

Sound Doctrine: An Interview with Walter Murch

Walter Murch picture edited *The Conversation*, *Apocalypse Now*, *Julia*, *The Unbearable Lightness of Being*, *Ghost*, *House of Cards*, *Romeo Is Bleeding*, *First Knight*, *Godfather III*, *The English Patient*, *The Talented Mr. Ripley*, and numerous other films. Plus, he has written a concise and highly readable study of editing, *In the Blink of an Eye*. But note this. The following interview concentrates, not on Murch the picture editor, leaning over an Avid in a cutting room, assembling a film's image track, but on Murch the sound designer and re-recording mixer. For once, the eyes don't have it, and the term "soundtrack" is meant literally. It refers to every sound—to the collage of voices, noises, and music—that a movie-going audience hears coming through speakers, not just to a potentially marketable collection of music isolated from the film it accompanied.

Murch cares about soundtracks. Listen to *THX-1138* (1971), *The Godfather* (1972), *American Graffiti* (1973), *The Godfather, Part II* (1974), *The Conversation* (1974), *Apocalypse Now* (1979), *Crumb* (1994), *The English Patient* (1996), or *The Talented Mr. Ripley* (1999). Murch mixed them all, and they each possess an audio allure. They sound as good as they look.

It's hardly surprising, then, that Murch ended up remixing and re-editing Orson Welles' *Touch of Evil* (1958). Welles, more than any other director before him, employed sound—to evoke cinematic worlds, establish mood, and raise goosebumps. For example, in *Citizen Kane*, the audio montage that condenses Susan Kane's singing career into a dizzying burst of music and noise anticipates "Tomorrow Never Knows," the Beatles at their experimental best. And as for the opening sequence to *Touch of Evil*? Now that Murch has replaced Henry Mancini's studio-mandated mambo with the audio-vérité track that Welles originally designed, it recalls nothing so much as *musique concrète* (Pierre Henry) or electronica (Josh Davis/DJ Shadow)—or, yes, the soundtrack to *American Graffiti*. Indeed, the newly realized *Touch of Evil*—for 40 years a virtual movie, a movie that Welles hoped against hope Universal would edit and distribute—might register most forcefully with a contemporary audience schooled on films, such as *American Graffiti*, that Murch edited and mixed. We've learned to see and hear the film that Welles intended.

In short, Murch stands as an important figure in cinema because he and a handful of peers realized possibilities offered by multi-track recording. (Or in materialist terms, the development of multi-track recording technology significantly broadened options available during postproduction, creating a niche for Murch and his peers to fill. It was, thus, crucial to the outpouring of independent films in the late '60s and '70s.) For while the possibilities of editing and mixing sounds had been glimpsed early on—long before the arrival of the talkies—they remained largely inaudible until magnetic tape emerged as an economically viable and practical recording medium. Tape made sound malleable, much like celluloid made visual images malleable. And that exposes an anomaly. If we want to understand the history of edited images we start by looking to the films of Eisenstein, Vertov, and Pudovkin. To understand the history of edited sound, we do well to listen to Murch's work with Lucas and Coppola.

MICHAEL JARRETT: *Has film sound led us to hear the world differently?*

WALTER MURCH: Yes . . . sure. I hesitate only because Welles was doing the same kind of thing with radio back in the 1930s. Then he continued to innovate when he got into film. If you listen to many of his films, including *Touch of Evil*, if you don't watch the picture, you kind of hear the sort of things that he was doing on radio, both with dialogue and sound.

Never before in history, before the invention of recorded sound, had people possessed the ability to manipulate sound the way they'd manipulated color or shapes. We were limited to

manipulating sound in music, which is a highly abstract medium. But with recorded material you can manipulate sound effects—the sound of the world—to great effect. In the same way that painting, or looking at paintings, makes you see the world in a different way, listening to interestingly arranged sounds makes you hear differently.

Sound came to film in the late '20s, but when it arrived, it anticipated the even later arrival of tape.

That's very true. Whenever you work in film, you're working with tape. It just happens to be tape with sprockets on it.

You find things being examined in one discipline; people develop a facility within that area. When they suddenly can expand into another area, there's a ready-made disposition. They already know how to do it, in a sense.

