Chapter 1
The Empowerment of Sound

"It's probably not a good idea to come into this room and hear this demo—because after I finish, you will belong to me."

David Lewis Yewdall MPSE *(playfully teasing clients who are not empowered by the art of sound as they enter the author's sound design and editorial facilities)*

This book is for everyone interested in sound. It does not matter if you are in the sound business. It does not matter if you aspire to personally design and prepare your own soundtracks for the silver screen, television broadcast, or live theatre performances. This book is just as important to those not involved in the actual hands-on creative efforts, but just as responsible for the ultimate success of the soundtrack through the misunderstood and seldom considered phases of preplanning, budgeting, and scheduling. This book has been written with one objective in mind—to empower you, the reader, in ways seldom offered or available. Many years ago (and I hesitate to admit just how many) I produced numerous amateur "home-movie" productions, dreaming of the day when I would set off for Hollywood and work on feature films.

I scoured libraries, bookstores, and technical periodicals looking for any information about the skills and techniques I would need to make more exciting and interesting films. I am not referring to the "technodata" books of engineering or the idealistic platitudes that so often fill such texts. I was starved of the real thing—the practical and experienced craftsman who had set down his or her thoughts and advice from which others could learn. Such books were, and still are, rare. Many talk *at* their subject, but few talk *about* it with substance and experience. It is for that very reason this book has been written—for the accurate compilation of the experiences and expertise of dozens of men and women who bring some of the most exciting audio achievements to the screen, regardless of the media format.

Figure 1.1 The author working as supervising sound editor on John Carpenter's *The Thing*, 1981. Photo by David Yewdall.

Our world is filled with a vast amount of misinformation—by far the most damaging is the misinformation that we hear or see written by those we respect or hold in high esteem or by those who have the perception that they should know what they are talking about, particularly books and papers written by people with PhDs. Most misinformation is born out of ignorance, drawing the wrong conclusions, or having knowledge of the front end and knowledge of the back in, then guessing or extrapolating what they think the middle is, and erring in the process. For instance, I have great respect for Ted Turner's Turner Classic Movies (TCM) cable channel. I consider it the last bastion of commercial-free presentations of great film. But it runs an occasional blurb that says, "Turner Classic Movies, 30 frames a second. . ."

I heave a sigh of disappointment every time I hear that. Thirty frames a second is a video standard. Motion pictures are shot at 24 frames per second. The extra six frames is made up by using a "drop-frame" video transfer technique, where every fourth frame of the film is repeated, thus making 24 frames per second view at 30 frames (video) per second.

Ignorance such as this by the writer, and consequently by the narrative voice, highlights the lack of a person or protocol at the network to catch such errors. It is how misinformation spreads throughout our daily lives. When you read it or hear it spoken by a voice that represents a standard of respect and quality, the truth is blurred and the audience left confused. I have, therefore, striven to present the material in this book in as straightforward a manner as possible. You will not find a bibliography note anywhere, because I do not draw upon other people's works to build my own. I will tell it like it is—as straight and honest as I can.

Back to the issue of the audio art form. Sound is sound—whether you are working on amateur film productions, commercials, student films, documentaries, multimedia presentations, CD-ROM games, interactive virtual reality, episodic long-form television, or multimillion-dollar theatrical motion pictures. The recording of dialog and sound effects, the style of editing, and the preparation of these sounds, as well as the philosophical taste and manner of mixing the sounds together are all virtually the same.

Read this paragraph very carefully. Whether you record with an analog tape recorder, a digital DAT machine, straight to hard disk, or to liquid-helium molecular storage; whether you cut on film with a Moviola and a synchronizer; or whether you spin a trackball with a nonlinear computer platform—the techniques, procedures, technical disciplines, and creative craftsmanship of creating an acoustical event are the same. Only the tools change; the artistic and scientific principles remain the same.

Whether I cut the sound cue with a Rivas splicer and scrape the magnetic soundtrack from the edge with a degaussed razor blade or whether I use a mouse to manipulate a digital cut on a computer screen and encode a fade-in, the artistic reasons for doing it and the net results are identical.

Of course, unique application differs from one medium to another, but the art form and techniques of sound recording, sound design, dialog preparation, and sound-effects editing are identical. The reason I have taken this moment to stress the art form so vehemently is that not enough people understand this, especially those perhaps most responsible for ensuring the success of the final audio track by planning for it long before the cameras even roll.

I will refer to the term *technical disciplines* many times throughout this book, and I want you to understand why. Many of us are rather puzzled by the educational institutions that now offer film and television courses. Most of these schools are caught up in theory and raw-creativity style instruction, something they call *critical studies*. Many are literally discarding and openly discounting the need for the film student to develop the technical skills and discipline necessary to create a successful project. This style of instruction is akin to a mechanic putting an engine into your car, offering creative ideas about where to go, but not giving you a steering wheel, transmission, or brakes to drive it. What good are theory and creativity when you are frustrated and floundering with the very tools that you need to bring your creative vision to fruition?

