# 3 The Recording Fields
## High Fidelity and Studio Audio Art

At the beginning of the twentieth century a musical revolution was taking place. In 1877 Thomas A. Edison invented a machine that could both record and play back sound, but for over a decade he could not figure out the uses his recording machines might best be marketed for. In 1890 a dealer of the machines invented a prototype of the jukebox: coins inserted into a slot played cylinder recordings of music and comic monologues (Thompson 1995:137). Thus it was discovered that people would pay good money to hear recordings of music! And with this novel idea, the seeds of a new industry were planted. Around the same time a similar machine was developed; known as the gramophone, it used flat discs instead of Edison cylinders. The advantage was that discs could be mass-produced from a master disc; the industry was on its way, and a new musical field came into being.

Describing the early twentieth century, musicologist Emily Thompson notes that

> as phonographic technologies provided a means to mass-produce identical *recordings of musical performances*, people increasingly experienced music not by attending unique live performances or by producing music themselves in their homes but instead by purchasing recordings, carrying them home, and reproducing the music on machines in their parlors, whenever and as often as they desired. Cultural critics as diverse as John Philip Sousa and Theodor Adorno have examined the significance of this transformation. (1995:132, my emphasis)[1]



By the turn of the twenty-first century, cosmopolitans' most common experiences with musical sound were through audio and video recordings. Since at least the midtwentieth century many scholars have studied the processes and social effects of recording technologies from different vantage points and have decried and celebrated recorded music from a variety of ideological positions.

My point of departure for this chapter is simply that music recordings are a ubiquitous fact of contemporary social life and that production processes, uses, and the significance of recordings are as varied as for the sounds and activities of live performance. To help make sense of the diversity, I propose two distinct fields of making music recordings—*high fidelity* and *studio audio art*. What is important from my perspective is that we place these fields, *as musical fields*, on par with participatory and presentational performance. That is, I propose that we conceptualize the making of high fidelity recordings and studio audio art simply as other distinct modes of musical activity, each with its own advantages and constraints.

### High Fidelity Music

*High fidelity music* refers to musical sounds heard on recordings that index or are iconic of live performance. High fidelity recordings (both audio and video) involve an ideology of dicent representation of live performance at some level—*dicent* in that live performance is believed to have affected the signs of liveness in the recording in some way. The ideal form of high fidelity music involves the actual recording of live performances in a ceremony or concert to be heard/seen at a later time as a representation of that event. 'Live concert' albums and videos and 'ethnographic' field recordings and films released by institutions like the Smithsonian are of this type. In addition, studio recordings that are meant to represent what an ensemble actually does, or could ideally do, on stage or in a ceremony are included in the high fidelity field. There is typically a dialectic between live perfor-

1. Sousa (1854–1932) was a prominent band leader and composer for marching band. Adorno (1903–1969) was a cultural critic who wrote about music and was often critical of mass-produced popular music.

mance and the recording process for ensembles that work in these two fields. That is, what is worked out for live performance influences what is recorded; pieces and particular features of pieces that receive approval or generate enthusiasm among live audiences will influence what is recorded. But the details and parts worked out with care in the recording process may also influence what is done on stage. If there is a close relationship between an ensemble's recordings and live performances, I consider the recorded versions high fidelity. A clear example of high fidelity recordings for a mass audience were the Atlantic and Stax-Volt soul music records made during the 1960s (e.g., Sam and Dave, Aretha Franklin, Solomon Burke), where people in the studio would actually make audience sounds as icons of live performance. While musicians can make high fidelity recordings for their own private purposes and bands make them to distribute among their local audience base, commercially released high fidelity recordings mediate between artists and audiences that are usually not in face-to-face contact.

## *Ethnographic Field Recordings as High Fidelity*

Like photographs, ethnographic field recordings and live concert albums have a strong dicent indexical quality; the microphones and tape recorder, like the camera, are assumed to simply capture what is in their presence—a live music event. Thus the object of the sign (the live performance) is assumed to actually affect the sign (the recorded sound) in a direct 'natural' way. Unlike studio audio art, high fidelity recording in a studio aims to make the recording process 'invisible' or at least to downplay production processes so that the recording will be received as a faithful representation of lifelike musical performance.