Touch of Evil recalls themes and approaches developed in your own work—the theme of surveillance, the use of source materials. Was working on it something like gazing into a mirror?

In a way, yes. It wasn't a film with which I was intimately familiar before I began work on its restoration. I'd seen it a couple of times, but I hadn't studied it the way some people have, on a frame-by-frame basis. Obviously, when you do a restoration, you really have to get down with the film on a very deep, technical level. But yes, I'd done work on *The Conversation*, which was all about surveillance, and *American Graffiti*, which was all about the creative use of source music. Welles had anticipated both of those things in *Touch of Evil*.

So Welles was less a direct influence than you both followed the logic inherent in recording technologies.

Once you take sound seriously—you think, "How can we use it to the best effect?"—it's almost inevitable that you'll start coming to the same conclusions as somebody else who was thinking along the same lines. I'd seen *Touch of Evil*. Who knows how subconsciously it influenced what I did.

Are there people in film, besides Welles, that you regard as anticipating later accomplishments with magnetic tape?

Certainly Murray Spivak, who was one of the premier and earliest sound editors. He worked on *King Kong*. You'll find the most creative use of sound in films like *King Kong* or in Warner Brothers' cartoons of the '30s and '40s—and Disney to a certain extent. They weren't limited by reality, and so they recorded interesting, fantastic sounds and, then, arranged and combined them in interesting ways—more so than features. Features were late in developing that sensibility. I grew up on Warner Brothers' cartoons. When I was five or six, I felt that they were fantastic. They laid down a very rich bed of information that I became aware of only much later.

By all accounts the division of labor at RKO, where King Kong was made, and at Warner Brothers, with Tex Avery, Raymond Scott, and Chuck Jones, wasn't as strict as elsewhere. Ideas could circulate.

Exactly. Remember that sound alone, just the fact that there was sound at all, was a huge thing in the '30s—for ten years. We've had Dolby sound in theaters for almost double that amount of time. You can imagine the sense of accomplishment in getting any sound at all and, then, to investigate stories with spoken word and a certain amount of sound effects? Plus, it was a corporate world in the sense that there were very few independent motion

pictures, and those that there were made had tiny budgets. Sound was expensive; they couldn't do much inventive work on that level. The push had to come from the director—somebody like Hitchcock or Welles—who said, "I am interested in sound." Otherwise, the tendency was to do a journeyman-like job and not spend too much money because they'd already jumped over the post so to speak, since there was sound to begin with. The really creative use of sound was something that took time. But there are many exceptions to that rule. Renoir, for example, claimed to be the first person to record a toilet flush and put it in a movie. He strung a microphone from the studio's sound department to a toilet, flushed the toilet, recorded it, and put it in a film he directed in the very early '30s.

Taking an example from your own work, when you edited sound on American Graffiti, did you have an entire radio show recorded that you could reference as needed?

Yes. We produced a two-hour radio show with Wolfman Jack as DJ—with commercials, with the songs. George [Lucas] built that show himself. While he was editing the film, he edited the songs, the commercials, and the disk-jockey patter. That is what's called a "B-track." It ran alongside the dialogue during the editing of the film.

And what did you bring to the production?

The acoustic treatment of worldizing it, so that it seemed to be something that existed in real space. The idea was that every teenage car in this town was turned to the same station, and, therefore, anywhere you went in the town, you heard this sound echoing off the buildings and passing by in cars.

George and I took the master track of the radio show and played it back on a Nagra in a real space—a suburban backyard. I was fifty-or-so-feet away with a microphone recording that sound onto another Nagra, keeping it in sync and moving the microphone kind of at random, back and forth, as George moved the speaker through 180 degrees. There were times when microphone and speaker were pointed right at each other, and there were other times when they were pointed in completely opposite directions. So that was a separate track. Then, we did that whole thing again.

When I was mixing the film, I had three tracks to draw from. One of them was what you might call the "dry studio track" of the radio show, where the music was very clear and sharp and everything was in audio focus. Then there were the other two tracks which were staggered a couple of frames to each other, and on which the axis of the microphone and the speakers was never the same because we couldn't remember what we had done intentionally. Sometimes, Wolfman Jack would be on axis on one track, but he would be off axis on the other track. I was able to blend those three tracks to get the right amount of atmosphere. I could make transitions from a live, very present sound to something that sounded like it was very distant and bouncing off many buildings. I could create a sense of movement too—hence, the moving microphones.

