Technology and Music Performance in the Age of Mechanical Reproduction
Author(s): Jon Frederickson
Published by: Croatian Musicological Society
Accessed: 27/06/2013 12:46

Your use of the JSTOR archive indicates your acceptance of the Terms & Conditions of Use, available at [http://www.jstor.org/page/info/about/policies/terms.jsp](http://www.jstor.org/page/info/about/policies/terms.jsp).

JSTOR is a not-for-profit service that helps scholars, researchers, and students discover, use, and build upon a wide range of content in a trusted digital archive. We use information technology and tools to increase productivity and facilitate new forms of scholarship. For more information about JSTOR, please contact support@jstor.org.
TECHNOLOGY AND MUSIC PERFORMANCE
IN THE AGE OF MECHANICAL REPRODUCTION

JON FREDERICKSON

1410 Hamilton St., N. W.
WASHINGTON D. C. 20011, U.S.A.

UDC: 78.01:78.091:159.982
Original Scientific Paper
Izvorni znanstveni rad
Received: February 25, 1989
Accepted: April 25, 1989

Abstract — Résumé

The introduction of technology into musical performance is transforming traditional aesthetic definitions of musical experience. Once social technology allows the abstraction of the individual from the performance, machine technology can complete the abstraction process. This process transforms traditional aesthetic definitions of what constitutes live musical experience: the relationship of the performer to the audience, to his sound and aura, to other musicians making music together, to his ears and environment, and to time. The discussion of musical time illustrates how aesthetics can function as a theory of experience rooted within a symbolic universe. Further, as the technological symbolic universe becomes dominant, we can observe a parallel shift in aesthetic theories.

Technology has had a tremendous impact on musical performance in the twentieth century. Traditionally, the musical artwork has come alive only through performers. But with the development of technology, electronic media can replace human media — performers. Such a development raises important questions for music and the performer. Among those questions one must ask how an artworld which has treasured the personal expression of the performer could allow that performer to be replaced through technology.

To answer that question we will need to remember that the changing role of the performer was already being outlined during the nineteenth century. Aesthetic arguments were redefining music’s relationship to other arts within artworlds. Those relationships in turn defined the relationships of the musicians to the artworld as a whole. For example, Wagner
redefined the position and role of opera orchestra musicians through the introduction of the covered orchestra pit. The gradual definition of these relationships and their organization within a cohesive unitary vision of the artworld constitutes a social technology, an essential element in the rationalization of production. This formal rationalization (BENSMAN 1983: 30) renders all collective actions subject to formal, standardized rules of procedure which are »...rationally — i.e., systematically — planned, calculated, and worked out in order to achieve explicitly agreed-upon goals.«

We will explore how this social technology prepared the way for the introduction of machine technology. We will then study the impact technology has on traditional conventions of music performance and on musical experience. To explore changes in musical experience, we will focus on the aesthetic concept of musical time contrasting it with technological time. This will allow us to recognize several interrelated facts: 1) aesthetics simultaneously serves several functions, one of which is to describe how man perceives aspects of the world around him such as time; 2) the traditional aesthetic description of musical time is rooted in an earlier symbolic universe; and 3) as technology and technological values of the new symbolic universe become more influential, aesthetic definitions of the musical artwork begin to shift in response. To begin we will briefly address the issue of social technology.

**Social Technology and Machine Technology**

When examining the impact of technology on music it is useful to recognize the interactions between aesthetics, social technology, and machine technology. One area of music aesthetics defines the relationships between various arts within a musical artworld. Modern technology represents a way of ordering the world as well but according to rational principles organized according to calculated goals. Aesthetic theories of artworlds in the nineteenth century such as Wagner’s Gesamtkunstwerk introduced concepts of organization according to rational principles coordinated with centralized artistic goals. Within such an order the relationships between performers, audience, and the musical object became varieties of components, that is, components of social technology.

PETERSON (1973:12) distinguishes social and machine technology as follows: machine technology involves the processing of tools and machines, and social technology involves the skills and means of organizing people to get work done. Tools and patterns of cooperation between people can be subject to principles of rational study and organization. This distinction between machine and social technology can be seen quite clearly in free-lance classical music. For example, in some musical shows the machine technology includes a recording studio, microphones, a digital computer, a sound system, and television monitors coordinated by a
sound engineer. The social technology involves the method of hiring, the patterns of cooperation to produce the show, and the artistic conventions of the musical show artworld.

Social technology prepared the way and was the stimulus for machine technology in musical artworlds. When social technology moved the orchestra to the pit, it would be only a matter of time before the orchestra could be moved to the sound studio for musical shows. If the social technology established that the orchestra need not be visible, it was only a matter of time before machine technology would replace the orchestra. If the audience can't see the orchestra, its live presence is not necessary since it has become merely a soundsource to be submitted to rational principles of organization. For instance, in the artworld of musical shows an entire orchestra can be replaced by four synthesizers. Four musicians playing synthesizers, one each for brass sounds, woodwind sounds, string sounds, and drums, create the illusion of an entire orchestra in the pit. Or when an orchestra is used in a musical show, the orchestra may be recorded in a studio, its sounds subjected to manipulations by an engineer, then broadcast into the hall. Or an orchestra may be completely replaced by machine technology as in ballet performances given with the accompaniment of tape recordings.

The social technology which creates invisible human components appears to be an important precondition for the development of machine technology. This is as true for conductors as for orchestras. When the social technology created an invisible conductor, he could be replaced too. In 1822 BERLIOZ (1904) described the advantages of an electric metronome, a precursor for the modern day click track. He noticed that a back stage orchestra often was poorly synchronized with the stage orchestra. Since the back stage conductor was invisible to the audience, he could be replaced by a machine. The conductor by pressing a key would send an electrical impulse to an electrical metronome backstage. »The performers being grouped behind the scenes, their eyes fixed upon the stick of the electric metronome, are thus directly subject to the conductor, who could, were it needful, conduct, from the middle of the Opera orchestra in Paris, a piece of music performed at Versailles.« Since the backstage conductor was simply the extension of the other conductor's baton, he could be replaced by a metronome.

One might note, however, that the social technology of the conductor and the pit has not led to similar machine technology in opera performance for musicians. Opera productions have not shifted to machine technologies in musical performance because the social technology of opera is different from that of ballet and musical shows. In opera, the conductor controls the production, not the dancers nor the producer. He controls the stage, the stage does not control him. Since the audience listens for his interpretation, he cannot be replaced by machine technology. The opera conductor is central to the production, whereas the ballet conductor is less so, and the musical show conductor is often just a hired hand. The
show conductor is hired less for his interpretation than for his hand movements which direct the orchestra. Since his job is hand movement, not interpretation, technology can replace his hand movement through the click track (an electronically generated beat transmitted over headphones), but not the interpretive process behind the movement.