A number of students and colleagues have questioned the validity of high fidelity as a separate field comparable to participatory and presentational performance, because they see the recording process as parasitic on, and secondary to, the 'actual' music making. Especially for ethnographic recordings they feel that the musical performance would go on in much the same way regardless of the presence of the documenter. The importance of emphasizing the high fidelity field is precisely to unmask the 'naturalness,' 'invisibility,' and secondary nature of the recording, mixing, and editing processes and to suggest that the people directing these processes have a crucial role in shaping high fidelity music. Note, for example, that even though orchestra conductors do not make a sound, people easily conceptualize them as integral to presentational performances; we have to make





a similar leap for recordists, studio producers, and engineers, who play equally integral roles in shaping the sound of high fidelity recordings.

In fact, the sound of documentary field recordings can be, and usually is, manipulated through microphone placement and sound equalization (reducing or augmenting certain frequencies) to *create,* not merely capture, the sound that the documenter wants to hear and present to others on a recording. In normal Shona mbira performance the sound of the hosho rattles is so loud that the details of the mbira parts are obscured. This is fine in situations where people are dancing, since the hosho provide much of the rhythmic drive of the music. If this live sound were reproduced literally on a recording, however, largely what listeners would hear, piece after piece, would be the same loud, repetitive shaker pattern. This would make for a very boring recording (not enough indexical nows) and would not help listeners understand the details of mbira playing. Ethnomusicologists, myself included, who have published recordings of mbira music to introduce it to non-Shona audiences have placed the microphones very close to the mbiras and as far from the hosho player as possible so that the details of the mbira parts can be heard clearly. In addition, ethnographic field recording sometimes involves specially arranged or staged performances so that optimal microphone placement, sound separation, and balance can be achieved. As a radical case, ethnomusicologist George List reports that he recorded rural Colombian musicians by placing and miking the members of an ensemble in different rooms of a small house so that they could still play together but he could get maximum separation between the parts for later analysis (1980). This emphasis on clarity of parts, also true for mbira and other field recording, is a common stylistic goal in the high fidelity field both in and out of the studio.

As with studio recordings, field recordings that are commercially released typically involve an editing and selection process whereby the recordist/documenter chooses the 'best' or 'most representative' performances based on her understanding of the tradition and what she wants to get across with the recordings. The long repetitive performances, so important to participatory events, are shortened with fade-outs so that the recording doesn't become boring (CD track 3). Awkward or insecure moments, which on a recording might sound like mistakes, are edited out, as are parts of recordings with too much background talking or noise. Pieces are typically chosen and arranged on the recording so that there will be variety and one track will contrast with the next—similar to the way presentational performances are planned. Genres that are not even played in the same events or times of year are placed side by side on ethnographic

recordings. Thus, even for ethnographic field recordings, supposedly the purest form of high fidelity music, the documenter purposefully shapes the sound in the recording and editing processes.

The requirements for a good high fidelity recording are simply different from the requirements for a good live performance, because the recording is directed to an audience not present and participating in the face-to-face event and because the frame for listening to recordings, even field recordings, is radically different from that for live performance. Continuing developments in recording and playback technologies have led consumers to expect higher quality and clarity of sound.[2] Even more than in presentational performances, on recordings sound alone carries the burden of sustaining attention and interest. Moreover, the sound presented has to stand up to repeated listenings; this fact requires a different type of detailed attention to the sound presented and influences the selection, mixing, and editing processes, as well as the processes of playing music in a studio, in fundamental ways.

## *The Studio Production of Liveness*

Sound manipulation is all the more pronounced in high fidelity music created in a studio. While the presentation of ethnographic field recordings often involves editing out some of the 'liveness' (overly loud instruments, talking, awkward moments, long performances), studio sound manipulation often involves effort to create signs of liveness.[3] The ideology underpinning high fidelity recordings is that what you hear on records has been or could be performed live. In the early days of recording this was important because all 'real' music was still tied to the idea of live performance. Even today, certain artists and genres rely on notions of authenticity involving live performance (e.g., rockers like Bruce Springsteen, 'African music') and thus operate with a close relationship between the presentational and

2. For example, earlier in my career, field recordings made on a Sony Professional Walkman cassette recorder were accepted as good enough for publication. This was no longer the case after the emergence of digital technology and CDs; at that point recording companies began to require greater clarity and less sound-to-noise ratios than cassette recorders could produce.