This is what I discovered Welles had done in a more primitive form in *Touch of Evil*. What he had not done was combine the original recording and the atmospheric recording. He simply positioned a microphone, static in an alleyway outside Universal Sound Studios, re-recording from a speaker to the microphone through the alleyway. He didn't have control over the balance of dry sound versus reflected sound, and he didn't have the sense of motion that we got from moving the speaker and moving the microphone relative to one another. This creates the sonic equivalent of depth of field in photography. We can still have the music in the background, but because it's so diffuse, you can't find edges to focus on and, therefore, the dialogue which is in the foreground and which is in focus is clearly what you're supposed to be listening to. That was the defect of all previous systems, except for Welles' system. In them the music was just filtered and played low, but it still had its edges, and, therefore, it

became hard for the mind to separate out the edges of the music versus the edges of the dialogue. We came up with a way of taking music that might, at one point, be fully in the foreground—in focus and loud—and, then, during a scene transition, sent way into the background and thrown out of focus so that people could talk in the foreground in dialogue and not have you driven mad. No other film before that one had had 42 songs back to back. They would have maybe three or four, five or six at most, scattered throughout the film.

The sonic space that's created in American Graffiti really gets opened up in Apocalypse Now.

American Graffiti was in mono. *Apocalypse Now* was my first stereo film. All of the films I'd worked on up until that point were mono. So I jumped with both feet into the fire, not only doing a stereo film but doing the first dramatic quadraphonic film.

With it, the audience gets a sense of being surrounded by sound. There are sound sources in back and in front of us.

You have to be very careful about what sounds you put behind the audience. They can distract attention away from the screen. We had a whole list of do's and don'ts: sounds that were permissible in the back and sounds that were not permissible in the back.

So a tiger leaping, if it's done quickly, could move from back to front?

That, specifically, is a sound that we would not put in the back. Sounds that have great definition we kept in the front.

On Apocalypse Now you and others had to edit an enormous amount of film. Was there a comparable surfeit of audio tape?

No. At the time of shooting almost no usable sound was recorded for the film because of the difficulties of production. We had what is called a "guide track." We had to recreate the whole sonic environment, item by item, for the finished film, including almost all the dialogue. Once you have the image, then that immediately begins to narrow down what you will use for sound. It's still a huge amount, but when you have sound, you're, thankfully, being guided by what you see in the picture.

How did you get the helicopter sounds in that movie?

We got the Coast Guard to cooperate. We went up to Washington State and for three or four days recorded all kinds of different helicopters. At the beginning of the film, where we wanted a more abstract approach, we took the helicopter sound and recreated it element by element on a synthesizer.

If you listen to a helicopter approach from a distance, fly overhead and, then, away, it's got many different stages that it goes through. We took each of those stages and said, "Alright, here we'll hear only the flap of the blade. We don't hear any motor. Let's do a flap." So we fooled around on the synthesizer until there was a flap that we felt was suitably abstract but helicopter-ish enough. And then the other elements, the turbine whine, the whoosh of the thing through the air, and all of those different aspects of it.

You've written that you were led to a career in sound design by hearing Pierre Schaeffer's musique concrète. It's striking to note similarities between Schaeffer's compositions and the sound of Welles' films.

A lot of what Welles did in *Citizen Kane* and what he'd done earlier on radio is a kind of

musique concrète. Schaeffer's innovation was to apply the then-new technology of magnetic tape to recording and assembling sound, and, then, to give performances in musical venues and call it *musique concrète*—concrete, as opposed to abstract, music. Nobody had done that before. It was a big revelation. But if you listened to what was produced for films and to much of what was done on the radio by innovators such as Welles, it was the same kind of thing.

It also turns out that the first piece of musique concrète—Étude aux Chemins de Fer—features train sounds. Schaeffer anticipated your use of train noises in American Graffiti, The Conversation, and The Godfather. In American Graffiti, we hear a train when Curt [Richard Dreyfuss] sabotages the police car. In The Conversation, when Harry Caul [Gene Hackman] first sits down to edit the tape that he and his crew have recorded, there's the sound of a train's bell that you, then, reintroduce in the film's dream sequence. In The Godfather, there's the sound of a train when Michael [Al Pacino] kills his father's enemies. What do you make of this reoccurring motif?