Even more important than knowing how to use the physical tools of production is knowing what is possible. I wish I had a nickel for every time I heard producers or directors say they did not know they actually had to do something or preplan the shot or action so they could achieve something creatively that they assumed could only be achieved months later in postproduction. They were not empowered by their educational background to release their full potential and/or creative desires.

I served as supervising sound editor on an unremarkable kickboxing picture several years ago. After the final mix, the director and producer both displayed little enthusiasm about what they had just heard during the final continuity playback. I noticed this and asked what was troubling them. The director's brow furrowed as he struggled to articulate his feelings. "I don't know, I guess I thought it would just sound. . .bigger."

I knew exactly what the problem was and what it had always been, but so seldom did I have such a receptive audience as I had right then and there. "I want you both to listen to me very carefully. We gave you the soundtrack for the movie that you made." The two men sat there waiting, as if I had not made my point yet. The director shook his head. "I don't understand." I knew he did not.

"What did you expect to hear?" I asked.

"I thought we would have stereo pan-by stuff, you know, big. . .broad."

"Absolutely, we can do all of that. But you first have to make the movie in such a way that we can do those kinds of things. For instance, you want all these stereo pan-by effects, but you didn't give us the cinematic opportunities to do it—because you didn't plan for it."

"Plan for it? What do you call those car-by shots?"

"A perfect example. Your film was photographed monophonically."

The producer leaned forward. "Mono-what?"

"When the car races by, your cameraman panned with the car, keeping the image in the center. If we put the sound of the car into a pan-pot joystick, where do you expect us to pan it when the action remains in the center of the screen? What your cinematographer should have done was to keep the camera anchored down, filming the car going past him, whooshing close-by to the left offscreen. While the stunt driver set up the action again, you set up the second shot, turning the camera around to catch the car whooshing past, only this time from the right of the screen and throttling down the road away from the camera."

The producer started to understand. "This way they can pan the car from center to hard left and then come by hard right and go away into the center of the screen."

I smiled. "That's right, except you have to continue to plan for it when you cut the picture. Many picture editors do not understand the difference between cutting for television and cutting theatrical, between cutting monophonically and cutting for stereo. Many picture editors would cut the first shot just as the car disappeared screen left and then a frame before it appeared on the right. That's monophonic thinking. Your picture editor should give a full beat once it has disappeared screen left, and a full beat before it appears screen right, knowing that the follow-through stereo panning effect the mixer makes will yield the fullest stereophonic result, making it big—and full."

I'm sure it was a bitter revelation for the two men, but judging from their subsequent pictures I would say they learned much from that enlightenment. From that moment, they became empowered—the proverbial lightbulb had gone on—and their creative planning and preparations would be forever different.

The sharing of actual war stories and examples like this is a vital part of this book. It is the glue that bonds the information and techniques in such a way as to give a vicarious experience that will serve you well in the future. Of course, you will make mistakes of your own along the way; we all do. Hopefully, though, you will learn from the mistakes described herein and avoid making them yourself.

This book is written with real industry terms, not only technical words, but the jargon and nomenclature that are part of the language and understanding of motion picture craftsmen. For instance, one simple example that often appears is the word

sync. The proper dictionary spelling of this word is *synch*, as it would be outside of postproduction industry usage. In the professional industry jargon, however, this word is spelled without the *h*.

Rather than write this book with a literary correctness, I have decided to spell the words as they have come to be known in their professional applications. You will find that if you read this book in sequential order, both your vocabulary and your technical understanding of the process will grow geometrically. As you learn more terms, you will not only understand them singularly but also quickly develop a rhythm and an ability to assimilate and comprehend. By the time you finish this book you should not only be enriched with detailed explanations of techniques and practical applications but also, through the various examples and actual experiences, you should begin to understand why the industry works the way it does.

One more ingredient is vital to any kind of work you do, whether creative or mechanical: You must have passion for what you are doing. Frankly, most craftsmen today are working in jobs other than those they dreamed of doing. This is not necessarily a bad thing; in fact, it can often lead to even more interesting and fulfilling opportunities—as long as you fuel your working gas tank with passion.

Many newcomers to the industry confuse the concept of loving the idea of doing something with being passionate about actually doing it. It reflects in their work; it reflects in the attitude of how to work. Many lose their way spending untold fruitless hours trying to develop shortcuts rather than rolling up their sleeves and simply doing the work. For those of us endowed with the love and passion of our work, there is only the craftsmanship and the yearning to achieve a greater level of quality and meaning. The secret to real success and personal satisfaction is knowing you must have passion for everything you do, even for jobs for which you have disdain. You cannot work in this industry by doing only what you want to do, and you probably cannot start right away working at the job of your dreams. The quickest way to achieve promotion and advancement toward the dream career is to approach each job assignment and task with as much passion and enthusiasm as if it were your dream job.

During a spirited argument with a colleague over the creative abstractness of the sound design of a picture on which we were working, my colleague became flustered and suddenly blurted out, "Yewdall, you know what your problem is? You have a passion for what you do, and you think it makes a difference!"

