

A View From the Bus: When Machines Make Music.

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When composers remove the locus of their activities from traditional musical arenas, as often happens when they begin to use computers to make music, issues which they never worried about before start to crystallize into cares and concerns. What follows is an attempt to say something about these issues. For want of a better term I'll call these concerns the social context of machine-made music. With all the junk that occupies our workbench when we enter the 'digital domain', neural nets, FIR filters, quantization errors, and so on, why worry about social issues as well? I contend that the history western music is one which is marked by consistent, and largely unsuccessful attempts to build music machines. But now that we have finally succeeded in this the nature of human musical relations is consequently changing--profoundly--and it goes without saying, that music will change profoundly as well. Fundamentally, machines are affecting the substance of music, and, for me, the essence of this development lies not so much in our increasing ability to model and invent, but rather in the ways in which we'll relate to one another in this new domain. When all is said and done, this is the bottom line. It is my feeling that as soon as we allow technology to intervene in the process of music making and communication, particularly computer technology, we radically alter the social and conceptual basis of this intercourse, so much so that we create contradictions and paradoxes if we refuse to recognize these new bases.

Music appreciation mavens used to wield an old saw about the composer-performer-listener triangle. We laughed at its naivete, but it is a good simple model of a classical notion of musical-social interaction. In this model the composer is genius/author, the performer is genius/servant, and the listener respectfully adores both. The receiver of the greater glory, either composer or performer, varies from time to time and place to place. This is a simple-minded perspective but, for the sake of argument, let's take it seriously and think of it as a network with three nodes. There is a conspicuous feedback loop. Each node responds to the actions, abilities and appreciations of the other. Musical revolutions are coincident with the breakdown of the lines of communication. Music is considered to have advanced when the lines of communication are restored--the myth of musical progress. In the intellectual climate of western music, and art in general, this process of breakdown and restoration is thought of as normal. We expect to have to struggle. We expect misunderstanding to be the first step in the advancement of knowledge. The failure to understand is synonymous with the need to be educated. We expect the individual nodes to constantly fuss with their lines of communication to the other nodes. To have read and absorbed *Finnegans Wake*, is to have become better. This process ascribes a dynamic quality to the lines of communication.

The network needs social institutions to provide a context for this communication and interaction -- typically, concerts, in which some play while others listen. Even with recording today we still think of the concert as the excitation function of this network. We tend to think of recording as documentation of live performance, and perhaps a less than perfect substitute, an illusion. an incomplete and distorted image of reality.

From a certain perspective this view describes a very rigid social structure. It is highly conservative in that it provides a conceptual framework which discourages evolution and promotes institutional stability. The degrees of passiveness and activeness of the individual nodes are relatively fixed and the environments in which they behave are designed to accommodate their habits without much fuss or bother. The composer writes, the performer plays and the listener claps. Art must be supported by its showcase, and if it cannot survive in that showcase it must either find some other venue or die. It must be added, however, that this framework is the arena in which some of the greatest intellectual accomplishments of western civilization have been born.

What happens when music-making machines and computers are added to the mix?

In the maelstrom of popular culture machines have had an immediate and rather drastic effect. First, the respective roles of concerts and recording have been switched Recording is the norm and concerts are glorifications of recording. 'For the first time in a decade, the Rolling Stones, live!' But concerts are often pale

substitutes for recording, because the illusion has to become incomplete reality, and is usually an orgy of celebration for the new album. There is consequently a deep dependence on music machines: 64-track mixers, synthesizers, computers, to create magical illusions, which in certain areas become the prime ingredient of success. Undoubtedly that the amount that Michael Jackson spends on technology and its overhead in one year would probably feed all of our digital habits for a long time, with plenty left over for a big party, and he has to constantly spend more just to survive. But the magic fades quickly and more is always needed to sustain the illusion. The music industry responds adroitly with new musical wands which have a typical lifetime of eighteen months and as a result, the field is constantly in "tradeshow-mode." It is significant here to note that automation has created a healthy swelling in the ranks of performing composers and composing performers and shrinkage among the ranks of servant performers. (This latter fact is deeply disturbing. In the near future, if not already, the ability of a violinist to make a living in commercial areas will virtually disappear. It remains to be seen whether this predicts a decline in performance study, but it is troublesome.)