These distinctions reveal that the degree to which machine technology will influence an artworld depends upon the type of social technology that has evolved in that artworld. Musicians who struggle for aesthetic control within artworlds find that they can be abstracted from the production in varying degrees. When the conventions of an artworld allow a type of social technology by which musicians can be abstracted from the production, machine technology can make its greatest inroads into musical performance.

This relationship between social technology and machine technology for musicians can also be observed in the social technology of servanthood. According to FAIRCHILDS (1984:54), »The ideal servant was efficient, hard-working, and above all inconspicuous, if not completely invisible — as one early nineteenth century manual put it, 'an intelligent and obedient machine costing 200 francs per year.' This image of the servant as a machine to do housework is striking, both for its repudiation of the close and personal master-slave relationships of the past and for its anticipation of the future, when actual machines for housework would finally guarantee the inviolability of domestic space and doom the servant to extinction«.

We might recall Honegger who wanted sound recordings to replace musicians: »Mechanical music permits the establishment of the master-interpretation. The future is with the completely mechanical orchestra, which will offer first the advantage of being no longer limited by the human possibilities of extent and duration... I believe in the future of the mechanical in the domain of music, in the development of machine-made music, and perhaps — perhaps — in the resurrection of the lyric theater by modern scientific methods, which alone are capable of solving the problems created by the growing demands of human interpreters.

»By suppressing them?«

»Yes« (Quoted in PINCHERLE 1963:37—38).

His aesthetic argument repudiated the personal relationship between the listener and the performer: the performer should be a faithful machine reproducing the composer's intentions, not an interpreter. The artwork is abstracted from the human relationships required for its recreation. We will observe other arguments later which legitimize this machine aesthetic.

Perhaps Malzel, the inventor of the metronome, implied this distinction within social technology between the interpreting and the reproducing musician in a conversation reported by BRETON (1826:40—41). When asked if he could create machines that could sing he replied: »Yes,
it would be easy for me to make some capable of performing roulades, tour des forces like the average singer (Mes Dames et MM); but in order to make a mechanical singer like the Toldis, the Moriellis, the Saint Hubertis, the Crescentinis, that is not in my power." Breton persisted in his questioning: "Since you have calculated all the probabilities of the chessboard (Malzel had constructed a machine capable of playing chess) and those are many times more numerous than those of the harmony of our musical system, could you perhaps build a machine capable of composing music?" Malzel replied, "Yes, I could build one capable of composing music such as that by the average composer, but none which would produce anything similar to the works of Mozart, Cimarosa, Sacchini, etc, etc; this power has not been given to me. My art cannot pretend to it, this right belongs only to the gods." Implicit within Malzel's statements is the idea that the machine can replace most musicians but not the greatest. This social technology dating from 1822 prepared the way for machine technology in the twentieth century. Tape recordings, and synthesizers are replacing support personnel but not the artistic personnel in musical artworlds. But we are getting ahead of ourselves. Let us examine machine technology in music today.

**Machine Technology: The Performer and the Audience**

Technology has advanced to the point that performers' sounds can be not only recorded but analyzed, reconstituted, and simulated. As the rationalization of technique continues to its logical conclusion, a specific musician is no longer necessary. Technology can create a simulated musical world without performers. To illustrate this process let us imagine a recording session.

Perhaps it is a recording for the orchestral background music for a television movie of the week that would formerly have been played by some free-lance classical musicians. A performer enters the studio and sits down at a synthesizer and performs a piano part with the click track. Having finished, he moves over to another synthesizer which produces guitar sounds. He plays a guitar part on this synthesizer keyboard with the click track as well. Then he moves over to another synthesizer which produces drum sounds. He thinks for a moment, considering which drummer he wants to sound like. He chooses a favorite drummer and rummages through some diskettes. Finding the one he was looking for, he inserts it into the synthesizer. This diskette allows him to produce sounds which are identical to those of his favorite drummer. He taps out the drum part on a special pad on the synthesizer. This process continues until all the instrumental passages are recorded and an entire orchestral score is recorded. This synthesizer player simulated all the orchestral parts on the synthesizer by himself.
But what if his recorded passages were not precisely coordinated with the beat on the click track? He corrects this problem by feeding all the recorded information back to the synthesizer which is coordinated with a track known as the MIDI. This track makes all the recorded tracks «talk» to each other. As a result, all the rhythmic irregularities between the tracks are resolved by a computer so that they play exactly together.

This scenario which summarizes current recording techniques provides us with an opportunity to discover how rapidly relationships between the performer and the listener are changing. The artist’s relationship to the audience changes as a result of technology. The musician in the recording studio does not play to an audience: he plays to a microphone. He doesn’t necessarily have the opportunity to adjust to an audience. Instead, his performance is adjusted by the sound engineer. The audience, hearing an orchestra, may assume it is experiencing a direct personally mediated performance when it is not. Some audience members were shocked when they came down to the orchestra pit to greet some musician friends who were playing the musical show Cats. They found an empty orchestra pit. The musicians were sequestered elsewhere in the theatre where their playing was recorded, mixed, and transmitted to the stage loudspeakers. Hence, the audience members who expected to find musicians in the pit, inadvertently encountered a new convention of musical production.

These musicians were not in the hall playing to an audience. In a sound studio playing into microphones they were somewhat like the film actor described by Pirandello (Quoted in BENJAMIN 1968) who «...feels as if in exile — exiled not only from the stage but also from himself. With a vague sense of discomfort he feels inexplicable emptiness: his body loses its corporeality, it evaporates, it is deprived of reality, life, voice, and the noises caused by his moving about, in order to be changed into a mute image, flickering an instant on the screen, then vanishing into silence... The projector will play with his shadow before the public and he himself must be content to play before the camera.»

When recorded, the musician’s physical presence has no reality for the audience. His presence evaporates, changed into a sound, instantaneously manipulated by a sound engineer, projected into the auditorium for an instant then followed by the silence of an auditorium without musicians. For the musicians, the microphone becomes the audience, and an unforgiving one at that, for the microphone does not respond, it does not register the personal presence, expression, and communication of the performer. It only records the notes.

BENJAMIN (1968) touched on this aspect of technology when he noted the inhumaness of the camera: we look into a machine which records our likeness without returning our gaze. The musician plays into a microphone which records his sound without being able to listen to him. Playing in the sound studio for a run of performances, performers have
described a sort of estrangement when they heard themselves over the monitors. That estrangement is rooted in the separation of the recorded sound from the musician-audience relationship. In the recording studio for one musical show performance, a conductor complained after a selection that the audience didn’t seem responsive. The piano player suggested, »Turn up the monitor.« Sometimes, in order to cope with this estrangement, musicians joke about »phoning the part in.« Both the microphone and the telephone substitute for face-to-face interactions. However, whereas the telephone allows for reciprocal communication, microphones may or may not. Again this possibility of reciprocal communication depends upon aesthetic control within an artworld. A show musician will have little if any influence on the technological mediation whereas a singer in concert may respond to the ongoing recording process and work with an engineer who is responding to her cues for special effects during the concert. What this reveals is that the artist is allowed to have reciprocal relationships with the audience and the engineer, whereas the support personnel may not.