I nodded. "You're right, I do have a passion for what I do, and I know it makes a difference."

The passion you have for your work will be a double-edged sword. It will energize you and empower you to stretch, and to go that extra distance to create and achieve. Unfortunately, it will also lay you open and expose you to those who would ridicule and destroy rather than inspire and challenge. You cannot have one without the other. You must choose. Are you going to be a photocopy drone of a thousand others and mindlessly turn out formula products that everyone has seen and heard over and over again? Or are you going to stretch and do something new and different? Therein lies the challenge; therein lies the passion.

You will also notice that very often I posture ideas or examples in military terms. I do this for a good reason. Making a motion picture is almost identical to a military operation. No two films are the same—you must alter and adjust your tactics for the new material and problems that arise. Good filmmaking is 5 percent creativity and 95 percent problem solving. Keep this simple axiom in the forefront of your mind, and you will become a Navy Seal commando of your craft.

Chapter 2
Our Amateur Beginnings

When I was in junior high school, I had to stay home for several weeks because of a contagious illness. My father had an old office 1/4″ audiotape machine with a simple omnidirectional microphone that was really only intended for recording close-proximity voices. In a matter of days I was swept into a fantasy world of writing and recording my own performances like those I had heard on the radio. I played all the parts, moving about the room to simulate perspective, and making a wide variety of sound effects and movements to conjure up mental images of Detective Ajax as he sought out the bad dealings of John J. Ellis and his henchmen.

I opened and closed doors, shuffled papers, moved chairs about. My parents had an antique rocking chair that had a great wooden creak when you sat in it. I ignited a firecracker to make gunshots and threw a canvas sack of potatoes on the floor for body falls. Then the tape broke. However, I got some scissors and tape to splice it back together, and I got the shock of my life. After I repaired the break, I wondered if I could cut and move around prerecorded sounds at will. This could remove the unwanted movement sounds—trim the mistakes and better tighten up the sound effects. Years later I came to appreciate how the early craftspeople in the infancy of motion pictures must have felt when they first tried moving shots and cutting for effect rather than repair. The power of editing had sunk in.

Late at night I would crawl under the covers, hiding the audiotape machine under the blankets, and play the sequence over and over. Though I would be embarrassed by its crudeness today, it was the germination and the empowerment of sound and storytelling for me. Clearly I had made a greater audio illusion than I ever thought possible.

Several years later I joined the high school photography club. That was when I became visually oriented. My exciting homemade radio shows became just fond memories after I found a fateful $20 bill hidden in a roll-top desk at a thrift shop. I had been looking at a black plastic Eastman Kodak 8 mm spring-wound camera that could be ordered from the Sears catalog for $19.95. Guess how I spent the $20?

The camera did not even have a lens, only a series of holes in a rotatable disk that acted as f-stops. The spring-wind motor lasted only 22 seconds, so I had to carefully plan how long the shots could be—but with it my life changed forever. The

visual image now moved, and with a little imagination I quickly made the camera do dozens of things I'm sure the designer and manufacturer never intended for it to do.

Later that year I was projecting some 8 mm film on the bedroom wall for some of my high school friends who had been a part of a wild and frenzied film shoot the previous weekend. We had performed the action on an ambitious scale, at least for small-town high school students. We were shooting an action film about the French Resistance ambushing a German patrol in a canyon, entitled *The Nuremberg Affair*. We carefully buried several pounds of black powder in numerous soft-drink cups around the narrow flatland between two canyon walls of a friend's California ranch as a couple of dozen of us dressed in military uniforms.

A hulk of a car had been hauled up from the junkyard, a vehicle identical to the operating one serving as the stunt car. We carefully filmed a sequence that gave the illusion of a French Resistance mortar shell hitting the staff vehicle, blowing it up, and sending a dozen soldiers sprawling into the dirt and shrubs of the wash. In the next setup, they rose and charged at the camera. My special-effects man, sitting just off-camera, ignited each soft-drink "mortar-cup" charge, sending a geyser of dirt and debris into the air. The high school stunt actors had fun as they jumped and flung themselves about, being invisibly ambushed by the off-screen French underground.

Figure 2.1 Amateur high school film *The Nuremberg Affair*. Warren Wheymeyer and Chris Callow act as German soldiers in a firefight scene with French resistance fighters. Photos by David Yewdall.

A week later we huddled together to watch the crudely edited sequence. It happened that my radio was sitting on the windowsill of my bedroom. An audio commercial advertising *The Guns of Navarone* burst forth. Action-combat sound effects and stirring music were playing while the segment of our amateur mortar attack flickered on the bedroom wall. Several of us reacted to the sudden sensation—our home movie suddenly came alive, as many of the sound effects seemed to work quite well with the visual action. That year I won an Eastman Kodak Teenage Award for *The Nuremberg Affair*. The bug had really bitten hard.

