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Appreciating the Mix: Teaching Music Listening Skills through Sound-Mixing Techniques

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Teaching music appreciation is a crucially important element of undergraduate liberal-arts programs. Many former students think back fondly and with great "appreciation" to this course that gave them new insight into music as well as a background in musical styles with which they would have otherwise been unfamiliar and, still more importantly, the development of basic listening skills. In the following essay, I suggest that along with teaching the fundamentals of music and providing a broad knowledge of genres and styles, instructing students in the fundamentals of sound recording will contribute to a deeper engagement with the music in the course and, more significantly, for the rest of their listening lives.

Many instructors feel strongly about the value of teaching music appreciation and dedicate a great deal of time, effort, and creativity to the endeavor. Naturally, as with any course that has a long-standing pedagogical tradition, there is the danger of a certain inertia that may keep us on a particular well-worn track—although there have been many recent advances. Many if not most new music-appreciation textbooks take care to include more popular music, jazz, world music, and a larger variety of 20th- and 21st-century music than earlier texts. Some are specifically geared toward addressing musical elements, such as melody, harmony, timbre, texture, and form, in all genres. A chronological approach is no longer assumed, and extensive multimedia resources are offered. This is all to the good, and we, of course, should continue to question our preconceived notions and search for new methods that address the needs and interests of our current students while also broadening their perspectives and giving them a foundation on which to build a life of learning and growth in musical understanding.

While some departments have a shared music-appreciation curriculum, in many instances we have a great deal of flexibility regarding the material we present and how we present it. For example, we can choose to focus on teaching elements of music, style conventions, music history, wider social and cultural contexts, or simple breadth of repertoire, and we can adjust the historical, geographical, and cultural compass of the repertoire. What we all have in common, however, is that we strive to deepen our students' awareness of music and help them to become better listeners.

For a variety of economic and cultural reasons (the state of the arts in our country, the lack of music education in many primary and secondary schools, etc.), our students frequently have little or no experience with live music and still less with live concerts of art music. We generally address this by having our students attend at least one concert and write a brief report about it. The concert report is a staple of most music-appreciation classes and should remain one. Some of us are lucky enough to have a wide variety of concerts available in the area, and some even manage to present live music in the classroom. But the rest of the time, we are presenting recorded music.

We are currently in the midst of a radical shift in the way recorded music is made and distributed that affects all aspects of music making and listening. Gone are the days of huge booming speakers (with the notable exception of cars in my neighborhood!) and, conversely, of tiny transistor radios. At our disposal are incredibly affordable, convenient, and sophisticated music players, headphones, and compact speakers, which give us a previously unheard-of accessibility to a fantastic array of music with excellent sound quality.

The new paradigm is complicated and fraught with difficult issues, however. The ubiquitous compressing of audio files, for example, has fundamentally changed the way we make and hear music. Audiophiles cringe at the "lossy" compressed sound of the MP3 format, which is typically at a resolution of 128 kbps, less than one-tenth the size of the original audio file. Nonetheless, for most of us, such compressed audio files have become the norm. Our students do much of their listening through headphones, which is another significant change in their involvement with the surrounding environment, as well as with the music. How many times have you seen a group of friends walking together, each with headphones on, listening to his or her own music? I also frequently see friends sharing earbud headphones with each other—a new method of listening together. Additionally, the convenience of buying music is unprecedented, and even more extraordinary is the fact that we can carry our entire music library to class on our laptops or a very small device.

Listening in our classes necessarily relies upon recorded music, and our students' listening experiences throughout their lives will primarily consist of recorded music. Consequently, I suggest that giving instruction

early in the semester in some basic issues of sound recording can enhance our students' ability to listen well, increase their appreciation of music, musicians, and the recording process, and allow them to get one step deeper into the music of their choice. As in all of our teaching, we must make difficult choices regarding which issues we choose to tackle in our classes. My proposed unit on recorded sound would necessarily displace other course material; nevertheless, I believe the concepts and techniques will prove of lasting value to students. A condensed look at the mixing process provides an opportunity to examine some of the more basic and easily explained aspects of the recording process. Because of the wide availability of excellent, free software,[1] combined with today's students' generally high level of technical savvy with both computers and audio files, we can also create an environment that allows them to experience and participate in this process firsthand.