You have to remember that those films were all made within about a year of each other. Trains were on my mind. Apart from that, I love the sound of a train. If you think of it as a musical instrument, it's a very complex, interesting sound. You can go into record stores and find whole bins full of train sounds.

Over time people have had a lot of associations with trains. Perhaps not so much now but certainly when I was growing up, trains were the thing that talked to you about travel. If you wanted to go anywhere, you went on a train. The whole idea of moving from place to place in the world was dominated by that sound. So it was a mixture of all those three things.

It seems that just as trains forever altered our consciousness of space, shortening distances, they also changed the sonic landscape.

Yes, very much. I remember talking to people in England in the 1960s who were old enough to remember when trains were first put through in remote parts of the country. They always talked about the thing that changed was the sound—that you couldn't go into that part of the world anymore without the presence of that sound. So they thought of trains primarily in terms of sound and only later in terms of their visual effect.

The train sounds in the films I mentioned create a sonic trope, a signature. How did you come to introduce that sound?

To deal with the most specific first, on *American Graffiti* we were doing some pick-up shooting, a couple of shots after the main photography had been done. We were at the used car lot. I heard a train in the distance. It was like two o'clock in the morning. I'd been trying to figure out how I was going to do that section, and I thought, "Oh, yes, I could do a train." So in a weird way that location and fate made me alert to the possibilities of using a train there.

I was mixing *Graffiti* when we were shooting *Conversation*, and that sound was, again, suggested by the actual environment in which Harry Caul [Gene Hackman] had his warehouse, which was really five or six blocks away from where American Zoetrope, the studio, was. There's a shot, quite early on, after the first apartment scene in which Harry talks to his landlady and plays the saxophone. He goes to work the next morning, and you see him picking his way across railroad tracks in order to get to the entrance of his warehouse. In fact, just on the other side of that warehouse is the main switching yard for freight and passenger trains coming into San Francisco from the south. So the idea was triggered by what's actually in the environment.

I always like to think, not only about the sound of the space a character is in, but also about what's outside—to break the wall and invoke some kind of presence of the exterior. Of course, it has to be a reasonably loud or percussive sound, something with a tonality to it, in order to penetrate through walls. Otherwise, you hear a generalized wash of city noise, which sounds like pink noise. It doesn't have much character. So it was a matter of looking for sounds with character that could get through the window and which were also true to the environment that Harry's in. That's really the extent of it. If the environment in which Harry works has trains in it, then he and, by extension, we are going to associate that sound with that environment. Because they are in the atmosphere, trains are going to worm themselves into Harry's dreams.

And then the train becomes a metaphor for the process of editing.

Oh yes, like putting one car after the other. There's also an affinity historically between films and trains. The first film at which an audience paid to see a film was *The Arrival of the Train*, the Lumiere Brothers. And the first feature was Porter's *The Great Train Robbery*. Somehow there is this affinity between trains and film. The two rows of sprockets are kind of like the two tracks. It's all a geared and mechanical kind of world, certainly when film started out. It's shifting now with digital machines, but if you look at old film equipment and listen to an optical printer while its going, you hear this clackity-clack, clackity-clack, clackity-clack sound. If you slow the projector down far enough, it will sound pretty much like a train, too. It's just that it's going so fast that you don't hear the separate clicks. The other thing about trains, which is what I mentioned with helicopters, is that they are very complicated, big mechanical objects that move at various speeds through space. As they do that they reveal a kind of chromatic array of the components out of which they are made. The very distant train has a very particular kind of sound; the close-up and idling train has another sound. Steam trains are more interesting sound-wise than diesels.

In your book—In the Blink of an Eye—you outline six rules for editing images. Are there comparable rules for editing sound?

You have more freedom with sound than you do with picture. There are, consequently, fewer rules. But the big three things—which are emotion, story, and rhythm—apply to sound just as much as they apply to picture. You are always primarily looking for something that will underline or emphasize or counterpoint the emotion that you want to elicit from the audience. You can do that through sound just as well as through editing, if not more so. Rhythm is obviously important; sound is a temporal medium. And then story. You choose sounds that help people to feel the story of what you're doing.