Up until that time, I had just been making silent films, with an eye toward the visual. Now my visual eye grew a pair of ears. Of course, sound did not just appear on the film from then on. We quickly learned that there seemed to be a whole lot more to sound than simply having the desire to include it as part of the performance package. Also, it did not help much that back in the 1960s there was no such thing as home video cameras with miniature microphones attached. Super 8 mm was offering a magnetic striped film, but any kind of additional sound editing and mixing was very crude and difficult.

We did make two amateur short films with a separate 1/4″ soundtrack. Of course no interlocking sync mechanism existed, and the only way to come even close was to use a 1/4″ tape recorder that had a sensitive pause switch. I would sit and carefully monitor the sound, and, as it started to run a little faster than the film being projected, I would give the machine little pauses every so often, helping the soundtrack jog closer to its intended sync. All of this seemed very amateurish and frustrating. Yet as difficult as noninterlocking sound gear was to deal with, it had become essential to have a soundtrack with the picture.

EARLY APPLICATIONS

My first real application of custom sound recording for public entertainment occurred when I was given the sound-effects job for Coalinga's West Hills College presentation of the play *Picnic*. Sound-effect records of the day were pretty dreadful, and only the audiophiles building their own Heathkit high-fidelity systems were interested more in authentic realism and speaker replication than in entertainment expression.

As you work increasingly in sound, you will quickly learn the difference between reality sound and entertainment sound. I can play you a recording of a rifle butt impacting a man's chin. It is an absolutely authentic recording, yet it sounds flat and lifeless. On the other hand, I can edit three carefully chosen sound cues together in parallel and play them as one, and I promise that you will cringe and double over in empathetic pain. Therein lies the essential difference between realism, which is an actual recording of an event, and a sound designer's version of the same event, a combination brew that evokes emotion and pathos.

I soon gave up trying to find prerecorded sound effects and set out to record my own. I did not know much about how to record good sound, but I was fortunate to have acquired a monaural Uher 1000 1/4″ tape deck that I used for my amateur 16 mm filmmaking. I talked a local policeman into driving his squad car out of town

and, from a couple of miles out, driving toward me at a hasty rate of speed with his siren wailing away. I recorded doorbells and dogs barking, as well as evening cricket backgrounds. At that time I was not at all interested in pursuing a career in sound, and actually would not take it seriously for another 10 years, yet here I was practicing the basic techniques I still use today.

While making a documentary film about my hometown, we had gotten permission to blow up an oil derrick on Kettleman Hills. We had shot the sequence MOS (without sound) and decided later that we needed an explosion sound effect. I did not know how to record an explosion, nor did I think the explosions we made for our films would sound very good; how they looked and how they sounded in reality were two entirely different things.

I decided to experiment. I discovered that by wrapping the microphone in a face towel and holding it right up next to my mouth I could mimic a concussionary explosion with my lips and tongue, forcing air through my clinched teeth. The audio illusion was magnificent!

A few years later a couple of friends and my father joined me in making a fundraising film for Calvin Crest, a Presbyterian church camp in the Sierra Nevada mountains. It was our first serious attempt at shooting synchronous sound while we filmed. We had built a homemade camera crane to replicate Hollywood-style sweeping camera moves in and among the pine trees. The 18-foot reach crane was made of wood and used precision ball-bearing pillow-blocks for rotation pivots.

We never actually had a synchronous motor on the camera, so during the post-production editorial phase of the project I learned how to eyeball sync. I discovered that a non-sync motor means that the sound recording drifts. I painstakingly resynced the sound every few seconds as the drift increased. Becoming extremely observant, I looked for the slightest movement and identified the particular sounds that must have come from that movement. I then listened to the track, found such audible movements, and lined the sound and action into sync. Conversely, I learned to take sound with no synchronous relationship at all with the image that I had, and, through clever cuts and manipulation, made the sound work for moments when we had no original sound recording at all.

I am the first to admit how bizarre and out of place the camera setup in Figure 2.2 appears. Most filmmakers starting out will tell you (especially if you have no money and must work "poor-boy" style) that you must learn how to mix and match various kinds of equipment together; to make do when money to rent modern camera and sound equipment is scarce. In the photo, I am standing just to the side of the lens of the 16 mm Arriflex as I am directing the action. My partner, Larry Yarbrough, is standing just behind me, coordinating the lighting and handling the audio playback of prerecorded dialog, as we did not record very much sync sound back then. Our actors listened to a prerecorded tape played back through a speaker offscreen as they mouthed the dialog—much the same way musicals are filmed to playback. Like I said, you have to make do with what you have. It certainly was not a convenient camera platform, but boy was it rock-steady!