In this chapter, after briefly introducing some basic concepts, I present several expert viewpoints regarding the mixing process and its importance by offering the opinions and perspectives of three producer-engineers working in various musical genres. Different styles of music often have different sound-mixing goals, and even within genres, producers and artists can have radically different approaches, further illuminating the importance of these processes to our listening perceptions. Albin Zak, the author of numerous articles and books on the importance of recording to the music-making process, also contributes his perspective regarding the pedagogical impact of the unit I propose.

MIXING BASICS

There are several stages of the sound production process, and mixing is the penultimate phase. In advance of the recording, artists and producers discuss issues such as repertoire, arrangements, and personnel. Once these issues are settled, recording sessions are scheduled. It takes considerably more time to record than one might expect. Microphone choices and placement take time, and these are critical technical and aesthetic issues. Multiple takes are generally recorded, and time is often taken to listen back. Once recording is completed, the mixing process takes place. The final stage (other than pressing CDs, artwork, liner notes, distribution, etc.) is mastering the recording. This process varies greatly but generally includes equalization (adding or subtracting high, middle, and low frequencies), adjusting volume levels, adding digital or analog effects (such as reverb and delay), and spacing the tracks.

At its simplest, mixing entails combining and balancing all the musical elements of a given piece. Beyond this simplified concept, it can get quite

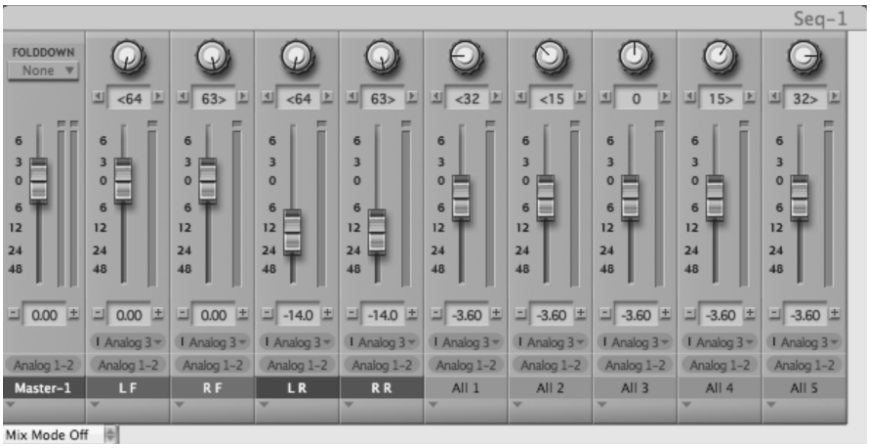

Figure 1.1. A typical digital audio workstation mixing board, with panning and volume controls. The row of knobs at the top control panning. Numbers below the knobs indicate left and right placement in the stereo field (zero position indicates center placement). The sliders control the volume. Numbers immediately below the sliders indicate decibels that are added or subtracted (zero position means nothing is added or subtracted).

complicated very quickly, as discussions with various producer-engineers will illustrate. I have chosen to present and have students experiment with the most basic issues of mixing: creating a stereo field through panning and volume (see figure 1.1). The stereo field is an aural image that in turn creates a visual image for the listener, whether consciously or unconsciously. Panning is the placement of musical elements in the left and right speakers that creates a sense of breadth in the stereo field (side to side), while the relative volume of different elements governs its depth (front to back). This leaves out many other important aspects of mixing, such as effects and equalization. It does, however, allow for a very focused and manageable discussion that provides students with great insight into the recording process and adds an analogous breadth and depth to their listening.

Mixing is an interpretive art that requires technical skill, and mixers are crucial partners in the process of communicating a performance. Unfortunately, the importance of the engineer-mixer to the final recorded product is generally overlooked, as is the importance of the mix to our listening experience.