3. A number of articles in the book *Wired for Sound* (Green and Porcello 2005) provide excellent detail of the processes and meanings of producing signs of liveness in studio recordings.





high fidelity fields. In her detailed study of the making of a Zulu *mbaqanga* music recording in South Africa, Louise Meintjes comments that "liveness is an illusion of sounding live that is constructed through technological intervention in the studio and mediated symbolically [in Peirce's sense] through discourses about the natural and the artistic. To sound authentically African is to sound live. This is an ideological position sustained by the promotional engine of the music industry, and it is kept alive by African and non-African South Africans in the studio" (2003:112).

Achieving what is perceived as a live sound in the studio involves a good deal of technological intervention. It also involves other musical roles, especially those of the record producer, who orchestrates, arranges, and designs the sounds of the recording, and the engineer, who manipulates the technology to the producer's specifications. Meintjes writes,

> West [the producer] says he wants a sequenced synth or clavi bass riff. He sings the riff. Peter [the engineer] programs the basic sound on the studio's DX7 keyboard. But West wants a warmer version of it. So while West chats to the singers, Peter alters the coordinates on the keyboard and EQs [equalizes] the sound a little at the recording console.
>
> "Okay, let's try one more time," Peter instructs Makhosini, who is playing the riff on the Yamaha DX7 keyboard. Peter starts the click track [a recorded track providing the basic beat of the song] and counts the keyboard entry for Makhosini, who then plays along with the rhythm tracks. (2003:109)

So in the process of creating this high fidelity album, the musicians do not even play with each other simultaneously. Rather, Makhosini plays along with prerecorded rhythm tracks.

Recording in a studio is a different field of music making from live performance; good recordings, even those intended to represent the live feel of presentational music, have different requirements from those of stage performance. The lack of visuals and aura of the musicians' presence, which create excitement and interest onstage, must be made up for through sound quality alone to end up with a satisfying product. Recording the different instrumental and vocal parts on separate tracks is important so that each can be manipulated independently to create the desired result.

A South African recording engineer, John Lindemann, explained, "The black producers we mix with want everything right up there. They want

to hear the works. They want to hear every guitar line, they want to hear every vocal line, they want to hear everything else that's going on—not like a white approach to music where there are a lot of holes, a lot of different levels—they want it all there. It used to be quite difficult to get all of this lot to mesh, and to get it in there all at one level, and be able to hear everything without losing the drive of it" (Meintjes 2003:114). So the aesthetics and conceptions about what live music is among different cultural groups affect the recording and mixing processes. Lindemann points out that black producers want to create the sonic effect of density ("get it in there all at one level") while still being able to hear each part clearly, whereas white producers want more "space" and part separation in the recording. In either case, however, the same emphasis on the clarity of parts that characterizes presentational music is of even greater concern in high fidelity music.

There is another consideration for high fidelity music that doesn't pertain to live performance. Not only do engineers and producers have to worry about what the recording will sound like in the studio, they have to shape a sound product so that it will be effective on all types of playback machines. Again Meintjes quotes Lindemann:

> I think what it's got to do with is that I think that the average black person [in South Africa] is listening through a cassette player through lousy little speakers. And I think the bottom line is that it's all very well if it sounds great on big hi-fi speakers, but you've got to somehow get some drive into that thing so that when that person listens through their little ghetto blaster or whatever it is, it's got to work. . . . They get their music brought to them on radios, and through tiny little speakers. . . .
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> The heavier your bass is the more it swings. That means grooves [the actual grooves of a record] used to cut into each other. So in the old days those portable record players they used to use, by doing this the record would suddenly jump—that's from the bass cutting into each other.
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> So [as a sound engineer] I used to cut that bottom out to create that clicky mid-type sound on the bass. Also they used to play a lot of cymbals. Everything was high-pitched. I removed that. Because that also created a lot of sibilance, which those record players didn't like. Eventually what I created was a loudness on the record, by using about around 4.8 [Hz], which used to give me a lot of mids [mid-range frequencies]. And somehow it worked.



Meintjes concludes, "The consumption practice—dancing, listening to the radio—is imagined right at the moment of production. The necessary technological intervention is used to boost, not only to accommodate, the bass aesthetic [of South Africans]" (2003:115–16). Similarly, record producers I knew in Zimbabwe, and one I worked with in the United States, would *mix* (manipulate the recorded sound by altering the balance, equalization, and compression) a recording and then listen to it on various types and qualities of playback machines. These tests were then the basis of remixing the recording in a way that would make it work on a variety of playback machines.