This raises interesting questions. It is now easy to make a lot of noise, and pretty fancy noise at that. But is a youngster sequencing eight tracks using four synthesizers and a drum machine really doing something nearly as complicated and rich as another who is struggling to reproduce a Van Halen lick on his electric guitar? Isn't this so-called democratization of music in popular culture really no more than a new generation of under-educated intelligent instruments which is basically automating and perpetuating a simple view of music and its accompanying habits? In many cases, despite their obvious power, drum machines, synthesizers and sequencers are being raised to a level only slightly above the chord organs where you only needed a left hand with one finger. Automation has certainly become a potent player in the studio, but has there been a conceptual gain which effects the lives of those who consume the product? For me, designing a technological leading edge for an effort which cannot see beyond existing musical and social positions is a corrupt endeavor. (It is interesting to notice that recent trends which have a revolutionary feel in this context make perverted use, at most, of new technological tools. Consider rap music, for example.) To my mind there is no correlation between automation and musical virtue. The music doesn't get better simply because one person can do the work of fifty in a fraction of the time. It probably gets worse. There is also no virtue in the fact that we have come to accept the sound of machine-made music as reality in our media. As a matter of fact, I think we will pay a very stiff price in the loss of generations of people who can make wonderful sounds with their mouths, fingers and toes.

There is fundamentally not much that is different or new in the musical- social structure of popular music as a consequence of the use of technology. What is worth noticing is how many young people are involved in music making, but I contend that this has more to do with distribution than with instrumentation. Aside from that, there is arteriosclerosis in the channels between composers, performers and listeners.

It is extremely arrogant and unfair, however, to sound off about popular culture in this way, particularly when the accuser is a denizen of what should probably be called unpopular culture. So let's now look at our own glass house of cards. Let's think of the classical epistemology of our composer-performer-listener paradigm in the following terms: The composer utters brilliant thoughts with great clarity and skill. They are ideally delivered to the listener by the performer in a manner which assures that the listener will have the best shot at understanding them. Clarity and precision are axiomatic virtues in classical models of explanation. This view rigidly reinforces the social structure of the composer, performer, listener network. It also indirectly characterizes essential aspects of musical thought. You expect to engage the music as a document whose manner of presentation is one-sided. It is easy to think of music as something which behaves discursively under these terms. A composition takes on the trappings of reasoned discourse. We begin at the beginning, proceed to the middle and finish up at the end, and at each point our sense of place time and place has to be stable. How many times have pieces been criticized because they end too soon or too late, or begin in the 'wrong place'? While this characterization is exaggerated, it is a view which is easy to substantiate in limited terms, and is therefore not entirely unreasonable.

But with machine-made music, it quickly and easily becomes unreasonable. With respect to the traditional paradigms many of the terms of engagement become absurd, contradictory, uncomfortable. We can no longer sit so comfortably in the same seats.. It is more than that there are new thoughts being uttered. There are important

differences about the ways in which they are being conceived and transmitted as well. As a symptom, consider the difficulties in presenting concerts of recorded music. Very often the music is not composed with this context in mind. Sometimes it is, however, and consequently sounds peculiar there in that it merely mimics the motions of human concert performers without the physical effort. Audiences are made uncomfortable by the unrelenting intensity of machine performance and this absence of physical motion. Contradictions are created by inappropriate contexts, and clearly a concert is now an inappropriate context. It is as if an agreement has been violated, or an illusion has been misunderstood. It is as if the being within the machine is more ghostlike than real. What becomes painfully obvious to many of us who have become sensitive to these issues is that the context in which you hear powerfully affects what you hear and understand. As a result, the power of machines now encourages us to think about musical shape and content in terms which are not necessarily discursive and self-explanatory, primarily because there is not necessarily any dependence on classical social venues for the music to survive. It follows that if your conception of the listening environment for your composition is modelled along different lines, then the ways in which you express thoughts are going to change. Mumbling, being evasive, indirect, elliptical, talking to yourself, hardly talking at all, being redundant, elaborating excessively, hinting, -- all become reasonable metaphors for musical engagement in that the consequences of misunderstanding time and place, formerly tied to environments which had strong time-place implications, are no longer fatal, and perhaps even interesting. Removing the music from classical models of explanation has substantial consequences for the ways in which we engage issues of time and unfolding.