LECTURE, CLASS ACTIVITY, PROJECT

I frequently begin the semester with the unit on sound recording and find that it quickly gets students listening more carefully to the mix. More

importantly, it immediately encourages them to become active listeners. I have found that a participatory class activity illustrates the principles more clearly and quickly than a lecture, so after an introduction, I tend to move directly to a demonstration. The recordings you choose should be well mixed and have distinctive mixing styles. Providing examples of contrasting mixes is helpful. Examples from any genre of music can be used, but I have found that employing contemporary popular music is quite effective for two primary reasons. First, the mixes can be quite exciting and are often extremely sophisticated and thoughtful. Secondly, students are able to quickly grasp these concepts in the familiar context of pop music, and are immediately excited by the details that are present in the mix.

To establish the basic elements of a mix, I begin with a contemporary classical CD that I produced, composer Sean Hickey's *Left at the Fork in the Road*.[2] The stereo field is quite straightforward, and I use it to illustrate breadth and depth. In the title composition, "Left at the Fork in the Road," the clarinet and bassoon are panned to the left and right respectively, and the flute is in the center, sounding as if it is a bit set back. I contrast this with one of the great contemporary popular mixes, James Taylor's CD *October Road*.[3] The mix for "On the 4th of July" contains numerous subtleties that illustrate the importance of the mix to the overall musical fabric: the placement of Taylor's acoustic guitar amongst drums and electronic instruments that would normally drown it out and the immediacy of Taylor's voice. More subtle touches can be found as well, such as a synthesizer line panned to the right, which has to be focused upon to notice its importance, and the background vocals, which slowly sneak in without our noticing them until they are firmly established.

For both of these listenings, I employ a handout (see figure 1.2) that asks the students to map various sounds in the stereo field on the sheet as the music plays. I then ask a student to place other students, one by one, in the front of the room in the places where he or she heard each instrument in the mix. I ask the class for comments on the positioning and to suggest other interpretations, continuing to move the students around. We then replay the piece and assess our physical representation of the stereo field. In addition to illustrating the importance of the mix, the activity is physically active and creates an exciting learning environment.

After this lecture and activity, I give an assignment. The students download Audacity,[4] a free, multi-platform (Mac and PC) audio software program that has effective and straightforward panning and volume controls. I give instructions for importing a CD into the program and ask them to import a track of their choice and experiment with volume and panning. Next, I assign a project to be done in two parts and submitted online via Blackboard course-management software. The assignment employs a wonderful resource: the popular band Radiohead has made five individual

"Left at the Fork in the Road," Sean Hickey, *Left at the Fork in the Road*

Place the following in the stereo field: Flute, Clarinet, and Bassoon

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"On the 4th of July," James Taylor, *October Road*

Place the following in the stereo field (in order of entrance): Guitar, Voice and Drums, Bass, Synthesizer pad, Chorus, Synthesizer lead, Whistler and 2nd guitar (optional).

Figure 1.2. Activity worksheet for placement of instruments in the stereo field

instrumental and vocal component tracks, or "stems," for their hit song "Nude" available for download from iTunes. The students are asked to download these tracks and create a mix of their own (see figure 1.3).

MIXING JAZZ

Jim Clouse, the owner-engineer of Park West Studios in Brooklyn, New York, specializes in the recording of jazz groups ranging from mainstream to the avant-garde.[5] I asked Clouse what he thinks about when he is mixing a jazz CD. He responded quickly and with glee: "It's funny because I've thought about it, but I never got to tell anybody about it, so thanks. I think about the Vanguard." He refers to the Village Vanguard in New York City, certainly one of the most venerable and respected jazz clubs in the world. Most jazz musicians and aficionados that live in or have visited New York City have been to this club, and more than 100 live albums have been

Radiohead Mixing Assignment

Due date:
A first draft of the assignment is due on Monday, 9/15, by 11:59 pm. I will provide comments on your draft, and you will submit the final version by 9/22.