Electronic manipulation—specific uses of reverb, echo, sonic spacing (panning), equalization, and compression—is required to create a live sound in a studio, and certain studios are known for having the facilities to work toward a high fidelity sound. Drums and loud instruments that bleed into other tracks might require their own sound booths, or techniques such as sound barricades around a drummer, if the band wants to record together with the drummer in the room. Bands and producers operate differently depending on their conceptions of what they want for the finished product. Let me offer several more examples.

In 1992–93 I performed single-row button accordion with the Zimbabwean guitar band Shangara. We recorded an LP at Shed Studios in Harare, capital city of Zimbabwe. In the making of this high fidelity recording, the drum tracks were laid down first against a click track. Then the guitarist and bassist played their parts together—instruments plugged directly into the console—while listening to the drum part through their headphones. The producer then wanted to record the lead vocal, which Josh Hlomayi Dube, the leader of the group, sang in a sound booth with the instrumental tracks coming through his headphones. In the next phase, I was put in a sound booth, and with the rest of the band, the producer, and the engineer watching me through the glass, I played my accordion parts, which were designed to interlock with the lead vocal and lead guitar parts.

We recorded in the studio on weekdays. On some weekends during the same period I had the opportunity to attend and sometimes play mbira in participatory spirit possession ceremonies. In the ceremonies, as I will describe in a later chapter, people are packed closely together making music and dancing inside a small space. Physical proximity, even feeling the body heat of those around you, heightens the feeling of social intimacy. In the studio I sat and played alone in the sound booth, as if in a fishbowl or a clinical observation booth. Instead of concentrating on and interacting musically with the *people* around me, in the sound booth I focused on the

isolated *sound* of my instrument in relation to the *sound* coming through the headphones. At the time I was struck by the radically contrasting nature of the recording process and participatory music making; it occurred to me then that 'music' itself was not the same phenomenon in these two types of situations.

The final recording stage with Shangara involved the addition of the background female vocals. The two singers recorded their parts together on the same microphone with the other tracks coming through their individual headphones. The producer frequently stopped them for retakes because he felt that they were singing out of tune. Ultimately, still unsatisfied with the results, the producer asked Josh to sing along with the women to strengthen the background vocals. In the final mix, he would be singing background vocals that overlapped with his own lead parts, not something that he could do onstage.

Once all the basic tracks were recorded, the producer and the engineer took several days to mix the sound; more sessions would be devoted to this phase for a higher-budget recording. While the musicians were present in the studio for the mixing, there was little for them to do. The producer would listen to the rough mix and then instruct the engineer to alter any number of things. For example, they would equalize different parts to change the timbre and presence of a given instrument for a variety of reasons; in one case, the sound of a drum was altered because it merged too much with the frequencies of the bass and muddied the sound. While the producer would consult with Josh about certain decisions, the musicians were largely left out of the mixing process. With the exception of volume balance, they did not have the expertise to even know what the technological options were.

As in the example reported by Meintjes, the producer and engineer of Shed Studios were not mere technicians neutrally capturing what the musicians played more or less as they would on stage. Rather, they were partners, albeit with distinct roles, in the high fidelity music-making process. They made aesthetic judgements about the manipulation of the recorded sound, but the producer also made aesthetic judgements about the intonation of the background vocalists and altered the way the group normally performed so that it would work *as a recording*. The musicians also played in a very different manner from the way they did on stage—alone or in pairs, and doing vocal and instrumental parts separately. The songs had been composed for and tested in live performances, the bread and butter of the group, but making a successful recording of those songs



required additional personnel and different technologies and performance processes. High fidelity sound is distinguished by an even greater concern for textural clarity and part separation than in the presentational field, a concern that determines many facets of the music-making process.