The musician not only loses a live connection to the audience, but the very definition of what is a live sound can change due to technology. Sound engineers produce musical shows, in part, because audiences find live performances less exciting than the technologically mediated performances on radio, television, and recordings. Audiences now identify with recording technology without being aware of it. They have come to expect a certain kind of dramatic, engineered sound available on recordings but unproducible live. So live musicians must imitate recordings which have created a new norm for what constitutes live music. Changing technology creates a new aesthetic expectations which in turn generate new artworld conventions. Live music begins to imitate technologically mediated music.

Yet technologically mediated music also imitates live music. A recording engineer stated that his job was to »... create an illusion. You have to make it sound like it took place in a concert hall; violins on the left, and so on. You have to create an effect of a hall, of depth, where instruments are and so on. But it’s not real. Remember that review I showed you where the guy said it was a natural sound? I used reverb (reverberation dial which creates the effect of a slight echo like in a concert hall) on that. Although it’s a recording, it’s supposed to imitate live music.« Live musicians are imitating recordings which are imitating live performances. That which is »live« can be analyzed, reconstituted, and then simulated through a judicious use of the dials. In fact, critics often praise »live« performances which are artificially created. Due to the unconscious identification with recording technology it is often no longer possible to distinguish between live and mechanically produced music.

One way recording technology provides the appearance of reality, of live music, is through creating the illusion of closeness to the performer.
Perhaps increased loudness is technology's attempt to recover the lost intimacy of live musical experience. This may provide an explanation for a change SHORE (1986:92) observes: the person listening to a recording is placed »in the orchestra«; he is no longer sitting out front. Perhaps the physical distance in the live concert is compensated for by the live experience, whereas the recording must replace experiential immediacy with sonic proximity.

Technology has also transformed the audience's expectations of performers, performances, and recordings. One engineer reported an argument with a conductor when he wanted a wrong note corrected during the recording session but the conductor thought it wouldn't be heard. The conductor was not worried because he was listening with the ears of a live performer, but the recording engineer was worried because he was listening with technologically conditioned ears. As he pointed out, we hear a live performance only once, but a recording many times. And during those many hearings, small mistakes suddenly become obvious. A wrong note would suggest a mistake, not by the orchestra, but by the recording engineer. It would damage his reputation. >Luckily<, he said, >the orchestra played the same passage later a whole step higher so I was able to splice that note, slow it down to get the right pitch, and put it in so no one would notice. Otherwise, I would have been in trouble.« The occasional wrong or out of tune note becomes unacceptable when our ears are conditioned by the technology. As BENJAMIN (1968) foresaw, we become experts, that is, testers, observers of technical perfection.

The changes mentioned above reveal how the bias of media become translated into a culture. McLuhan (1965) suggested that each new technology functions as an extension of some human organ or activity. The book is an extension of the eye, the microphone the extension of the ear, etc. However, once technology becomes widespread and has transformed our sensory awareness, these changes become less observable. Listeners accustomed to the sound of recordings have been listening with an omnipresent ear, the microphone, placed throughout the orchestra and in front of the soloist. For such listeners, a live concert often seems but a pale reflection of the recording because the living ear cannot be omnipresent. Hence, a new medium not only shapes our sensory awareness, but that transformed awareness becomes that which observes.

Machine Technology: The Performer and his Sound

According to ELLUL (1964:387—388), >Technique analyzes its objects so that it can re-constitute them.« This is never as clear as in the analysis and reconstitution of musicians' sounds. Today a sound engineer can record a musician's sound, analyze it, and then recreate that exact sound. Now able to create that sound, the engineer need never hire that musician again. He can sound like any musician he chooses. How does this come about?
Suppose an oboe player wanted to sound like John Mack, the principal oboe player of the Cleveland Orchestra. The oboist would ask a sound engineer to analyze Mr. Mack's sound with a Synclavier. The Synclavier is an electronic device which performs what is known as a spectral analysis. That is, the machine records several sounds of Mr. Mack's oboe playing, then it converts those sounds into digital information which is stored on diskettes. Then the sound wave of Mr. Mack's oboe is analyzed. It is analyzed because, like fingerprints, every musician's sound is unique. Each musician's sound looks different when the sound wave is analyzed. The sound engineer would take a sample of Mr. Mack's sound then submit it to spectral analysis, sampling the sound wave at 16,000 different places to obtain an aural fingerprint as it were.

An oboist could then perform a sonata which would be taped and each note would be enhanced or altered to fit the spectral analysis of Mr. Mack's sound. As a result, the oboist's recording would contain her nuances but Mr. Mack's sound. But perhaps the sound engineer decides to dispense with the oboist altogether. Since he has analyzed the sound, he can recreate it himself without the aid of an oboist. After sampling three or four notes of an instrumentalist he can recreate the sounds of that performer and never hire him again.

The »sound« of many pop and rock groups is in fact the result of such spectral analyses and enhancements. A group plays the notes and the engineer creates the »sound«. Many groups sound less good on tour than on recordings because the recording engineer isn't on the tour. Without the numerous types of tonal enhancement he can provide, the group lacks »its« sound.

Once technology can abstract the sound from the musician, his relationship to his sound is changed. That which had been a sign of his uniqueness becomes a commodity available to anyone. As an example, we might look at the impact of drum machines on drummers. Drum machines are synthesizers which can produce an absolutely regular drum beat. The performer, who need not be a drummer, hits a pad which is connected to the synthesizer. The synthesizer produces drum sounds which are those of any drummer the player chooses. By inserting a diskette with samples of that drummer's sound, the player can sound like any drummer. Rather than be replaced by the machines, drummers have adjusted to technology by shifting from playing drums to playing drum machines. More importantly, they bring their own diskettes with the sounds of drummers currently in demand. The players know they aren't in demand, their diskette collection is. In fact, they must have other people's sounds to be hired. As one engineer stated, »...Part of what you are hired for is your sounds« (NEUMANN 1988:3).

According to WEISSMAN (1988) there have been instances where musicians were hired for a recording session but were asked to play only
a few notes then sent home. Those players will never be hired again by the studio because it owns their sounds now. This raises the question: what are the limits of ownership of the musician's sound?

The answer to that technologically created question will be decided in the courts in the near future. Several groups and performers have filed suits alleging that their sounds have been stolen. To assess the veracity of such claims a programmer is hired to give expert testimony. He takes musical "fingerprints" by comparing spectral analyses of a performer's sound and the sound of the group who is alleged to have stolen that performer's sound. Identical spectral analyses provide proof that the sound was stolen.