Directions:
For this assignment, you must download the five individual Radiohead "stems" for "Nude" from iTunes ("Bass Stem," "Drum Stem," "Guitar Stem," "String FX Etc. Stem," and "Voice Stem"). In Audacity, very carefully and thoughtfully set volume and panning levels for each track (or stem) to create your own mix that reflects your musical aesthetic and that showcases the various components of the song, as well as the overall mix, to the greatest degree possible.

To export your final mix:
Go to Audacity > Preferences. Click File Formats. OGG Export Setup, set quality slider all the way to the left to 0. Click OK.
Go to File > Export as Ogg vorbis. If a warning comes up, press OK.
Name the file FirstName_LastName_Nude_Mix.ogg and save to a convenient spot on your computer. This will create a stereo mix. Quit Audacity, and then double-click the saved file to make sure it works. It should open, and it should play your mix. When you open this file, you will see one stereo track with two waveforms, representing the left and right tracks of your stereo mix.

To upload the assignment:
Go to the Digital Dropbox in Blackboard. In File Information, enter your name. Click "choose file," navigate to your file, and then choose it. Click to submit.

Figure 1.3. A sample final project

recorded there, including important records by John Coltrane, Bill Evans, Wynton Marsalis, Dexter Gordon, the Thad Jones/Mel Lewis Orchestra, and more recently, Brad Mehldau.

The room has a small and irregularly shaped bandstand, the sound system is not particularly notable, and the room itself has quirky angles throughout. There are two levels, columns on one side create awkward sightlines, and the room narrows at the back where there is a bar along one side. Clouse explains: "I say that because of all the things I heard there. But getting to play there! The first time was with the Thad Jones/Mel Lewis Orchestra. There's something about sitting in front of that band that was very special, but there's also something that is unbelievable about sitting *in* the band. Something about that club! The way those funky old curtains,

or whatever is. The uneven walls—there was just something about the way sound came out of it. It was pure—that's the simplest word."

It is the combination of the impressions that Clouse had as an audience member and a performer that he seeks to recreate as he mixes. In other words, his intention is to make the recording as close to a live performance at his favorite club as he can from both perspectives. His desire is to stay out of the way as he mixes. He finds that the musicians, most of whom are excellent and extremely experienced in both performing and recording, manage to actually mix themselves. As we spoke, Clouse was startled to realize that he makes almost no changes in many aspects of his recording settings from one recording project to the next. His goal with microphone choices and placement is to get as close to the players' sound as possible, with the least intrusion upon the actual playing experience.

This said, when it comes time to mix, making a mixer's mark on the music is necessary and inevitable. The sounds have to be placed left and right (panning) and front and back (volume). This is an artificial process, and a mixer must make choices that have a huge impact on how the listener perceives the music. Clouse's intention is to create a "natural" sound through this artificial process.

Regarding panning for a typical jazz recording of a quintet with two horns (e.g., trumpet and saxophone), piano, bass, and drums, he takes care to "spread the drums out exactly like they are" over the central area of the stereo field. The high-hat is to the left, ride cymbal to the right, snare slightly to the left, tom-toms spread across this span, and bass drum in the middle, just as most drummers set up their kit (from the drummer's point of view). He puts the bass directly in the center of the stereo field, as the bottom end needs to be equally distributed, and with the bass and bass drum in the middle, all aspects of the mix have a distinct and unique placement, allowing the mix "to breathe." The piano presents a bit of a dilemma. In live performance, it is generally off to one side or the other, and an "old school" recording approach might have it clearly in its physical spot, but Clouse adopts a more modern technique: he does not give it such a tight, specific location but slightly spreads it out over a portion of the stereo field, perhaps slightly to the left to reflect its actual position. The horns are panned slightly to opposite sides. The aural and visual picture thus presented is largely as we would see it in a club: drums in the center (slightly spread out), bass to the right, piano to the left but washing over to the right as well, and trumpet to the left and sax to the right (or vice versa). This is a pretty straightforward mix that clearly demonstrates the desire to recreate the live listening experience in both the timbre of the instruments and the aural and visual sound-image.