That example of the elevated train in *Godfather* is something that's primarily an emotional cue. There's rhythm to it but only to a certain extent, and story-wise it's a little ambiguous. "What is that sound? What is it doing in the film?" There's not an easy answer to that. But emotionally you absolutely understand what that sound is there for. You understand it in a subconscious way, but it provokes the audience, partly by virtue of its mystery. It's a mysterious sound that is nibbling away at their subconscious, and people, being people, like to resolve things in some way. So subconsciously they will say, "What is that sound?" Because there's nothing in the picture that is anything like a train—although it's reasonable that a train might be heard in that part of the Bronx—the emotion that comes along with that sound, which is a screeching effect as a train turns a difficult corner, gets immediately applied to Michael's state of mind. Here is a person who is also screeching as he turns a difficult corner. This is the first time he is going to kill somebody face to face. He's doing what he said he would never do. He wanted not to be part of the family, and now he's overcompensating. He's doing what he alone can do for the family.

Do you recall how you came up with that idea?

Francis [Coppola] wanted to not have any music in that scene. He wanted the music to come in after the murder was over, after Michael had dropped the gun the way Clemenza told him to do it. Only at that moment would these big operatic chords come in. He felt that, if he had music earlier, it would dilute the effect of the music. He was quite right. Yet we looked at the scene and said, "You know, it just kind of sits there unless we have something. Well, let's try some sound effects." It being the Bronx, and since I grew up in that part of New York, I remember—again, just like in *American Graffiti*—I remember those kinds of places always being close to elevated trains. So I came up with this idea of the screeching which I remembered from my youth as being a provocative kind of sound. We did a test—tried it, and it worked. So it went in the film.

Basically, you're saying that audiences should be able to work with sound in a manner similar to the way Eisenstein said they should be able to puzzle out the meaning of edited images.

That's the key to all film for me—both editorial and sound. You provoke the audience to complete a circle of which you've only drawn a part. Each person being unique, they will complete that in their own way. When they have done that, the wonderful part of it is that they re-project that completion onto the film. They actually are seeing a film that they are, in part, creating: both in terms of juxtaposition of images and, then, juxtaposition of sound versus image and, then, image following sound, and all kinds of those variations.

I always try to be metaphoric as much as I can and not to be literal. When you're presented with something that doesn't quite resolve on a normal level, that's what makes the audience go deeper. Again, that train screech in *Godfather* is a good example. It doesn't make any sense from what you're looking at. You haven't been shown a train anywhere in the neighborhood. The loudness with which you hear it is too loud. Even if you were in a restaurant right under an elevated train, it wouldn't quite be that loud. So the audience is presented with a discontinuity. They're looking at very still images, close-ups of people talking in a foreign language, and yet they're hearing something completely different. That forces them to say, "What is that? What could that be?" Again, not consciously but subconsciously. And, as a result, they come up with a feeling about Michael's state of mind, and then they re-project that feeling onto his face. And in addition to what Al Pacino was doing, there's this whole other dimension that gets added to that.

So though you work metaphorically, you employ sounds that have a plausible origin in the film's world.

Yes. If you stretch it too far, it just becomes absurd. You haven't given the audience enough of the circle to know whether it's a circle or not.

That leads to the question of determining the line between metaphor and catachresis—the absurd image.

You have to use intuition and trust your instincts. At a certain point there's nothing else to guide you. And then, also, try stuff out. Don't be afraid. What I've always found, consistently, is that you can go much further than you think you can. So if you just think about it, you would hold yourself back, but if you actually do it and look at it and see what the effect is, you realize, "Oh yes, this is great. I think I can go even more with it." So you keep on going with ideas and with approaches until you sense, "Oops, that's too far." And again, who is there to tell you you've gone too far? I don't know. It's just you and your relationship to the work. So it's a combination of faith, that something like this will work. It's an experiment to prove, as much as you can prove, what the edges of this world are. When

you've gone too far, you hopefully will realize it.

Do you think you could come up with an auteurist theory describing the way sound is employed in film? Do you recognize auteurs of sound?

Yes, in the sense that different people have generally different approaches. But it's so influenced by the director and by the kind of film it is that I don't think you can quite entertain that idea to the same extent.