Once a musician can prove that his sound is stolen, he must go through the courts to find redress. At this point he encounters a fascinating legal question: is one's sound, one's musical or auditory identity (McGIVERIN 1987) a form of property which cannot be stolen by others? Some recent court decisions suggest some legal limits to the technological appropriation of one's auditory identity.

In the case of Midler v. Ford Motor Co. an ad agency used an unknown singer to impersonate a famous singer. The judge ruled that to impersonate a singer's voice "is to pirate her identity." However, the limitations of the ruling are also significant given our earlier distinction between well known artists and support personnel. The judge ruled that not every use of sampling is subject to legal action. Only when the artist is well known can the artist claim that sampling has infringed upon his or her identity. Hence, fame translates into a marketable identity which is then protected.

In the meantime, according to one producer, "We're all blatantly stealing from everyone else. That's just the way it's done in the 80's" (WEISSMAN 1988:18). Now a significant black market exists of sound samples which are shared by sound producers.

The uniqueness of the musician's sound can be completely stripped away through the use of synthesizers. For a musician, his sound has been the sign of his uniqueness, his 'soul' as it were. People attend a live performance to hear the unique sound of a performer, the sound which embodies so many aspects of the artist's style. Live performance was threatened by recordings to a limited extent because audiences could listen to a recording rather than the live musician. Technology, however, has allowed even more radical inroads into the artist's 'aura.' Now the listener, provided he can play a keyboard, can sound like the artist of his choice. The artist's 'aura' has become transformed into a collection of electronic information on a diskette. The musician loses his status as an interpreter becoming instead a sound source, and a dispensable one at that.
Machine Technology: Making Music Together?

Machine technology transforms traditional conventions of music making by separating musicians from one another and treating them as components. We have already described the social technology of musical shows where musicians may be isolated in a sound studio. In one musical the conductor and the stage performers could observe one another only via television monitors. This arrangement calls into question some of the fundamental conventions which define musical performances. These changing conventions demonstrate that technology can make its greatest inroads into music when its aesthetic control in a given artworld is relatively weak. In contrast, when music has great aesthetic control within an artworld, technology makes few inroads. For example, although the singers of the Metropolitan Opera could perform an opera while observing a televised image of the conductor, no such performance would take place since the presence of a live conductor is considered an essential element of the conventions of opera production, at least so far.

When live presence of performers is not necessary, however, recording techniques can further the process of separating musicians from one another. The music for a radio or television advertisement, for example, is recorded according to rational principles of organization rather than traditional aesthetic principles of music making. If the music for the commercial involves strings, brass, woodwinds, piano, and drums, each of those groups of players will record individually. For example, the rhythm section will record first, or, as they put it, >lay down a track.< Later in the day the woodwinds will record their music while listening to a click track and to the previous music recorded by the rhythm section. Then the strings will enter the studio to record their music in the same fashion and so the process continues. Instead of an interlocking web of musical relationships between performers listening to and responding to one another we have a series of layers of technologically connected relationships between performers listening to a click track and responding to the pitch and rhythms of the previously recorded players. In this musical artworld, musicians do not make music together as is customary in other settings. They play with tapes but not with players who are fitting together and responding to one another. This change in music making is taken one step further when we examine the impact of the synthesizer and sampling.

The reader may recall the example of a recording session where a single player created the illusion of an orchestral performance through the use of synthesizers. He then linked all the parts together through a computer. The image of a group of performers making music together disappears. Yet the concept of musicians making music together disappears not only because one person plays all the parts on synthesizers, but because the human interaction which coordinates musical lines has become transformed into a technological function, the MIDI. The MIDI,
not a group of listening and cooperating musicians, electronically coordinates and unifies the sounds. Players are no longer members of an interacting ensemble, but rather components in a technologically mediated system. Music making is no longer a form of communication between players but the result of computerized manipulation of sounds.

The synthesizer encloses the individual within a non-echoing mechanical universe in which he is alone, communicating only to his previously recorded sounds, and to his machines. The separation between himself and fellow musicians is complete. He becomes accustomed to communicating with machines. In place of musical dialogues, he performs in a perpetual monologue. Technology envelops him in solitude. Instead of communicating with others, he 'interfaces' with a diskette. Complexity derives not from the interaction with numerous performers and their ideas, but from the accumulation of more diskettes and the musical lines the synthesizer creates.

While one might argue that the synthesizer is simply another instrument which can play entire works much like the piano, we must point out several key differences. The synthesizer creates the illusion of an orchestra. It substitutes a technological function for music making, sounds for artists, and technological time for musical time. It abstracts technological components of music making and reconstitutes them. But it does so at the cost of abstracting out the human relationships in which music making has been traditionally embedded.

**Machine Technology: The Musician and his Environment**

Many have written about the impact technology has on the ways men perceive the world around them. We have already examined how technology has changed our perception of what is live. Now we will briefly explore the impact of the microphone and recording equipment on auditory space, i.e. how we experience the space around us through our ears. Auditory space has been praised by McLuhan as a space where sound "fills the air", comes from every direction, and can't be shut out. However, whereas McLuhan suggests that technology can return us to auditory space, musicians often find that technology transforms auditory space. In the recording studio, for instance, sound no longer fills the air, for the performer wearing headsets is cut off from the auditory space of the room. These headsets serve as "earlids" to cut him off from multiple musical relationships in the room, and to orient him to those already on the tape which are being played to him on the headsets.

Cut off from the room, he does not fill the air, he fills the "cans" (the tapes). Cut off from the concert hall, players comment on the difficulties of playing in studios which are "dead", that is, with no reverberation. They are accustomed to responsive halls where they can hear themselves. In a sound studio they are no longer surrounded by the
presence of a room which speaks back to them. One musician claimed, "It's like you drop it (the sound) into a hole and it disappears." These facts lead one to question McLuhan's belief that technology brings about a return of auditory space. Instead, it appears that technology changes the ways we experience auditory space. In fact, the purpose of much technology is to eliminate traditional forms of auditory experience.

* * *

Recent developments in recording technology illustrate a point made by ELLUL (1964:135): »Technique pursues its own course more and more independently of man. This means that man participates less and less actively in technical creation, which, by the automatic combination of prior elements, becomes a kind of fate. Man is reduced to the level of a catalyst. Better still, he resembles a slug inserted into a slot machine: he starts the operation without participating in it.« Ellul could not have known that what musicians offered would soon become digital information contained on a diskette which would be inserted into a synthesizer. Although the catalyst for this stored information, the musician would have no part in later works performed with his sound and style. Such a situation illustrates ELLUL's (1964) (KUHNS 1971) remarks on man's identity. According to Ellul, work in the technical society implies an absence in man because he is subordinated to the ends of technology. In the recording studio, under certain conditions, the musician represents an absence which will be filled by the stored up digital information representing the aura of other players. The performer of the drum machine is wanted less for his presence than for his absence and the presences of others which he has stored on diskettes. »You are hired for your sounds«, means the sounds of others. The irony becomes that an art which has been revered for individual expressiveness can become so thoroughly reconstituted by technology that a specific individual is no longer necessary.