Some aspects of the depth of this picture are simple while others are more complicated. The horns should normally sound as if they are in the

front of the band. This is accomplished with a combination of microphone placement and volume settings, which necessarily affect each other. For example, making the horns a bit louder will make them seem more up-front. The volume of the piano and bass should be slightly lower and the drums perhaps a bit lower still. Since the drums are spread out, they will have a strong presence despite being set back in the mix. A vocalist would be put even farther out front in the mix than the horns, both for clarity of text and because vocalists are generally "accompanied" by the band, as opposed to being part of a larger whole.

MIXING WESTERN ART MUSIC

I myself have produced a number of albums in the jazz and classical fields. As Clouse speaks to the jazz perspective, I will briefly discuss my general approach to mixing a classically oriented recording. In truth, my approaches to classical music and to acoustic jazz are quite similar since both are chamber-oriented musics and have a somewhat standardized concert setup. For example, string quartets generally sit in a standard order across the stage in a kind of semicircle (from left to right: violin 1, violin 2, cello, viola). Orchestras have more variation, but we generally know what to expect.[6] Subconsciously, experienced listeners expect this setup to be recreated in a recording. Our students do not have this knowledge (or baggage), and recordings can be used to help the students aurally visualize the standard stage settings common in classical music performances.

Like Clouse, my first concern is to capture the sound of the performer as much as possible. As is true for all recorded music, microphone choices and placement are the first and perhaps most important step. Experience tells an engineer what microphones are generally good for recording particular instruments, but only one's ear can make a final decision as to which microphone is best for recording an individual performer. Microphone placement, at its most basic, will determine if the sound of the recording is more present (with microphones close to the performer) or more remote (with microphones farther away). Close microphone placement makes the listeners feel as if they are quite close to the music, and sounds such as fingers on the instruments and the breathing of wind players become part of the music. A more remote placement creates the effect of being in a large hall listening to the music from some distance away.

These are important aesthetic decisions. I prefer an intimate environment and an immediate presence that allows the listener to feel close to the music and the musicians. I like the sound of keys and valves clicking and bows viscerally pulling strings. I find that this recording technique, as opposed to a more remote and reverberant sound, is also more conducive

to an effective use of panning and volume to create a clear aural and visual picture in the stereo field.

Using the string quartet as an example, I would usually pan the first violin farthest left, the second violin slightly left of center, the cello slightly right of center, and the viola farther to the right, probably symmetrically balanced with the first violin. This creates a stereo field that replicates the concert experience of sitting in the middle of the concert hall and is a balanced sound as well. To create depth, I would use volume levels to place the second violin and cello slightly farther back in the stereo field while having the first violin and viola a bit forward. This is subtle and challenging as the volumes must be musically correct, and the inner voices of the second violin and viola can be obscured and difficult to pick out. A mixer must also subtly balance the volume of the second violin and cello, making them seem a bit farther back but still clear and appropriately musically present. These are very refined musical issues and are an indication of the subtlety that goes into the process of recording and mixing. These same types of subtleties also are important for deep listening and can lead to interesting discussions that can bring our students—and ourselves—into more intimate terms with the music, particularly in its recorded form.

MIXING ROCK, POP, AND R&B

Adrian Harpham,[7] an independent producer-songwriter-instrumentalist in New York City, offers a contrasting perspective on the mixing process. He generally works in the pop, rock, and R&B genres and has a very different approach to the specifics of mixing, although there are, of course, many underlying similarities of process. Rather than trying to recreate the aural or visual image of a live performance, Harpham stresses that he looks for the right sonic place for each instrument in the stereo field with no preconceived notion of where each is supposed to be, but tries to stay open to all possibilities. This is an intuitive process, and every song may call for an entirely different approach. He calls on his performance experience and attempts to bring improvisational spontaneity to the music and "make it sparkle and stand out as something truly unique."