Of course, our soundtrack was crude by professional audio standards today, but for its day and for where I was on the evolutionary scale of experience, Calvin Crest had opened a multitude of doors and possibilities—to develop different ideas

Figure 2.2 I'm standing just behind the lens of a 16 mm Arriflex sitting atop the giant 100 Moey gear head specially designed for the giant MGM 65 mm cameras. This particular gear head was one of the set used in William Wyler's *Ben-Hur*. Photo by David Yewdall.

because of new, empowering, creative tools then in hand. With what I had learned through the "baptism by fire" of doing, I could take a simple 35 mm combat Eymo camera with a spring-wound motor and an unremarkable 1/4" tape recorder with absolutely no sound sync relationship between them and, if I had the will to do so, I could make a full-length motion picture with both perfectly synchronized sound and depth and breadth of entertainment value. I was—and still am—only limited by my own imagination, just as you are.

A few months before I started in feature films I made one last documentary for my sponsor. He sent us to the Navajo Reservation to make a film about their college. Since we had no budget we built a remote camera crane out of aluminum and drilling steel.

The young man standing just to my right in the picture is Steve Rice. This was his very first job in Hollywood and when I asked him if he wanted to do the job I could not even get the question out before he jumped at the opportunity. Two hours later we were on our way to the northeast corner of Arizona to shoot my last documentary.

A couple of months after we returned to Los Angeles I told Steve Rice that if he came down to the studio an hour before the boss arrived I could teach him enough to convince the studio owner to hire him as an assistant editor. Not only did he get the job, but over the years he became one of the most amazing dialog editors I ever had the pleasure to train and work with. Steve could easily write a book on the

Figure 2.3 Author (on the right behind the camera) and his crew on location in Ganada, Arizona (Navajo reservation) where we filmed a fund raising film for the Navajo college. The camera assistant to the author's right (in dark t-shirt) is Steve Rice, who later became one of the industry's most talented dialog editors. Photo by Doug Klusmeyer.

intricate techniques and trade secrets of dialog editing—without question one of the most misunderstood and underappreciated phases of the sound arts.

INTERVIEW WITH BRUCE CAMPBELL

Bruce Campbell is best known and recognized both for his grizzly cult starring role in the *Evil Dead* trilogy as well as his starring role in the television series *Brisco County, Jr.*, in which he portrays the title character. When it comes to sound, Bruce is one of the most passionate and audio-involved actor-director-producers I have ever met and had the pleasure to work alongside.

Bruce began making amateur movies with his high school buddies Sam Raimi (who went on to direct pictures like *Crimewave* and *Darkman*, as well as the cult classics *The Evil Dead*, *Evil Dead II*, and the ultimate sequel *Army of Darkness*) and Rob Tapert (producer of movies and television shows). They grew up just outside Detroit, where they spent a great deal of time creating their first amateur efforts. Bruce remembers:

> Originally, we worked with regular 8 mm film and a little wind-up camera. The film was 16 mm in width. You would shoot one side, which was 50 feet long, then flip the roll over

Figure 2.4 Bruce Campbell, cult star of the *Evil Dead* trilogy, star of *The Adventures of Brisco County, Jr.*, and director and recurring guest star in the number one syndicated *Hercules: The Legendary Journeys* and *Xena: Warrior Princess.*

and expose the other side. You sent it to the lab and they developed it and slit it in half for you.

Of course, we shot those films silent; at least, as we know and understand synchronous sound recording today. Our friend, Scott Spiegel, had a cassette recorder, and he had recorded our dialog as we shot the film. Of course, there was nothing like what we have today with crystal sync and timecode. We just recorded it to the cassette, and Scott would keep careful track of the various angles and takes and rerecord/transfer them later as close as he could to the final-cut 8 mm film.

Scott would also record sound effects and backgrounds, many of them from television broadcasts of the Three Stooges films. The nice thing about the Stooges was that they didn't have any music during the action scenes, just dialog and loud sound effects. Scott would have all the sound effects he intended to use lined up on one cassette tape, like a radio man would set up his cue list, and have his sound-effect source material at the ready.

We would get in a room and watch the cut 8 mm picture, and then Scott would roll the original dialog cassette, playing the sound through a speaker. Scott would play the second cassette of sound effects at precise moments in the action against the dialog cassette, and we would stand around and add extra dialog lines that we had not recorded when we shot the film to begin with. All this time, Scott was rerecording the collage of

speaker playback sound and our new live dialog performances onto a new cassette in a crude but effective sound mix.

It was kind of like doing live radio as we were injecting sound effects, looping dialog, and mixing it all at once, the difference being that we had to keep in sync to the picture. The real trick was Scott Spiegel mastering the pause button to keep on top of the sync issues.

Scott was the master of this so we let him do it. We had a varispeed projector, and Scott had made marks on the edges of the film that only he could see during a presentation so that he could tell how out-of-sync the cassette playback was going to be; then he would adjust the projector a little faster or a little slower to correct the sync. Sometimes Scott would have to fast-forward or rewind the cassette real quick in order for the playback to be right. You could hear the on and off clicks in the track, but we didn't care—after all, we had sound!

We would test our films at parties. If [we] could get people to stop partying and watch the movie, then we knew we had a good one. We made about 50 of these short movies, both comedies and dramas.