I recorded with my group, the Squeezetones Dance Band, in Pogo Studios in Champaign, Illinois, in 1996. This was quite different from my experience with Shangara at Shed Studios. In the first place we were paying for the studio time and controlled the process as 'self-producers' with Mark Rubel serving as engineer and gentle guide. We were doing the recording mainly for ourselves, as a record of our music at that time, and we never released anything. Our idea was to perform pieces together in the studio much as we did at home and in performances. We were primarily a live participatory music ensemble, and we were used to feeding off each other when we played; we wanted to try to capture that type of energy and spontaneity on the recording. Pogo Studios was perfect for this approach in that it has a large living room–like space, but this manner of recording had its own drawbacks. The drums were too loud and bled into other people's microphones. Mark placed sound barriers around the drums to reduce the problem. My Cajun accordion bled into my vocal mike, and Randy Cordle's bass also bled into other microphones. The number of microphones used overall was not extensive. We overdubbed a few percussion parts, and I overdubbed a rhythm guitar part on one of my accordion compositions, but mainly what we recorded were first or second takes of songs played together as we always did.

This manner of recording reduced the possibilities at the mixing stage. Without full separation on the different tracks, we could not equalize or change the balance of individual parts very much, and what we ended up with was largely what we did at home or onstage. I still listen to this recording and enjoy it much as I enjoy looking at photos of old friends, but lacking clarity and separation it does not sound like the vast majority of commercial recordings, and it would probably not be considered successful according to the values of the high fidelity field.

Our recording process contrasted in many ways with the approaches described by Meintjes for recording Zulu popular music in South Africa and by me for Shangara's Shed studio sessions in Harare, where, for the most part, musicians recorded their parts individually. Thus even within the high fidelity field, the ideological importance of, and approaches to, representing liveness will vary according to different genre frames, social contexts, and bands. Live participatory performance for dancing was cen-

tral to the Squeezetones' identity as a band, and we emphasized this in our manner of recording. Tom Porcello describes a similar ideology and approach to recording by bands in Austin, Texas. On signs in the airport and in tourist brochures, Austin bills itself as the "Live Music Capital of the World," "which pointedly marks a musical identity based in performance that Nashville's 'Music City, U.S.A.' does not. Out of this basic dichotomy has evolved an ideology that, as expressed in Austin, ties liveness to musical authenticity (which is fundamentally linked to sincerity and personal expression) and recording to alienated, calculated corporate profiteering schemes" (Porcello 2005:111).

Porcello describes the recording of bands in Austin, whose methods prove somewhat similar to those of our Pogo sessions: "Rarely, in my experience, did members of the rhythm sections of Austin bands record individually; the common approach was for the ensemble to perform and record live with the intent of keeping all of the live rhythm tracks (bass, drums, possibly keyboards and rhythm guitar) for the final mix. In effect, then, the rhythm tracks were generated in live performance, and significant overdubbing was reserved for lead and solo instruments and voice" (2005:107). Note that the *core* parts were performed together in the studio to create a live feel while overdubbing was reserved for *elaboration* parts (chapter 2).

Porcello goes on in great detail to discuss how the drum kit is miked in the studio, because "in most contemporary popular music, drum sounds are the single most important source of information [signs] about roominess, and they therefore have a dramatic impact on the degree of liveness evoked in a recording" (2005:107). Each drum and cymbal in the kit is "close miked" with one or more microphones and

> often its own track on the multitrack tape. A composite kit sound is then mixed by the sound engineer, who manipulates the balance among the individual elements at the recording console. The goal of this process is to achieve maximum isolation on the tape for each piece of the drum kit. . . .
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> In order to record live-sounding, ambience-rich ("roomy") drums, one can technologically induce liveness simply by running the close-miked drum tracks through a reverb machine (a signal processor that creates or simulates reverberation). But in my studio work in Austin, such technologically facilitated solutions were often viewed with skepticism. (2005:108–9)





Instead, and so as not to sacrifice the control achieved through close miking, additional ambient mikes were placed a further distance from the drums so that the real room sound could later be mixed with the close-miked drum tracks.

The point of this somewhat lengthy technical account is to illustrate the complexity of achieving a 'live' music sound on recordings. Even in situations where commitment to simulating live performance is at its highest, primary attention remains on shaping the artistic product. Great efforts are made to separate and control the different sounds (even the different cymbals of the drum set) so they can be manipulated later in the mixing process.

The uniqueness of the high fidelity field is defined by ideologies of authenticity connected to live performance on the one hand and the special demands of making recorded music that can represent people, live performance, and be captivating through sound alone on the other. Of course the desire to achieve a high fidelity sound depends on particular frames of interpretation and reception which are rooted, more fundamentally still, in broader systems of social value, identity, and basic conceptions about what music is. As Porcello remarks, in the Austin scene live performance is still linked to ideas about sincerity and personal expression—to people making music with 'real' instruments in 'real time' for people. Although these Austinites may be somewhat more traditionalist than cosmopolitans elsewhere, I would suggest that this basic attitude is still quite widespread. It is this conception of music as essentially a 'live' phenomenon, coupled with the valuing of professionalism, specialization, and artistic control, that explains why the presentational and high fidelity fields are the most highly favored—the most mainstream—in modernist-capitalist societies.