Harpham thinks in metaphors: he works toward each instrument having "its own space in the mix" and looks to "create a large and weighty sound that still has air in it and is uncluttered." His sonic picture of a mix might at times be layers of frequencies, with the lowest frequencies at the bottom (the bass, for example) and the highest at the top (guitar or vocal). This arrangement does not reflect the band members as they might appear at a concert but instead highlights the various levels of sound organization. This is conceptually very different from Clouse's approach, underscoring

the point that understanding a few intricacies of mixing can lead to deeper listening, ultimately changing the way we listen to music.

Harpham speaks of mixing as a creative activity and of the mixer as an independent artist who brings new dimensions to the music that the creators never dreamed of. The notion of employing the mix as a pedagogical tool appeals to him greatly, as he feels that mixes and mixers are underappreciated: "People overlook the intellectual and creative aspects of rock and soul. There is some deep stuff going on there. If they only knew what went into the recording. Mixing is a performance, just like cutting a great bass track or a trumpet solo in the recording studio. It's all performance. It is all based on whatever the music is telling you at that moment—I don't have any formula."

Harpham gives some specific illustrations:

> In rock and in soul, it starts with the drums. The music needs to be from the bottom up—it has to have weight to it. Think of Led Zeppelin, the Beatles, or even Al Green. It's all got this bottom to it. It's about creating air, a space for each instrument, and a punch to the sound. Led Zeppelin is a really good example because they are recorded so well. There is an implied heaviness. Robert Plant [vocals] is on top in the high-highs [frequency range], Jimmy Page [guitar] is four inches below in the high-mids, John Bonham [drums] is in the entire mid-range and a bit in the low end, and John Paul Jones [bass] is below that in the low end. What you are hearing is this huge sound, but it is just three instruments and a voice. They are moving so much air because each instrument is in an exact slot sonically. It has this open quality, yet it is powerful and huge. You have to get the instruments out of the way of each other.
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> For example, in some modern rock, and this is a bad thing, they might put, say, nine guitars on the same part because it has to sound big. They are all distorted and over-driven, and panned across [the stereo field]. The drums are often close miked and high end [high frequencies are favored or embellished], the drums are eaten up by the guitars, and the track becomes harsh and unpleasant and loses its heaviness. The heaviness comes from the drums, so you have to give the drum kit its space to allow it to add its weight and power.
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> I'm really intrigued by mixing soul and rock because the more records I listen to and the more I mix, the more I feel it is done by instinct and that there are no rules or patterns. You are just reacting to what's happening. For example, if you think about Motown, you think about soft drums. The drums aren't prominent, but they're there. And then the bass is very loud—like it's the lead instrument. It would seem like it would be like breaking some kind of rule to put the bass that high in the mix—it might even be louder than the voices. So the mixer had to be very "in the moment" to allow himself to do something unorthodox, but that was right for the mix.

Harpham also spoke of Prince taking the opposite approach to the bass in his hit "When Doves Cry" from the album *Purple Rain*. At the point of

completing the final mix, Prince spontaneously made the unorthodox and rather radical decision (for a 1984 dance hit) to eliminate the bass when on the verge of completing the final mix.

Harpham gives another example: "When you think of [the hard rock band] the Black Crowes, the first thing you think of is the singer. But when you listen carefully, you notice that he is pulled back in the mix, and the guitar and bass are more up-front. Yet you still come away with the impression that the singer is what stands out. The same with Led Zeppelin. The singer is perceived to be up-front, but he actually isn't." In these cases, the mixer has managed to create "sonic spaces" for the singers that allow the vocals to stand out, even though the guitars and basses are louder and pushed a bit forward. This is an example of a particular mixing aesthetic that does not necessarily recreate the concert experience. It also does not adhere to the more typical vocal setting that places the vocal well forward, both in position and volume.

In contrast to Clouse's notion of capturing a performance and staying out of the way of the musicians, Harpham might employ a wide array of sonic effects, perhaps even radical ones, to make something stand out in a mix or to clarify particular musical elements. Harpham speaks of making the track "come alive" and focuses on the track as something distinct from an actual performance. This leads us to the work of Albin Zak.