Then we moved up to Super 8 mm, which had a magnetic sound stripe on it so you could record sound as you filmed the action. The quality of the sound was very poor by today's standards, but at the time it was a miracle! You could either send your Super 8 film out for sound striping [having a thin ribbon of magnetic emulsion applied to the edge of the film for the purposes of adding a soundtrack later], or you could buy Super 8 film with a magnetic sound stripe on it.

There were projectors that had sound-on-sound, where you had the ability for one attempt to dub something in over the soundtrack that was already on the film. Say the action in your Super 8 mm film has two guys acting out a shootout scene, and the first actor's line, "Stick 'em up!" was already on the film. Reacting to the first guy, the second actor turned, drew his pistol, and fired, which of course is a cap gun or a quarter-load blank. If you wanted a big sound effect for the gunshot, using the sound-on-sound technique, you would only have one chance to lay a gunshot in. If you did not record it in correctly or close enough sync, then you wiped out the actor's voice and you would have to then loop the actor saying "Stick 'em up!" all over again, which on Super 8 mm film was going to be extremely difficult at best.

On the original Super 8 mm projectors you could only record on the main magnetic stripe, but when the new generation of projectors came out you could record on the balance stripe [a thin layer of magnetic emulsion on the opposite side of the film from the primary magnetic soundtrack to maintain an even thickness for stability in film transport and being wound or rewound onto a film reel]. This allowed us to record music and sound effects much easier by utilizing the balance stripe as a second track instead of messing up the original recorded track that had been recorded in sync when we originally filmed the sequence.

Our postproduction supervisor was the lady behind the counter at K-Mart. She would see us coming and say, "Okay fellas, whad'ya got now?" Whether it was developing or sending our cut film back to have a new balance stripe applied to the edge so we could record a smoother music track, she was our lab.

Sam Raimi did a 50-minute film called *The Happy Valley Kid*, the story of a college student driven insane, which he shot on the Michigan State University campus with real professors and real students. Rob Tapert portrayed the Happy Valley Kid. The film cost about $700 to make, and they showed it at midnight showings to students. The kids loved to see the film because they got to see the Happy Valley Kid blow away all the evil professors. Sam actually got the professors to allow themselves to be shot and gunned down

on film. They made about $3500 on it—probably some of the best vicarious therapy that frustrated students could sit down and enjoy without going postal themselves.

We actually raised the money to make a movie based on a Super 8 mm film that we had shot as a pilot, as a device to show investors the kind of motion picture that we were going to make and convince them to invest money in us. Sam Raimi had been studying some occult history in humanities class when his prolific and overactive imagination gave him a middle-of-the-night vision. I personally think it stemmed from something he had eaten for dinner earlier in the evening, but a lot of Sam's subsequent script was based on the Necronomicon stuff that came up in class.

We made our best Super 8 mm double-system sound film yet. We had acquired much better sound effects, using a 1/4″ reel-to-reel deck whenever we could get our hands on one. We would carefully patch directly in from a stereo system so we could control the quality of the sound transfer for music or sound effects. By this time we had gotten much better about understanding recording levels, even the concept of distortion and how to avoid it as much as possible. By the time we raised the money to make the first *Evil Dead* film, we were much better prepared, at least knowing that we wanted a really good and interesting sound, and we knew that before we went out to film the picture.

When we finished cutting the picture of *Evil Dead* and we were ready for the post-production sound process, we went to Sound One in New York City with Elisha Birnbaum. We immediately discovered that, from an audio point of view, it was a whole new ballgame and that we weren't in Kansas anymore. We had a lot of bones and blood and carnage in the film, so Sam and I would go to a market and we would buy chickens and celery and carrots and meat cleavers and that sort of stuff to use for recording. Elisha was a one-man show. He would roll the picture, then run in and perform Foley cues on the stage; then he would run back into the back booth to stop the system.

Our supervising sound editor was Joe Masefield. Joe was extremely detail-oriented. Each sound effect had a number, based on the reel it belonged to, whether it was a cue of Foley or a sound effect or dialog or whatever. He sat there in the recording booth and told us what we needed to perform. For Sam and I, we were still kind of lagging from our amateur days of how to make sounds, because we would argue who could make the best gravy-sucking sound and who would twist and cut the celery while the other guy was making awful slurping noises. We heard later that it took weeks for them to get the smell of rotting cabbage and chicken out of their Foley stage.

Mel Zelniker was the mixer. He was really good for us, as he brought us up out of our amateur beginnings and helped to point us into a more professional way of doing things. Mel would teach us stage protocol and procedure through example. Sam stepped off the stage for a drink of water and returned just as Mel mixed the sound of a body being flopped into a grave. Sam asked Mel if he could mix the bodyfall a little hotter. Mel played the game of not touching the fader pot to see if we noticed—you know, the way mixers can do. It was so embarrassing because then he would ask Sam what he thought after he supposedly mixed it hotter, and Sam would say he liked it, and Mel would huff and reply, "I didn't touch it."