Are there movies that you would just as soon hear as view?

It's the interaction between sound and image that I like. Although as I did mention, it's an interesting experiment to turn off *Touch of Evil*, the picture, and just listen to the sound. I'm sure the same would be true with *Citizen Kane* although I've never done that. I see very few films myself. I'm not a film buff.

Do you listen to music?

Yes, but I also listen to the environment that's around me. When I'm making a film, I'm like a particularly thirsty sponge and will pull up things in the environment and think, "Oh, I could use that." A trivial example is in *Apocalypse Now*. At the end of Kilgore's beach party, there's the sound of helicopter turbines starting up. It pre-laps the transition to when the helicopters are already in full wing.

At a party he'd thrown for Marty Sheen, Francis had arranged a helicopter to take Marty from Napa to a baseball game at Giant Stadium. I was at the party, and I heard this sound of the helicopter turbines starting up, and I immediately saw that transition and thought, "Hey, this would be great! That sound could pre-lap the cut. Then, when we do cut, it could hit very hard with the sound of dozens and dozens of helicopters idling on the ground." Rather than simply cut with that sound, we had something slowly building illogically underneath Kilgore's dialogue. There are no helicopters at night when he's saying, "Charlie don't surf." But what you hear under the dialogue is this turbine whine accelerating. Musically, it gives you a sense of anticipation and a windup. Something's about to happen. And then, of course, there's this cut, and the sound is very loud.

Your response to environmental sounds recalls the recommendations of John Cage.

I was a big fan of John Cage in my teenage years.

What are your feelings about nondiegetic music? If you could always exercise your will, would you use it?

Do you mean ordinary film music? I generally think music is used too much. But the general principle, for me anyway, is that although music is an effective rallier of emotions—it can provoke emotions in people—it's best used in film as something that directs or channels emotions that are already present. If a film becomes too dependent on music to create the emotion, there's a kind of steroid-like artificiality that comes into play. The audience, without knowing it, begins to feel manipulated. "They want me to feel sad, so they play sad music." What I'd much rather have happen is that the scene itself—and that scene from *Godfather* is a perfect example because it provokes an emotion—I'd rather, when music comes in, that it tell the audience *where* to channel that emotion—what twist to put on that emotion. Is it a safe emotion? Is it a heroic emotion? Is it an uncertain emotion? Or any word you care to apply to them. That's when music, to me, is most effective. *Godfather* overall is a film that could be used as the textbook for that sort of use of music. And, Welles, too, did the same sort of thing.

The use of music that you're recommending posits an audience intelligent enough to bridge the gap between what's seen and what's heard.

I always assume that an audience has intelligence. They're extremely intelligent. It's just that, if you don't allow people to use their intelligence, then they start losing their ability to function with it. It's like if you live solely on a diet of junk food, your taste buds after awhile just give up, because they are assaulted daily with very strong doses of salt, sugar and fat. After awhile, you lose the ability to discern subtle variances in flavor. And so the overuse of music can become as addictive as eating junk food.

Clarify for me the role of re-recording mixer versus the role of sound designer. You're credited as doing both tasks .

It's a nebulous area. The origin of the term "sound designer" goes back to *Apocalypse Now* when I was trying to come up with what I had actually done on the film. Because Francis had wanted to do the film in this quadraphonic format, which had never been done before, that seemed to require from me an analysis of the design of the film in a three-dimensional space of the sound. I thought, "Well, if an interior designer can go into an architectural space and decorate it interestingly, that's sort of what I am doing in the theater. I'm taking the three-dimensional space of the theater and decorating it with sound." I had to come up with an approach, specifically for *Apocalypse Now*, that would make that work coherently. In my case, that was where "sound designer," the word, came from.

Later on, people appropriated it, which is certainly their prerogative, but it also has become known as the person who designs interesting, unique sounds. So if you have a sound that you can't get from a library, that you can't go out and record yourself, but that you have to concoct out of a different number of contributing sounds, then that becomes what the sound designer does. For instance, the sound of the flashbulbs in *Raging Bull* that Frank Warner came up with and the sound of the punches that he came up with in *Raging Bull* were unique. They were not simply punches or flashbulbs. They had a strong emotional component to them. So in that sense he was a sound designer, although he's the last person in the world to use that term. But that's what he was doing.