THE TRACK

Albin Zak is a musician, musicologist, and recordist.[8] In *The Poetics of Rock: Cutting Tracks, Making Records* (Zak 2001), he discusses the recording process and its importance to a final product extensively and in great detail. He argues convincingly that sound recording has changed our conceptions of music and points out that "records are often equated with their song or performance, but these are only aspects of what is actually a more comprehensive work, the track" (xiii). He also speaks of a conflation of writing, recording, and performance that "makes for a seamless process where song, sound, and musical performance flow together in a steady stream of raw creative expression" (31).

Zak describes why the writing of rock and pop and the recording of the music are inseparable. In relation to my proposed course unit, he equates discussing the mixing process with other elements of the music appreciation curriculum:

> I completely agree with your premise. When I teach music appreciation, it is mostly based on the concept of examining how music gets written. Once they start to grasp the idea of form, for example sonata form, which has a narrative

> scheme to it, they get really excited. They look empowered as they can hear the music in a way that they feel a sense of authority: "I know where I am in the piece, and I know what is going on here."
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> The same goes for other idioms. For example, Led Zeppelin's "Whole Lotta Love" is a great example of how a mixer, very consciously, sets up the stereo space as if it's a stage for maximum dramatic effect.[9] It begins with a hint or a shadow of a guitar panned to the right, as opposed to the heavy guitar riff that is panned left, and when the guitar solo finally comes in, panned all the way right, the students kind of come out of their seats and say, "Yeah!" as they totally understand that this is an important moment that the song has been leading up to. It is all part of teaching people to listen in an informed way.

He sees understanding the mixing process and its intentions in the same light as understanding sonata form: they both enhance the listener's ability to hear and understand what is taking place in the music.

Zak continues: "There are certain principles we teach regarding classical music; it is the same with listening to jazz and understanding what they are doing with the [chord] changes or if you are listening to a rock mix and hearing what is going on. The more you know about it, the more you hear, the more fun you have, and the more you are engaged by the music. Being more informed is always a better thing."

Regarding differences in mixing approaches, Zak states:

> In addition to genres, different historical periods handle mixing issues differently. For example, there was a time when all recordings were mono and panning was irrelevant. That is where the depth of the mix was so important. That is the whole point of Phil Spector's "Wall of Sound."[10] What's in there? Well, that's the whole point—you don't know what's there—and that's how he wants it. You hear the voices, you hear the beat, you hear the string line, and the rest is just a murky mess. He spent endless hours getting the balances just how he wanted so you would have the aural perspective that he was after. How you set up the volume—I like to refer to it as prominence—affects how the listener experiences the depth of the track and how deeply they are drawn in. And if there is some kind of inscrutable background—whether they want to do it or not—their ear is grasping for that background. It gets you back there behind the singer somewhere, and it's a cool effect.

Zak gives another example of depth in one of my all-time favorite records, Marvin Gaye's "What's Going On":[11]

> He sets it up with voices just talking, and that's the foreground. Then the band comes in, and it's louder, and the voices are a step back, and the band is in front. Then finally, the lead vocal comes in and is even further out in front, and now the voices are really to the back. But because he started out with the talking, as they transition from talking to becoming backup singers, you are very aware of the voices and this sense of camaraderie ["Hey, what's happening

> brother. How you doin'? Groovy party, man."][12] In the middle of the song, the voices come back, and it is as if you are zooming in on this sort of man party in the middle. The sense of layering and just how deep that track is is part of the thrill of the listening experience.