Then Mel would run it again, only this time he would push the volume until it was obviously over the top. He'd ask us, "How was that?" We'd nod our heads, "That was fine, just fine." Mel snapped back at us "It's too loud!" and he would run it again and bring the volume back down. Mel knew we were a couple of hicks from Detroit, but in his own way he was trying to teach us at the same time.

At one point I asked him if he could lower one of my loop lines. Mel turned on me, "What's the matter, you embarrassed?!"

I didn't know what to say. "Yeah, I am actually."

Mel shrugged, "Okay, I just wanted to clear that up," and he would continue mixing. He would mix one long pass at a time, and we actually got a weird effect out of it. Their equipment had an odd, funky problem with one of the fader pots; it left an open chamber, which created a strange airy-like sound that, if he just moved that pot up a little, created the best eerie ambience for us. It was not a wind; it was almost like you were in a hollow room. That was our gift. Every so often either Sam or I would say, "Hey, stick that ambience in there!" Mel would frown, "You guys! You're usin' it too much!"

It wasn't until after the mix that Mel and his engineer discovered that a rotating fan motor vibration was being conducted through hard point contact that was leaking into the echo chamber, a clever technique that Mel quietly tucked away for future use.

For our first real movie we got several gifts. Another one happened in the middle of the night when we were shooting the film in Tennessee. Sam was awakened by a ghostly wind that was coming through the broken glass window in his room. He ran down the hall and dragged the sound guy out of bed to fire up the Nagra to record it. That airy tonal wind became the signature for the film. The fact is, there are gifts around you all of the time, whether you are shooting or not—the trick is for you to recognize the gifts when they happen and be versatile enough to take advantage of them. That's when the magic really happens.

Several years later, the trio made the sequel, *Evil Dead II*. It was their first opportunity to work with the sound in a way that they could prebuild entire segments before they got to the rerecording dubbing stage. They had progressed from the Moviola, where their sound had been cut on 35 mm mag-stripe and fullcoat to 24-track using videotape and timecode to interlock the sync between picture (on videotape) and soundtrack (being assembled on 24-track 2″ tape). Bruce Campbell not only reprised his character of Ash from the original *Evil Dead*, but he also handled the postproduction sound chores. He started by insisting on walking his own footsteps in the film, and one thing led to another. The attention to detail became an obsession.

We cut the picture for *Evil Dead II* in Ferndale, Michigan, in a dentist's office. I asked the manager of the building to give me one of the offices for a month that was in the center of the building, not near the front and not near the back. I didn't want to contend with traffic noise. We got the deepest part of an office that was well-insulated by the old building's thick walls. I asked a sound engineer by the name of Ed Wolfman, who I would describe in radio terms as a tonemeister, a German term for a master craftsman mixer or recordist, to come look at this huge plaster room we had. I told him that I wanted to record wild sound effects in this room, and how could I best go about utilizing the space acoustically?

We built a wooden section of the floor, then built a downscaled replica of the original cabin set from the film. We needed the floor to replicate the correct hollowness that we had from the original cabin because we had a lot of scuffling, props falling, footsteps—a lot of movement that would have to fold seamlessly into the production recording. Ed told us to build one of the walls nonsymmetrical—to angle it off 10 percent, 20 percent—so we put in a dummy wall that angled in, so that the sound would not reflect back and forth and build up slap and reverb. We did the foam-and-egg-carton routine by attaching them in regimented sheets around on sections of the wall for trapping and controlling sound waves.

While Sam [Raimi] was in a different part of the office building picture-cutting the film, I cranked up my word processor and built an audio event list—a chronological list of sounds that were going to be needed for the picture which we could replicate in our

> downsized cabin stage and custom record them. I guess you would consider this wild Foley. These sound cues were not performed while we watched picture or anything. We would review the list and see "things rattle on a table." Okay, let's record a bunch of things rattling on a table, and we'll record a number of variations. "Table falls over"—we recorded several variations of a table falling over, et cetera.
>
> This one office of the dentist building had water damage from the radiators, and we thought, "Let's help 'em out just a little bit more." So I took an axe and recorded some really good chops and scrapes. It is so hard to find that kind of material in just that kind of condition to record. It was so crunchy, and it had these old dried wood slats from the 1920s—it was perfectly brittle. One little chop led to another. "Keep that recorder rolling!" I'd swing the axe, smashing and bashing. I felt guilty about what I was doing to the ceiling, but the recordings were priceless. It is just impossible to simulate that kind of sound any other way!

What resulted was Bruce and Sam returning to Los Angeles for formal postproduction sound-editorial work with a wealth of custom-recorded material under their arms, meticulously developed over weeks of study and experimentation.

Bruce Campbell continued his acting and directing career both here and abroad, spending much of his time in New Zealand, writing, directing, and even appearing in the *Xena* and *Hercules* television series, as well as developing theatrical motion-picture projects of his own.