Technology analyzes musical performance, reconstitutes its components, and then creates a simulated musical world. This situation generates a number of difficulties because it is often not possible to discern whether one is hearing a live musical world or a simulated musical world. JOSIPOVIĆ (1984:44) suggests that it is wrong to »... a priori accuse the mass media of offering a distorted view of reality.« Distortion, he says, varies according to the quality of the message and the adequacy of the medium. Yet, as we have outlined above, technology attempts to present a distorted view. The performance which appears to the result of many musicians may be the performance of one. The apparent continuous performance may be the result of splicing many performances. The apparent sound of the performer may, in fact, be the sound of someone else who was not present at the performance, etc. The purpose of
much technological manipulation in recording is precisely to create an illusion of reality. BOSANAC (1981) points out that «... when they aim at presenting as a part of that reality, the mass media offer just an illusion of objectivity ... By means of various kinds of manipulation, they contribute to the distortion of reality.»

Technology is able to analyze and reconstitute the musical performance and thereby change how it is defined. As a result, this process alters the relationships between performers and listeners and the world around them, relationships which have been traditionally defined and legitimized through aesthetics. To develop this last point we will shift to a discussion of a concept drawn from music aesthetics: musical time. We hope to illustrate how musical time, an aesthetic concept rooted in an earlier symbolic universe, describes a type of relationship between man and the world. With the introduction of technology, musical time has been superceded by technological time, and man's relationship to time and the world around him has changed as a result.

Musical Time and Technological Time

Up to this point we have observed how technology alters the traditional aesthetic definitions of musical relationships. Now we will focus on the effect technology has on our experience of time in music. We hope to illustrate several points: 1) one aspect of musical aesthetics, musical time, functions as a theory about how we experience time; 2) as a theory about the experience of time, it is rooted in a pre-technological symbolic universe and differs from technological time; and 3) as the technological symbolic universe becomes dominant, aesthetic theories begin to shift in response.

We will focus on one aspect of musical aesthetics, musical time, to illustrate how one area of aesthetics defines man's mode of perception, his relationship to the world around him. As social conditions change, our relationship to and our mode of perception of the world change as well. These changes are reflected in new musical aesthetics based on technological values. Before we examine these changes, however, we need to explore how man has experienced time throughout history.

For centuries, men lived without measuring time precisely. Time was measured by needs and events. Life had been regulated according to psychological and biological tempos, nature's time, the rising and setting of the sun, the movement of the stars, the changes in the seasons. But with the development of the clock, time became abstracted from the natural rhythms of life (MUMFORD 1934); it could be quantified and separated from lived time.

We are so accustomed to clock time that we have lost sight of its impact on our lives. Yet music allows us to observe the impact that technology can have on lived time. Music is one of the few areas of life
where we can still experience lived time unmediated by the clock. A commonplace experience which demonstrates this simple fact is the occasion of listening to a piece of music and being surprised afterwards that so much clock time had passed because our experiential time was so different (ORLOV 1979).

Musicians experience this conflict of lived time and clock time when they perform with a click track. Normally, the players shift tempos slightly in response to the conductor, fellow players, and the music. They share an experience in time which varies and shifts subtly throughout performance. The indicated tempo of a work provides only a framework within which lived time occurs with all its fluctuations.

The click track tempo, on the other hand, is an imposed clock time which does not vary according to the experiences of the players or in response to their interpretation of the organic processes of the work. The click track determines how time will be lived. Clock time eliminates the performer’s role as an interpreter of experience. Players performing with a click track experience something similar to what people on assembly lines experience: the loss of lived time. Notes must be produced at an unvarying speed preordained by a machine or else the player will hold up the rest of the musical assembly line. Movable time becomes immovable (BRINER 1979).

One musician referred to his work in the pit as being »... just like an assembly line except it’s a beat stream.« The player was implicitly referring to the differences between lived time and clock time. The pace of lived experience gives way to the pace of clock time. One might be tempted to argue that this analogy is an exaggeration, but in key respects it is not. In both the assembly line and musical performances with the click track, machinery determines the tempo. The assembly line worker and the musician both must submit to technological time and work at the preordained pace. Objective time — machine time rules; not subjective or musical time. And in both cases the tempo is unvarying, predictable, in contrast to normal musical experience.

ZUCKERKANDL (1956:196) allows us to clarify the distinction between musical and technological time. In a discussion of the role of the conductor, he observes that the conductor »... begins with the tones, not before them.« That is, the conductor or performer decides a tempo by finding the tempo of the music in the notes, the way they sound, the effect they have. He is not guided in advance by an abstract idea of the music’s tempo, but rather he is guided by his experience of the motion of the music, the time in the music. Rather than being imposed from the outside, tempo is derived from musical events, inseparable from their form and content, and »... is experienced as a natural flow arising from the intrinsic nature of the music« (PIKE 1970:18).

The click track, on the other hand, creates a new aesthetic of music making. Time is abstracted from its musical origins and imposed on the music. The conductor with the click track begins not with the music,
but, rather, before the music. He is not guided by an idea of musical
motion nor by the time in the music, but, rather, by an idea of clock
motion, the time music must fit in: how long should this piece last?
Rather than performers feeling the time within the music, the click track
puts time into the music. This represents a radical shift from the tra-
ditional philosophy of tempo according to which tempo fluctuations are
determined by the music's structure. (See, e.g. YESTON 1975.) Time
which had always been discovered in relation to the structure of the
music becomes a technological function. In this sense, the click track
repeats in music what the clock accomplished in society, »... the new
time substituted quantity for quality and automatism for the rhythmic
pulse of the natural world« (RIFKIN 1987:86). The click track removes
time from its musical origins and parcels it out in steady, predictable
beats.

The click track also has an impact on musical time as it affects per-
formers and listeners. SCHUTZ (1964; 1976; BERGMAN 1973) described
musical time among performers as a shared time which differed from
that of objectified clock time. According to SCHUTZ (1976:43), when the
conductor raises his baton, listeners »... are no longer involved in the
maze of activities necessary to deal with men and things. They accept
the guidance of music in order to relax their tension and to surrender
to its flux, a flux which is that of their stream of consciousness in inner-
time.« Musical time then is a shared intersubjective experience. In con-
trast, the click track, or technological time would then represent an
intrusion upon shared time of the performers. They can no longer re-
spond to or share one another's sense of inner time. They can only share
the experience of submitting to a time outside of them, clock time.

As we can see, musical time is very different from technological
time. Musical time cannot be divided and measured. It is not a mere
succession of moments but rather an organic process which is in motion,
always containing the past and generating the future rhythmic move-
ment. It is a time which is active, full of past, present, and future time.
It is a shared time, a time of »growing old together« (SCHUTZ 1964). It
contrasts with technological time which is static and empty, a series of
points which provides a means of measuring processes which take place
»in« time. Technological time is quantifiable and predictable.

