of greatest tension.

The question remains, in all of this, why we generally perceive the product of the fusion of image and sound in terms of the image. Why does sound usually enhance the image, and not the other way around? In other words, why does King Sight still sit on his throne and Queen Sound haunt the corridors of the palace?

In his book "AudioVision", Michel Chion describes an effect that he calls the acousmètre, which depends on delaying the fusion of sound and image to the extreme by supplying only the sound — most frequently a voice — and withholding the revelation of the sound's true source until nearly the end of the film. Only then, when the audience has used its imagination to the fullest, is the identity of the source revealed. The Wizard in "The Wizard of Oz" is one of a number of examples, along with the mother in "Psycho" and Hal in "2001" (and although he didn't mention it, Wolfman Jack in "American Graffiti" and Colonel Kurtz in "Apocalypse Now"). The acousmètre is — for various reasons having to do with our perceptions — a uniquely cinematic device: the disembodied voice seems to come from everywhere and therefore to have no clearly defined limits to its power. And yet . . .



And yet there is an echo here of our earliest experience of the world: the revelation at birth that the song that sang to us from the very dawn of our consciousness in the womb — a song that seemed to come from everywhere and to be part of us before we had any conception of what "us" meant — that this song is the voice of another and that she is now separate from us and we from her. We regret the loss of former unity — some say that our lives are a

ceaseless quest to retrieve it — and yet we delight in seeing the face of our mother: the one is the price to be paid for the other.

This earliest, most powerful fusion of sound and image sets the tone for all that are to come.

Walter Murch, won an Oscar for sound for "Apocalypse Now" (1979) and was awarded Oscars for editing and sound for "The English Patient" (1996)

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This article was adapted from "Sound Design: The Dancing Shadow" - an article that appeared in [Projections 4](#)



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