Combining a number of different sounds to make a single sound, that—in miniature—is exactly what a re-recording mixer does. They take all the different sounds prepared for a film and mix or blend them in an interesting, developed way that can be sustained over a two to two-and-half hour period. But the conditions under which mixers and sound designers work are very different. The sound designer usually works in a kind of sound laboratory, whereas re-recording mixers work on a sound stage, usually with the director present. Time is of the essence. You have to keep moving and producing so many reels per day. The demands on a re-recording mixer are very different than those on a sound designer. And, some re-recording mixers are sound designers and vice versa.

Probably no other film exists in as many versions as The Godfather. Is that an effect of a short postproduction schedule paired with subsequent opportunities to re-edit.

That's a process that extended over 25 years. Nobody knew that the original was going to be the success that it was. We all hoped, but there was always a doubt. There were some dark days toward the end of postproduction where we wondered if people would sit still through a three-hour film about gangsters. Had it not been a success, that would have been it. There would be just one version. There's only one version of *The Conversation* because *The Conversation* was not a financial success.

How did you arrive at the distorted sounds heard at the beginning of that film, those sounds we hear when the recorded voices of Cindy Williams and Frederic Forrest break up?

We started shooting *The Conversation* in '72 and finished the film in '74. But 1973 was the year of *The Conversation*, for me anyway. Even as early as that, there were already shudderings of the world of digital sound. It hadn't hit yet, but we knew that people were experimenting with it. A lab at the University of Utah was doing groundbreaking stuff.

I thought, "It's slightly logical that Harry Caul would have a digital setup of some kind. In fact, the only way he would be able to do what he does—remove an overlay of drums and reveal a voice behind—is by some kind of digital subtraction. Along that line I thought, "If he's recording and the signal goes off, it would be interesting if, when it went off, the digital algorithm that underlays it is revealed." Instead of the signal just getting weaker or instead of it getting staticy, it could somehow begin to break down into its digital elements. I found a synthesizer and sent the voices through it. I processed them—the control track—with square waves and various other things to get what was an approximate indication, to me anyway, of a digital signal. The motive was everything that I've just been talking about. The means was sending the voice through an Arp synthesizer, a fairly state-of-the-art analog synthesizer for 1973.

The result is prescient. It sounds like a lot of recordings being released by contemporary musicians such as Scanner, Chessie, or artists on the Mille Plateaux labe. When did you shift from working with analog machines to digital ones?

It was fairly gradual. What I've done ever since *The Conversation* is edit the picture and, then, mix the soundtracks. Because the schedules were long on *The Conversation* and, to a certain extent, on *Apocalypse Now*, I was able to do all three things: edit the film, edit sound, and, then, mix it. Since then, however, schedules have not allowed me to do sound editing other than the sound that I'm working with when I cut the picture. I depend very much on collaboration with a sound designer or a sound supervisor—whomever it may be—to receive the ideas that I've developed during the cutting of the picture and to generate material that I can then use to mix the film.

The first film I worked on that had any digital elements to it was *Godfather III* and, then, *Romeo Is Bleeding*, which was '94. *Romeo* was the first film that I worked on where the sound was edited on workstations. But I didn't do that editing. I edited that film conventionally, and a sound supervisor, Dane Davis, did the sound on a workstation. A couple of years after that, in '96, I started editing on the Avid with *English Patient*.

While mixing the The English Patient I assume that sounds were delivered to you but that there were a few sounds that needed to be picked up or designed after you'd already finished editing?

Yes, loads—all of the sound effects in the film: the sound of the planes, the sandstorm, many occasional sounds—footsteps, sounds that objects make, the sounds of jeeps, machine-gun fire, campfires, the whole atmosphere of the desert. In reality, the desert itself was absolutely quiet, which made for great dialog recording, but the problem is, if you simply played it the way it was, it would sound artificial. It's a paradox where reality sounds artificial. So we had to develop a signature of the desert, what you might call an active silence that had elements that fit with the desert: a sound that wouldn't raise any suspicions and that seemed quieter than if we had had absolute silence. Pat Jackson—who was the sound supervisor on the film—came up with a fairly complicated blend of sounds that included a very, very dry insect sound and the sound of grains of sand rolling down paper. Of the total sound of the film—including the dialogue, music, and sound effects—probably eighty percent was added at a later date.