What are some other differences between musical time and technol-
ogical time? According to ZUCKERKANDL (1956:202—247), musical time
differs from technological time (what he refers to as the physical
time concept) in several ways [also see KERN's (1983) discussion of public
versus private time; and NEWELL (1978)]. First of all, technological time
represents a type of order which attempts to give form to experience.
The clock imposes an arbitrary order over time. Musical time, in contrast,
is regarded as a continuous flowing of experience. Drawing on Bergson,
several music theorists (ZUCKERKANDL 1956; ERICKSON 1963) suggest
that we do not experience music as a succession of separate beats and
notes but rather as a continuous flux, a succession of states, each of which interpenetrate the other. From this perspective, musical time knows no division into equal parts; it is organic. Musical time is the content of experience.

Technological time also differs from musical time because it measures events whereas musical time produces events. To illustrate this, ZUKERKANDL (1956) uses the example of the half life of radioactive material. Suppose an object has a half life of 100 years. This half life is the result of physical forces, not time. The physical forces take place within technological time, a time which is not the force at work.

Musical time is different. The effect of rhythm in music is due not to the tones themselves but to their duration. 'Because tones have duration, because time elapses in them, and for no other reason, we have the rhythm of our music. Only time can be the agent and source of the forces active in meter and rhythm' (ZUCKERKANDL 1956:206). In contrast to technology which abstracts time from the music, music reveals that time cannot be separated from the forces that create rhythm. Without tones there is no rhythm or time, without time there is no music. The agent and the acting force are inseparable.

For the musician, musical time moves. When he hears meanings in music, he hears implications, incompleteness, direction, flowing, becoming, change, motion. For the performing musician, motion is immanent in the musical line. According to Ernest Kurth (HSU 1966:12—13), '... what one calls the soul of an art can never consist of rigidly established external forms, but can only be felt as a flowing state; it cannot be thought of as a substance to be delineated, but rather as direction, motion, striving.' (Also see CLIFTON 1975 for discussion of time as motion and stasis). We hear time. In contrast, technological time does not give rise to meaning such as we hear in musical time. Technological time is the time of succeeding beats, each the same, without direction, without implication.

Another difference between technological and musical time concerns the measurement of time. Technological time divides the flux of experience into equal parts known as hours, minutes, and seconds. We can never measure two different hours to see if they are identical in length because we cannot stand outside of time. Time is measured then by comparing the motions of separate bodies. ZUCKERKANDL (1956:209) asserts that '... the equality of hours is the equality of the distances traveled by clock hands; it is in the last analysis an equality of spaces not of times.'

Musical time on the other hand holds that time cannot be divided into equal parts. In fact, ERICKSON (1963:178), in reference to musical time, suggests that '... any music which takes as its point of departure the belief that rhythms is more than the pounding of a trip hammer will be likely to exploit this aspect of our time experience... the time of our unclocked real existence.' Yet it was the introduction of a regular 'trip hammer', the metronome, which called this unclocked real existence into question.
The Metronome vs. Musical Time

Musical time is not measured by the ticking of the clock but by the unfolding of musical events as in lived time. Hence, musical time is similar to the pre-clock time concept in many cultures. In pre-clock cultures an individual when asked for the time will not respond with »one o’clock« but will respond with what kind of time it is: the time to eat, the time to sleep, etc. When a musician is asked for the tempo of a work he may respond, »quarter note equals 132 beats per minute«, but he may also respond with the character of the time: lebhaft (lively), giocoso (joyously), rasch (rash), etc.

Until the early nineteenth century musical tempos were entirely subjective. MALZEL (1822:4—5), the inventor of the metronome, argued that tempo indications were too subjective: »... Different composers have given diverse meanings to the same words and the same composer has not always given the same meaning to the same word.« He then refers the reader to examples demonstrating how composers used the same word to indicate very different tempos, e.g. allegro referred to tempos anywhere from 50 to 126 beats per minute. »... With such evident proofs«, he continues, »of which I could have given many more, the most distinguished composers have not hesitated to declare that they renounce indications for their works with Italian words and that from now on they would only use metronome markings.« The character of musical time became rationalized. Accuracy and precision became more important than the character of the time: the principle object of the metronome is »to prescribe exactly (our emphasis) the degree of speed of movement« (MALZEL 1822:5).

Beethoven questioned Malzel’s desire for an exact tempo. With regard to the four standard tempo markings of allegro, andante, adagio, and presto, he said: »... We readily do agree to dispense with them, but it is quite another matter as to the words that indicate the character of the music; these we cannot consent to do away with, for while the time is, as it were, part and parcel of the piece, the words denote the spirit in which it is conceived« (BEETHOVEN 1868:230). Beethoven initially relished the objective standard which the metronome provided yet he made a clear distinction between clock time and musical time.

We find on the manuscript of his song Nord oder Süd the notation, »100 according to Maelzel. But this must be applicable only to the first measures, for feeling also has its tempo and this cannot be entirely expressed in this figure« (Quoted in DORIAN 1942:198). His emphasis on the feeling, the musical time, was reflected in his later disaffection with the metronome. In exasperation with a musician who noted a discrepancy in metronome markings Beethoven had indicated for the same work at different periods in his life, the composer snapped, »No metronome at all! Whoever has the right feeling, needs none; and whoever lacks it, has no use for one — he will run away with the whole orchestra any-
way« (DORIAN 1942:200). A composer who initially favored the objectivity of clock time began to realize that what would be lost would be musical time, the capacity to find the right feeling. But in an age of industrialization and increased rationalization of production, musical values began to shift accordingly favoring increased concern with objectivity in performance, accurate reproduction, synchronization, and precision.

This greater concern for technological precision was expressed by LOMBARD (1897) who maintained that the metronome was indispensable for the transmission of »exact« traditions. Not just traditions, but »exact« traditions. He asserted that ambiguous tempo markings should be discarded in favor of metronome markings which ensure consistent tempos worldwide. By suggesting that the metronome marking was the »true guardian of tempo traditions« he was redefining one of the most important elements of musical tradition — the role of the performer who derives the character of the time from the music itself. Furthermore, tradition would no longer be passed down in an aural tradition but through objective measurements. These comments reflect a shift to the new value of clock time — precision. With the rise of values rooted in the rationalization of production such as precision, the subjective interpreter would become the objective reproducer.

The influence of the worldwide rationalization of production was implied in SAINT-SAENS' (1922:124) remarks on the metronome. Welcoming this machine’s influence, he suggested that the Academie des Sciences standardize, stamp, and approve metronomes »... as in the case with weights and measures.«

The metronome led to a unified world time frame. Whereas there could be many different tempo interpretations of a passage marked allegro, the metronome, by referring to the universal language of numbers and clock time, allowed a composer to suggest the exact tempo desired. In some ways, the rise of the metronome might be compared to the standardization of time zones. This parallel was not lost on an observer describing the metronome in 1821: »The metronomic scale is not borrowed from the measures of length peculiar to any one country, but is founded on the division of time into minutes. The minute being thus, as it were, the element of the metronome scale, its divisions are thereby rendered intelligible and applicable in every country: an universal standard measure for musical time is thus obtained, and its correctness may be proved at all times by comparison with a stop-watch« (emphasis in the original) (ANONYMOUS 1821:303).