For the three fields discussed so far, live performance and the representation of live performance are still central to the conceptualization of the art and activity. The participatory field is radical within the capitalist cosmopolitan formation in that it is *not for listening apart from doing*—and we still tend to think of music as something meant for listening. Participatory performance is also radical in that it hinders professionalism, control, and the creation of commodity forms. The fourth field, studio audio art, is radical in a different way in that it has been freed from ideologies of authenticity involving people making music together in real-time performance. Studio audio art is the realm of electronically manipulated sound for the creation of an art object that is purposefully disassociated from live performance. Historically, the emergence of this

field during the midtwentieth century is a logical extension of people's acceptance of recordings as the actual music rather than as high fidelity representations of 'real' (i.e., live) music; the birth of studio audio art indexes this shift in cultural conception.

## Studio Audio Art

*Studio audio art* is recorded music that is patently a studio form with no suggestion or expectation that it should or even could be performed live in real time. Being freed from ideologies of authenticity involving live performance, studio audio art has extremely different dynamics, goals, and potentials from those of the other three fields. This field involves the manipulation of taped sounds, synthesized sounds, or digital technology for the creation of sonic art objects that exist only in electronically reproducible form (recordings, sound files) and in which the goal is the creation of the recorded piece itself—to be listened to after it is completed, much as a painting is to be viewed once it is finished. While the recordings of computer music or other studio audio art pieces can be played by a reproduction device for an audience in a concert hall or other presentational settings, this is more akin to viewing sculpture or paintings in a gallery than it is to listening to a live ensemble performing.

The most developed examples of studio audio art are the electronic and computer pieces produced in cosmopolitan cultural institutions and universities and known under the general category of *electroacoustic* music. Around 1948, French composer Pierre Schaeffer began working in *musique concrète,* a term that refers to pieces made with prerecorded sounds and with techniques for manipulating the taped materials: tape loops, cutting and splicing, speed changes, direction changes. Other composers such as Varése, Messiaen, Berio, Stockhausen, Cage, and Boulez also worked in this genre. In the 1950s electronic music studios were created; in Europe they were often connected to state-run radio stations, and in the United States they were typically connected to universities. These studios contained advanced tape recorders, oscillator banks, mixing boards, reverberation chambers, sound filters, and other devices for manipulating sound. Sound-generating synthesizers were developed in the 1950s and became more available after the mid-1960s, superseding the need to manipulate taped materials. The use of computers for musical composition developed after the late 1950s; computers have become the most important, flexible tool for studio audio art composers.



It should be emphasized that the use of a synthesizer or a computer, in and of itself, does not define studio audio art; these instruments are also used to create high fidelity music, for example to create a string-orchestra sound on a pop record. Moreover, electronically produced and recorded portions of a piece have been composed to be combined with acoustic instruments specifically for presentational performance, a purposeful mixing of fields that is ultimately presentational in the overall goal. Unlike high fidelity, studio audio art does not mask the processes of electronically creating and manipulating sound; rather, these are usually transparent and even celebrated through the sound quality of the music itself. Sound collage and tape manipulation techniques (e.g., playing a taped guitar line backward) foreground the processes of electronically fashioning sound. Again, the distinguishing feature of studio audio art is that it is presented through recordings that are not intended to index or be used in real-time musical performance.

In many cases a single studio audio artist will create all the tracks or parts necessary for a piece and then assemble and sonically shape them, initially with tape, then synthesizers, and now computers. Forming something like the first draft of a poem or the roughing out of a sculpture, the artist can then go back to the original material assembled and add, subtract, and change sounds and tracks to come up with the finished piece. Repeated listening to early drafts of the piece can spawn new ideas, additions, extensions, and deletions, and the artist or artists can keep working with the taped, synthesized, or digital materials until they are completely satisfied with the result.