Bruce admits that sound has had a tremendous effect on his professional career. It has made him a better storyteller as well as a more creative filmmaker, but he admits he misses having the luxury of the hands-on participation in custom-recording and developing soundtracks. Listen to the *Xena* and *Hercules* television shows. The roots of their sound design go all the way back to those early days in Detroit when Bruce and his friends struggled not only to keep an audiotrack in sync with the visual image but also to create something extraordinary.

DEVELOP YOUR EYES AND EARS TO OBSERVE

I do not mean for this to sound egotistical or pompous, but, shortly after you finish reading this book, most of you will notice that you see and hear things differently than ever before. The fact is, you have always seen and heard them—you have just not been as aware of them as you now are going to become. This transition does not happen all at once. It does not go "flomp" like a heavy curtain—and suddenly you have visual and audio awareness. You probably will not be aware the change is taking place, but several weeks or a few months from now, you will suddenly stop and recognize that your sensory perceptions have been changing. Some of you will thank me, and others will curse me. Some people become so aware that they find it incredibly hard to watch movies or television again. This is a common side effect. It is really nothing more than your awareness kicking in, along with a growing knowledge of how things work. Be comforted to know that this hyperawareness appears to wear off over time. In fact, it actually does not.

Your subconscious learns to separate awareness of technique and disciplines from the assimilation of form and storytelling, the division between left-brain and right-brain jurisdictions. Regardless of whether you are aware of it, you learn how

to watch a motion picture or television program and to disregard its warts and imperfections. If you did not learn this ability, you probably would be driven to the point of insanity (of course, that might explain a few things in our industry these days).

As for myself, I remember the exact moment the figurative lightbulb went on for me. I was sitting in my folks' camper, parked amid the tall redwood trees near the Russian River in Northern California, reading Spottiswoode's book *Film and Its Techniques*. I was slowly making my way through the chapter dealing with the film synchronizer and how film is synced together when kapow!—suddenly everything I had read before, most of which I was struggling to understand conceptually, came together and made perfect sense. Those of you who have gone through this transition, this piercing of the concept membrane, know exactly to what I'm referring. Those of you who have not experienced it are in for a wonderful moment filled with a special excitement.

PROTECT YOUR MOST PRECIOUS POSSESSIONS

The world has become a combat zone for one of your most precious possessions, your ability to hear. During everyday activities, you are constantly in close proximity to audio sources with the potential to permanently impair your future ability to hear. Unfortunately, you probably give none of these sources a passing consideration.

If you hope to continue to see and hear the world around you clearly for a long time, then let go of any naïve misperception that those senses will always, perfectly, be with you. This book does not address the everyday dangers and potentially harmful situations regarding loss of, or impairment to, your eyesight because it was not written with authority on that topic. As for protecting your ability to hear clearly, one of the most common and sensory-damaging dangers is distortion. This is not the same as volume. Your ears can handle a considerable amount of clearly produced volume; however, if the audio source is filled with distortion, the human ear soon fatigues and starts to degenerate. A common source of distortion is the device known as the *boom box*. Car radios are another source of overdriven audio sources, played through underqualified amplifiers and reproduced by speakers setting up a much higher distortion-noise-to-clear-signal ratio, which begins to break down the sensitivity of your audio sensors.

In an other scenario, you attend a rock concert. After a few minutes, you start to feel buzzing or tingling in your ears. This is the first sign that your ears have become overloaded and are in danger of suffering permanent and irreparable damage.

The audio signal in question does not have to be loud, however. Many television engineers and craftspeople who work in close proximity to a bank of television monitors for long periods of time discover that they have either lost or are losing their high-end sensitivity. Many of these individuals cannot hear 10 kHz and above.

Sometimes I have groups of students from either a high school or college come to the studio to tour the facility and receive an audio demonstration. During the demos, I put a specially made test-tone tape on a DAT machine and play a 1 kHz tone, which everyone could hear. They would see signal register accordingly on the

VU meter. I would then play them 17 kHz. Only about half could hear that, but they could all see the signal on the VU meter. I would then play them 10 kHz with the same strength on the VU meter. By this time, several students inevitably would be in tears; they had lost the ability to hear a 10 kHz tone so early in life. After asking one or two poignant questions regarding their daily habits of audio exposure, I knew the exact culprit. Almost no demonstration strikes home more dramatically than this, forcing a personal self-awareness and disallowing denial. The students could fib to me about whether they could hear the signal, but they themselves knew they could not hear it; the proof was in front of them, the visual affirmation of the strong and stable volume on the VU meter for all to see. I plead with you, before it is too late. Become aware of the dangers that surround you every day, understand what audio fatigue is; realize that length of duration to high decibels and audio distortion results in permanent hearing loss, either select frequency or total.

Someone asked me once, "If you had to choose between being blind or deaf, which would you choose?" I did not hesitate. I chose blind. As visual a person as I am, I could not imagine living in a world where I could not enjoy the sweet vibrant sound of the cello, or the wind as it moves through the pine trees with the blue jays and mourning doves, or the sensual caress of the whispered words from my wife as we cuddle together and share the day's events. So protect your most precious of personal possessions—your eyes and ears.