The metronome initiated a period of greater concern for objective reproduction versus subjective interpretation similar to the process of rationalization of production through the use of the clock in industry. Spontini (ANGERMÜLLER 1971:137), in a letter to the Leipzig Allgemeiner Musikalischen Zeitung in 1816 proclaimed, »... Italy, Germany, France, and England applaud fully the author and inventor of the machine which will faithfully read all the intentions of the composers, where
their productions will not be guessed at in the presence and in front of the public as it has often been done up to now. The interpreter has been impugned as a guesser rather than a faithful, accurate reproducer. Subjectivity is equated with inaccuracy and guesswork. But this critique is mild compared to Weber's. Upon first hearing of the metronome he is said to have screamed, >Do we want to mechanize our art?< But later he changed his mind saying, »... the metronome from now on will be for me a means of insuring that my music will not be maimed« (HIRN 1887:3). In a similar vein, HIRN (1887:57), after noting that there are often as many tempos for a song as there are singers, asks rhetorically, »Where does this come from, if it is not from the arbitrary, that the expressions which are used to fix the tempos, and those expressions are left to each musician to interpret, and they are insufficient within themselves (our emphasis) without a universally admitted rule to which one can report.« The performer's role shifts from that of an interpreter to that of a reproducer of an ideal with exact specifications.

The concept of an ideal model which can be reproduced according to universal measurements reveals itself in the comments of THIEME (1801:55), »... the composer, first, will find the advantage of perpetuating the true movements of the airs of all his compositions by a single sign taken from the division of the scale (of the metronome) and placed at the beginning of his airs; by doing so he will communicate the true movement for any time, for any place« (our emphasis). The one »true« tempo for a work has been abstracted out of the musical work, allowing for more accurate reproduction. This accurate reproduction can transcend national borders because the language is no longer verbal but technological: the numerical values of clock time. HIRN (1887:57) alluded to this new capacity for reproduction when he espoused the advantages of the »portable machine«, the metronome. »All musicians, curious and convinced that the movement of the air is very important to its character, will be able to transport everywhere the measures of the airs of masterpieces from our modern composers be they from Germany, Italy, France, etc.«

We have illustrated how aesthetics symbolizes cultural ideas regarding man's relationship to the world around him: for example, how he experiences time. The discussion of the differences between musical time and technological time allowed us to see how the presuppositions of musical time are rooted in a symbolic universe pre-dating clock time and the rise of technology. However, with the rise of technology and the rationalization of production we see aesthetic arguments emerging which indicate a shift away from musical time to technological time, away from interpretation to exact reproduction. Now we will show how aesthetics as a cultural symbol changes in response to social conditions. To do so we will explore another area of aesthetics: the relationship of the listener to the performer.
Technology and Aesthetics

As we have illustrated, technology is radically changing the types of social relations between the musician and the audience. That is because technology can analyze each of the components of a given activity and then reconstitute them. Technology can abstract a product from the human relationships previously necessary for its production. Insofar as musical performances become reconstituted through technology, these social relations disappear as well as the aesthetic definitions associated with them. As a result, a technological aesthetics of music is evolving. We will now review a sample of writings which suggest the outlines of a technological aesthetics of musical performance.

Recent aesthetic judgements which state implicitly that the musical object is more important than the performance reflect an altered sense of the artwork. For instance, HOSOKAWA (1981:33) suggests that a sufficient musical experience may arise through recordings. He notes that repeated experiences are sometimes condemned as false whereas «... lived experience is not necessarily a non-repeated experience.» He argues that by listening to a recording repeatedly, one may gain a new type of musical understanding of the artwork. While this is true, Hosokawa's argument implies that gaining a fuller understanding of the artwork separated from the performance is sufficient; awareness of and a relationship to the performers is not necessary. He is legitimizing a new form of listening: listening to the music and not the performance. With technology, the performance can be detached from the music. Hosokawa's argument justifies that which technology achieves: the detachment of music from performance. Traditionally, music and the relationships involved with its performance were inextricably intertwined. But through technology these aspects are separated.

Another writer who legitimizes the technological aesthetics of music is JOSIPOVIĆ (1984). He suggests that the technological changes effected on music are less drastic than some might suggest. As an example, he states that «... a number of surveys have shown that regular concert-goers can receive the full experience of a work of art whether they perceive it at a concert or through a mass medium» (1984:50). To do so, he says, requires only the listener's concentration. For JOSIPOVIĆ (1984) concentration, not proximity, is necessary. By his approach, he suggests that the musical experience is rooted not in the web of human relationships that comprise a performance, but in the musical object itself. The audience listens only to the musical work, not to the communicating players. The music is separated from the act of communication by which that work is brought to life. Like HOSOKAWA (1981), he abstracts the musical work from the rationships which create it. He thereby repeats intellectually the technological abstraction of music from its setting, performance. An aesthetic position follows from social condition.
This shift in the aesthetic definition of the musical object has accelerated in recent years because recording technology has detached the musical object from the external conditions necessary for its creation. Kadem (1984) refers to two types of listening which might be understood as the aesthetic positions of the past and the present. In the past, listening involved a concern with the inner meanings of the music as well as «...all the references of the musical event to the external world» (Kadem 1984:202). But increasingly, listeners to recordings can focus only on the musical object, not on its background (except through linear notes), nor the performance, nor the performers.

This narrowing of focus was anticipated by Benjamin (1968:230—231). In the context of film, he observed that «... the film actor lacks the opportunity of the stage actor to adjust to the audience during his performance, since he does not present his performance to the audience in person. This permits the audience to take the position of a critic, without experiencing any personal contact with the actor. The audience's identification with the actor is really an identification with the camera. Consequently the audience takes the position of the camera; its approach is that of testing.» This change in relationship he viewed as an advance. Yet what he failed to recognize was that the viewer was no longer an experiencer but rather a judge, or an »inspector« as Ellul (1964) puts it. The listener's role becomes technical rather than social. He measures sensory data as an observer rather than experiences meanings as a participant. Benjamin unwittingly extolled an alienated form of music making.