Thus, one attraction to working in this field is that an individual artist can have maximum control over the finished piece. The creator does not need to depend on, or collaborate with, the ideas and abilities of performers. Moreover, musical complexity is no longer limited to what performers can play. Initially, maximum artistic control seems to have been a major impetus for composers working in this field—it is a space for working out one's own musical ideas and imaginings in the most direct way possible with the help of machines and without the encumbrances of humans. Edgard Varése, "the father of electronic music," is quoted as saying, "I no longer believe in concerts, *the sweat of conductors* and *the flying storms of virtuosos' dandruff,* and am only interested in recorded music" (quoted in Mattis 1992:557, my emphasis). A more telling remark about this composer's view of the human equation in musical performance is hard to imagine. A more distanced position from the values of participatory musicians is also hard to imagine.

Another attraction of the studio audio art field is that synthesizers and computers can provide an almost infinite pallet of sounds to work with and thus have potential for expanding the limits of 'musical sound' beyond what previously existed. Cornelia Fales, an ethnomusicologist who studies music perception, argues that the very processes of perceiving and processing certain electronic music sounds are different from those for acoustic music because of habitual perceptual processes relating to sound that are hardwired in humans: "Human interpretation of complex sound stimuli has been shown to be precisely geared to source identification. Lower-level processing, in particular, is based on what appears to be hardwired information about sound sources" (2005:163). Since auditory information is often incomplete and unfolds through time, Fales suggests that the mind fills in the blanks and makes "after-the-fact" corrections about sound sources. It is easy to understand how this basic mechanism of perceiving sounds in relation to their sources in the objective world has a survival function in evolutionary terms, but certain electronically created sounds create a problem because they have no correlates in our "canonical" *types* of sound producers.

Fales outlines four basic kinds of electronic musical sounds on a continuum. The first kind is iconic of real world sounds, "derived perhaps from unaltered sampled sounds. These might be acoustic instruments, environmental noises, or other sounds that demonstrate" an iconic reference to some sound source that we already know and can identify. The second class of iconic sounds diverges from known sound sources but is close enough to suggest a *possible* relation to such a source. She explains, "While not pointing to a specific referent, that is, these sounds indicate sources that follow the rules of the acoustic world, and they conform to our canonical sense of how sound works in the world; these are not shocking sounds, they are simply ones we have never heard before" (2005:169–70). Sounds in her third category, those used in electronic music, work through the infraction of acknowledged rules of the acoustic world: "these are sounds that are impossible, that could never exist in the perceptual world in which we believe so wholeheartedly" (2005:170). And sounds in the fourth category provide no iconicity whatsoever in relation to our understanding of the world. "Sounds in this category exist in total autonomy from any canon of sounds we might favor. A deluge of these sounds makes us anxious for a foothold, for something familiar to direct our auditory efforts" (ibid.). Thus, according to this account, studio audio art not only reduces the human equation in relation to performance but also can be used to confound and reorient our basic human perceptual apparatus in relation to sound (CD track 7).





The goal of pushing the very borders of musical conception has led to another trend in studio audio art. Composers have begun to write computer programs that generate pieces on their own. Since human musical conception is largely bounded by what is known, it is difficult to radically push the limits of the possible—humans are limited by the limits of their own imaginations. By writing computer programs that generate sounds based on theories involving indeterminacy, chaos theory, or some other system, these composers make the machine able to generate music that goes beyond human imagination and the known. Composers who work in this way seem as interested in the conceptual process of creating music as they are in the finished product. As with participatory music, but in contrast to the presentational and high fidelity fields, process rather than product comes to the fore or is at least of equal importance for composers working in this way. Unlike participatory music, however, interactive relationships for studio audio artists are usually between the composer and her instruments (sound generating and recording devices) and between the finished recorded piece and listeners.

## *Academic Composers and Studio Audio Art*

Many pieces in the electroacoustic repertory are purposefully devoid of sounds that iconically suggest conventional music; indeed when I play John Cage's electronic piece "Cartridge Music" in my general music appreciation classes, students often reject the idea that it belongs to the category *music* at all. Contemporary academic composers who create studio audio art are primarily concerned with the original fashioning of art objects through the organization and manipulation of a variety of sound sources in new ways. The pieces are often intended to be unique, self-contained systems of arrangement and logic that are stylistically connected to this specific musical tradition by the very goals of formal and sonic autonomy and difference. This makes for difficult listening. Let me try to explain what I mean.