As you were editing the images, would you send out a call to Pat Jackson, asking her to obtain sounds, or did you gather sounds, too?

A little of both. It was more like, "Hey, I just had a great idea. Why don't we do this?" Then, Pat would say, "Yes, that gives me another idea. Why don't we do that?" It's collaborative filmmaking at its best. I'm naturally thinking about the final soundtrack as I edit the film, but because of my hands being full editing the picture and, then, mixing the film, it's more efficient for me to collaborate with somebody. Pat recorded a bunch of stuff, found sounds at libraries, and ransacked the production sound of the film for interesting sounds that might have been picked up here and there.

The English Patient begins with a rattle of percussion that we come to associate with vials of medicinal oils. At the beginning of American Graffiti there's the sound of someone twirling a radio dial, locating a station. And we've discussed the sounds that start The Conversation.

And the helicopters in *Apocalypse Now*.

Do you labor over that first sound that the audience will hear?

No. In the case of *The English Patient*, that montage of little sounds at the beginning was a very late addition. It was generated in the last two weeks of making the film. Once we had the title sequence in place, the film seemed to call out for something—a little montage of desert sounds to locate you in space and time. And so Pat came up with those things. I made suggestions about some of the elements, but she came up with everything else.

In mixing that opening montage, you move from percussive to orchestral sound and, then, to male voices chanting. Those voice then resolve into the sound of an airplane engine. Did you use ProTools or some digital means to tune the sound of the airplane engine or the voices?

The voices were in tune with the music that Gabriel [Yared] had already composed. So we tuned the airplane engine to them. We've been doing that for years. The sound of the outboard motor in *Godfather II* was tuned to harmonize with the music that Nino Rota wrote. This is when Fredo was being taken out into the middle of the lake. We tuned the engine, but in those days we did it by speed varying the tape recorder.

I'd wondered how much tuning goes on versus how much we in the audience are required to reconcile disparate sounds.

Musical tonalities are very tricky. If you're slightly off, it sounds bad. The audience can't say, "Oh, that's a quarter tone out. I'll resolve it." Instead, you hear a dissonance that you can't resolve. Music is a good case where a gestalt completion just can't happen, at least as far as tonality goes. You have to be in tune. Otherwise, it sounds bad.

Through numerous dissolves, the edited images in The English Patient orient the audience. They help us know where we are in space—geographically—and whether we're in the narrative past or present. Edited sounds seem to function in an opposite way. They often blur one place into another, or they link past and present.

A good example of that is the scene where Hanna [Juliette Binoche] is playing hopscotch, and you hear the sound of her hopping around and dropping the whistle or whatever the metal object is that she's throwing. That sound blends with the percussive sound of Arab music in Count Almásy's [Ralph Fiennes's] head until you can't distinguish one from the other. You, then, go from that environment into the desert. In another scene there's a Benny Goodman tune with a clarinet solo, and out of a clarinet note comes the sound on an incoming artillery shell. All of a sudden, you're in Tobruk during a siege and a lot of munitions are going off. In that case, there is no picture dissolve, but the sound has made a transition for you from clarinet to artillery, anticipating what's about to happen.

For whom do you mix a film: for people who hear it in state-of-the-art theaters, for people in small rooms at cineplexes, or for people who'll catch it on video?

It's always a compromise because you can produce only one mix. It has to be a mix that will play in both small theaters and large theaters. It just so happens that large theaters are less forgiving than small theaters. If you mix for a large theater, it will tend to play all right in a small theater. You can get into very serious trouble going the other way, mostly with dynamic range. The balance between the energy of average dialogue versus the loudest sounds in the film has to be very carefully controlled for a large theater. The large theater will suck up dialogue and yet reproduce sound effects and music very efficiently because of the energizing of the field that happens with music. Music is continuous, and, thus, it's like it sets up a reverberant pattern that resonates within the theater. Dialogue is individual words separated by silence. They aren't capable of energizing all of the cubic feet of a large theater with the same efficiency that music is. Compared to music, you have to raise the dialogue relatively loudly if you're mixing for a large room.

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