Finally, Zak's experience speaking to engineers mirrored my own experience as I interviewed Clouse and Harpham:

> Engineers don't talk much about what they do—they just do it. They are usually self-effacing and will say things like "It was all feel," "You got to have a good song and good musicians," or "It's just a craft." But then they say, "I wanted it to sound like it sounded in the room," or "I wanted to catch the magic." So while they are hesitant to take much credit, they are responsible for turning an aural image into a mental image and then try to replicate that somehow electronically. It isn't their job to articulate it, and it is ours to unpack what is going on there. It is an aesthetic process, no matter how much they seek to replicate the real world. It still involves artifice and sleight of hand. It isn't the real world, it's still a record![13]

CONCLUSION

What I am suggesting is actually very simple (so why did it take so long to say it, you may ask) as well as practical and musically sound. At the core of music appreciation courses, no matter what our musical perspectives are, I believe we all agree that our most important job is to teach students how to listen to music. Since they are primarily listening to recorded music, both in this course and in their lives, we should be instructing them, and ourselves, how to listen to recordings in a more sophisticated manner. The basics of the mixing process, panning and volume, are possible places to start.

This basic concept can be employed for both non-music majors and music majors at the undergraduate level. In my experience, most music majors are inexperienced in this area, as are most instructors, so this unit can be an exploratory journey for all involved. Non-music majors' ability to listen critically and deeply to recordings will be improved. This is true for music majors as well, but in addition, understanding the basics of the recording process is essential for all contemporary musicians, as is fluency in basic audio-editing programs. Although I developed the unit for college-level classes, I believe it would be quite successful in the secondary-school music curriculum as well.

The unit on mixing techniques can also be incorporated into a wide variety of other courses. Discussions and exercises such as these can be extremely valuable, for example, as the first element in a course on electronic

music, whether a survey course or a more technically oriented course for music majors. In world music, a discussion of mixing could illuminate recordings of a gamelan orchestra, exploring the stereo field and its relationship to the performance layout of the gamelan. A pop-rock survey course could also benefit greatly from this unit, as the mixing process is of primary importance in these genres: think of Phil Spector's "Wall of Sound," George Martin's work with the Beatles, Brian Wilson's experiments with the Beach Boys, the bass- and drum-heavy sounds of hip-hop, or the glossy orchestral sheen of a pop ballad. Considering the treatments of panning and volume and their relationship to the larger musical context can greatly enhance and deepen our students'—and our own—listening.

NOTES

1. Audacity is a free, open-source, multi-platform software program that is quite effective for basic recording and editing. Apple's GarageBand is an affordable program for audio and MIDI recording that is popular in educational settings but is not available for PC. A more full-featured program than GarageBand is Logic Express, and the next step up, Logic Studio, is an industry standard. Pro Tools, SONAR, and Digital Performer are other examples of full-featured, industry-standard recording programs.
2. Sean Hickey, *Left at the Fork in the Road*, Naxos, 2005.
3. James Taylor, *October Road*, Atlantic, 2002.
4. Audacity is available for free download at http://audacity.sourceforge.net.
5. Jim Clouse, interview by the author, October 5, 2009, Brooklyn, New York.
6. One typical arrangement of the orchestra places the strings across the stage (from left to right: violins 1, violins 2, violas in the center, cellos, and basses); behind the strings, centrally located, are the woodwinds; behind the woodwinds are brass (left to right: horns, trumpets, trombones, and tuba); and percussion and timpani are in the rear.
7. Adrian Harpham, interview by the author, October 9, 2009.
8. Albin Zak, telephone interview by the author, October 16, 2009.
9. Led Zeppelin, "Whole Lotta Love," *Led Zeppelin II*, Atlantic, 1969.
10. The influential producer Phil Spector (b. 1939) created a production technique, the "Wall of Sound," that was extremely dense and layered.
11. Marvin Gaye, *What's Going On*, Sony, 1971.
12. This is a loose transcription of several simultaneous voices that simulate party conversation at the beginning of "What's Going On."
13. For further reading on this subject, see Allan F. Moore's work on the "heuristic sound-box model" and his discussion of the stereo field from several perspectives. His publication website (http://www.surrey.ac.uk/Music/NewsGenInfo/AcademicStaff/Moore/MoorePub.htm) is an excellent resource; in particular, see Moore 2005.

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