When we view 'realistic' paintings of a person or a landscape, the iconic representation of things we know from indexical experience gives us an easy point of entry into the artwork. Even people who do not know much about visual art can relate to such works through their knowledge of the subjects being presented. In abstract paintings, however, viewers

are challenged to attend to the forms, colors, and textures presented in the painting—to the artwork itself—without intended outside references. Uninitiated viewers might still relate to abstract paintings much as they do to an inkblot test. That is, they might imagine *possible* subjects that are being presented through some type of iconicity, but this is usually not what is intended by the artist. Abstract art is about the art itself and about the piece as an object that is autonomous from daily life. Highly abstract studio audio art is also like this.

In most popular music and in the classical repertories of the eighteenth and nineteenth centuries, the use of known musical instruments, closed, recognizable forms, the tonal harmonic system, and a wide variety of musical conventions (shared indices) give us points of reference to interpret a newly encountered piece. At the most general level, a newly discovered piece in these repertories is immediately recognized as *music,* and as a certain *type* of music (classical symphony, pop, country, R&B), with all the indexical associations that these conventions and genres carry. Against the genre-specific frame of interpretation, a listener then may attend to, or be affected by, the specific features of the piece. By the early twentieth century, elite European and American composers increasingly sought to free music from the tonal harmonic system and traditional musical conventions. They created new systems for organizing sounds. For example, composers began creating harmonic and melodic relations in a given piece in terms of a predetermined order of twelve pitches, known as twelve-tone music. In effect, each piece had its own self-contained harmonic-melodic system based on an original twelve-tone row.[4] Composers also began to extend the types of sounds included in musical compositions, at first through experimentation with new timbres available on conventional instruments and new combinations of conventional instruments. Computers, and recording studio techniques more generally, provide advanced possibilities for creating new types of sounds or using 'found' sounds and organizing them into finished recorded pieces, each with its own form and logic. In their efforts to extend the boundaries of what constitutes music, composers often avoid sounds and musical structures that provide easy iconic and indexical references to things and music that listeners already know; thus

4. For twelve-tone music the composer chooses and orders twelve pitches; the *row* is used as a unique scale. In the standard tonal music system of earlier classical music and most contemporary popular music, the same scales are used as a unifying feature to create melodies and harmonies across different pieces. In twelve-tone music each piece is like its own melodic-harmonic system.



such studio audio art often sounds abstract and even nonmusical to the uninitiated. As with abstract painting, one intent is to draw attention to the piece in and of itself as an autonomous art object.

In a second related trend, for centuries composers in the European classical music tradition sought to gain fuller control over the way their pieces were performed. In earlier centuries scores provided a general sketch of how a piece should be rendered, but performers had a good deal of leeway for interpretation. By the eighteenth and especially the nineteenth centuries, composers increasingly included more specific instructions in their scores regarding how all features of their pieces were to be realized in performance (tempo and dynamic markings, markings to indicate instrumental timbres, specific orchestration), although performers always have the option of interpreting things differently. Studio audio art can be seen as the most advanced stage of this trend, whereby the composer can eliminate the performer altogether and create an art object all by herself in a finished recorded form in the studio. Computers and other tools in the sound studio provide the most advanced possibilities for full artistic control over audio art and in a sense allow for the fullest play of individual artistic imagination.

The desire for maximum individual artistic control and autonomy is understandable from a certain cultural perspective, but it is hardly universal. For example, participatory Aymara musicians prefer to compose collectively, in spite of all the compromises that such a process requires, and their compositions will not even be played unless they remain highly formulaic (chapter 2). Like the desire to create abstract art with its assertion of autonomy from daily life, the valuing of individual artistic control is specific to a particular cultural value system that has developed over a long period in Europe, the Americas, and, by now, modernist-cosmopolitan circles more broadly.

Socially and artistically studio audio art is the most autonomous field, and, like the other fields, it has its own positive aspects and drawbacks. On the positive side there is artistic control and a broad sound pallette; on the negative side there is less human interaction to guide the artistic process (e.g., direct audience response), or to be enjoyed as a basic part of music making. These drawbacks are somewhat mitigated by a major context where new studio audio art is exhibited: composer conferences, forums, and workshops where criticism and feedback from colleagues are possible. These contexts, however, fortify the connection between this field of music making and a particular cultural cohort comprising the composers themselves, and thus reinforce the values of the cohort. There is no inher-