This narrowing of focus in listening is reflected in yet another area: the redefinition of the ear. Some (Ballantine 1984; Benjamin 1968; McLuhan 1968) maintain that technology extends our comprehension and frees us from our 'auditory prison'. They view the microphone as an extension of the ear. Ballantine (1984:126—127) quotes Vertov's homage to the camera as a possible homage to the microphone: «I am an eye. I am a mechanical eye. I, the machine, show you a world the way only I can see it. I free myself for today and forever from human immobility. I am in constant movement. I approach and pull away from objects. I creep under them. I move alongside a running horse's mouth. I cut into a crowd in full speed. I run in front of running soldiers. I turn over on my back. I soar with an aeroplane. I fall and rise with the falling and rising bodies... Freed from the obligation of shooting 16 to 17 frames per second, freed from the boundaries of time and space, I coordinate any and all points of the universe, wherever I want them to be. My way leads towards the creation of a fresh perception of the world. Thus I explain in a new way the world unknown to you.» According to this view, the advantages of technology consist in its extension of how much the ear can perceive. However, the listener is then identifying with a machine in terms of the quantity of sensory data he can absorb. He is no longer identifying with a performer in terms of the quality of shared human experience. This is what Mumford (1952:65) is referring to.
when he describes how technology reduces »... a whole human being into a magnified eye, a magnified hand, a magnified finger, subordinating every other function to that whose province is enlarged«.

Technology is not necessarily an extension of a sense organ as BAL-LANTINE (1984), VERTOV, and McLuhan (1968) suggest. Winner (1977) points out that technology must be analyzed within the structure that it creates and requires. When we consider that our sense of musical time and »live« music are subtly conditioned by technology, when we consider that performer-audience relationships are occasionally established primarily according to organizational rationality alone (as in some musical shows described previously) — then the concept of technology as controlled extension falls apart. The free-lance classical musician removed from the hall into a sound studio, playing into a microphone, observing the stage through a television monitor, hearing the audience's applause through loudspeaker monitors, while following a click track, poignantly illustrates Marx's conclusion that men were becoming the appendages of machines in a factory system. Perhaps anticipating these developments, Malzel (1822:5), the inventor of the metronome, warned his readers that »... one does not pretend that a skillful musician should play an entire piece with the metronome because all expression would be paralyzed by such slavery.« Hirn (1887) likewise stated that he did not want »to pretend to fix a body of musicians to a pendulum,« yet technology in certain musical settings does just that.

Interestingly, some of these technological changes bring up old aesthetic arguments. For instance, we are reminded of Wagner who felt that visible musicians interfered with auditory enjoyment. The question returns of whether the perfect performance is one without performers. The emphasis is on the artwork, not on the performance. Hence, a reproduced artwork is sufficient for those who emphasize the artwork, but insufficient for those who emphasize the live performance which is irreproducible.

This abstraction of the performer from the performance takes place when a social technology allowing such abstraction prepares the way for machine technology. This social technology has developed over the past two hundred years in the form of aesthetic arguments. Current aesthetic arguments which view technology in utopian terms reflect values by which man is abstracted from his productions. In so doing, they reflect social conditions rather than analyze them.

An approach to music aesthetics which suggests that musical experience can be detached from musical performance without any significant loss intellectually rationalizes the technological abstraction of qualities from human experience. If time can be abstracted technologically, then that is considered better and more sensible than the previous arrangement. If time can be imposed by technique and therefore verified, the concept of musical time which is perceived within the music by a musician becomes less important. The musician who interprets musical time has been replaced by the clock which imposes technological time. Time becomes
an abstract element which can be imposed from the outside. An exact, objectively measured quantity of time replaces an inexact, subjective quality of time. If the performance can be abstracted out of musical experience by means of technology then music is supposedly adequate when detached from performance. If the quantity of sensory data can be increased, that is better than the quality of the listening relationship. These are aesthetic judgements which justify technological values and as such they dehumanize musical performance and ignore the inroads of technology on musical experience. Through technology, music can be removed from the web of human relationships in which it has been traditionally rooted.

The human elements of music making can be abstracted and reconstituted thereby eliminating the necessity of human interaction. This is giving rise to a new aesthetics of music. "For the first time in history the human intermediary between the creator and the listener is voluntarily excluded from the domain of music, that intermediary whose frequent imperfections were, however, preferable to the inhuman perfection of the machine" (GOLEA 1954:198).

Conclusion

We have tried to illustrate some of the specific implications technology poses to the traditional aesthetic definitions of musical performance. These definitions are radically transformed by advances in technology: 1) The performance need not be live; 2) the performer relates to the microphone, not to an audience; the audience relates to a machine, not a performer; 4) musical time is replaced by clock time; 5) the 'aura' of the musician, his sound, becomes transformed into electronic information; the artist's unique voice becomes a universal possession; 6) the act of making music together (SCHUTZ 1956) becomes transformed into an electronic function of a computer track which coordinates all the other tracks; 7) technology simulates live music so well that the simulated reality often becomes the new definition of reality music.

We have also analyzed an area of aesthetics, musical time, as a legitimation of a significant construction of reality in modern society. Within this perspective, the arts are considered as "...institutionalized procedures for systematically realizing the intrinsic values" of a society (MARTINDALE 1978:275). Aesthetics can be understood as a theory of how man experiences the world. Without examining the scientific "proof" of such a theory we have chosen instead to view this theory as data which allows us to understand how man makes sense of his experience of time and likewise how that understanding can be influenced in turn by events in the objective world. We suggest implicitly through this analysis that aesthetics can be fruitfully understood as a socially constructed reality.
However, the rise of a technological order requiring the mechanization of human activity generates a rationale, an aesthetic, for the new order. The sociology of technology has explored two major themes: 1) the mechanization of human activity; and 2) the conditioning of people through technology. In this paper we have argued that technology conditions the mode of perception by which music is experienced. In response to the transformation of musical experience, aesthetics has shifted to a rationale for a technologically mediated musical experience. The ends (aesthetic definitions of music) shift to accommodate the means (technology). We would agree with WINNER (1977:202) that «... we do not use technologies so much as live them.» New technologies are transforming the lived experience of music. And by transforming the performer’s and the listener’s relationship to music, technology changes man’s relationship to the world around him.

BIBLIOGRAPHY


MIDLER v. Ford Motor Co. *849 F.2d 460* (9th Cir. 1988)


Uvođenje tehničke reprodukcije u glazbenu izvedbu transformira tradicionalne estetičke definicije glazbenog iskustva. Kad jednom društvena tehnologija dopusti odvajanje pojedinca od izvedbe strojna tehnologija može dovršiti proces odvajanja. Ovaj proces transformira tradicionalne estetičke definicije o tome što uspostavlja živo glazbeno iskustvo: odnos izvoditelja i publike, odnos spram vlastitog zvuka i 'imagi', odnos spram drugih glazbenika s kojima zajedno muzičira, odnos spram vlastitog uha i okoline, te odnos spram vremena. Rasprava o glazbenom vremenu pokazuje kako estetika može funkcionirati kao teorija iskustva utemeljena unutar simboličkog svijeta. Nadalje, kako tehnološki simbolički svijet postaje dominantan možemo promatrati paralelni pomak u estetičkim teorijama.