In the realm of classical institutions many of us constantly notice a conflict. Much of our music cannot survive in traditional showcases. The social contract we make as composers is invalid. We have lots of patches. We involve live performers we put blinking lights on our machines, we compromise our vision. But still, many of the things we do with our machines simply do not have appropriate contexts among the classical musical-social institutions. We can try to shoehorn them in, but that is missing the point. Given the extraordinary richness and complexity which computer synthesis, assistance, and intelligence enables us to create, it becomes challenging to rethink the contextual consequences of modes of musical discourse and explanation which do not lie comfortably with the implications of the classical model. Just as the context in which you write affects what you write, so the context in which you listen will affect what and how you hear. To my mind, consequently, the real computer music revolution lies in the ways it forces us to rebuild the world in which we live, and the social structure of that world is its underpinning.

Let me now redesign the performer-composer-listener network to more accurately reflect the social consequences of using machines. I want simply to add two nodes to the network, and contend that to take these seriously is to fundamentally reassess the situation and broaden the realm in which this music lives.

First I'll add a node called 'sound-giver.' Being a sound-giver may mean simply giving a cassette to a friend, or it may mean publishing a compact disc. The sound-giver may or may not have made the sounds on the tape, it really doesn't matter. It may even mean being the sonic source for someone else's musical explorations. Before the advent of recording the only way one could be a sound-giver was to be a performer. Today, however, most of us would have to admit that giving and receiving sounds in one way or another is the most active part of our musical social life. Hardly a week goes by when I don't give and get several tapes. And an increasing number of us would also have to admit that receiving sonic material which we subsequently use in one way or another is also a new activity. When I was visiting the California Institute of the Arts, one of my students there gave me a tape of the most wonderful moving white noise bands. It turned out to be U.S. Interstate 5 late at night. He had simply parked part of his musical view of the world on this tape and wanted to share it. It certainly changed my world-view--a highway would never sound the same!. Some sound-givers mainly want to share musical experiences; others want to give you their latest and greatest efforts. These are two ends of a spectrum, and the neutral character of the technological medium of transmission is the unifying element. At first blush this may seem like a weak concept, but if you accept it in the network the consequences are very interesting. In adding this node I am making what I consider to be a radical assessment of the social effects of technology. The attributes of skill and genius are no longer the sole prerequisites for inclusion in the network as a sound

generating node, as we are used to thinking in the case of composer and performer. What is more, the sound-giver is specifically activating a musical-social exchange in the most direct and simple way. (Consider the potential of radio in this sense.) In a way it is as if our collective genius in constructing these technological tools takes a seat alongside individual accomplishments.

By defining this node I am also making a fundamental statement about the perception of recorded sound. A recording is no longer primarily a documentation of composer- performer interaction, but rather a self- contained and self-confirming entity. There is now no illusion. What you hear is what you get.

Finally, in terms of social vitality, a sound-giver is an abstraction which has several more levels of meaning and implication than a listener. He is more than a listener--while he listens, he shares. He thus absorbs some of the roles of performer, composer, and listener. In some ways, composers, performers, and listeners are subclasses of sound-givers. In other ways sound-givers are subclasses of composers and performers. In short, being able to promulgate and share sound in this way absorbs some of the musical rewards of being a performer.

The second node I want to add is called "instrument-builder." There are many forms of this. One form simply builds and designs sound- generating hardware and software. On one hand there is nothing particularly new about this. It has been going on for hundreds of years. On the other hand, the ability to imbue constructions with almost arbitrary points of view is quite new. An instrument builder is no longer necessarily dependent on the evolutionary state of the musical climate to determine the next step. Instrument design and construction now become a form of musical composition. The vision of the instrument-builder can be idiosyncratic, and even compositional. Playing someone else's instruments becomes a form of playing someone else's composition. Harry Partch probably didn't intend to have other people play his instruments, and there was probably little distinction in his mind between building an instrument and composing the music for it. Though not technologically-based, his work clearly presages similar recent machine-based efforts by a wide variety of people.

More to the point, using Csound, Music5, Cmix, M, Performer, Ovaltune, Vision, Texture, CMU Toolkit, is, to varying extents, adopting the musical vision of the designer. While the same thing might be said about playing the piano it must be remembered that the piano evolved over a period of time and had a large literature associated with it. In the past, instrument design necessarily involved generalizations. Instruments which were not sufficiently general didn't survive. The cost was too high. But now, some of these new "instruments" may have a history no longer than the builder's most recent project. On one end of this spectrum there are systems whose self-proclaimed aim is to be musically neutral. This is an absurd concept. Anyone who has worked in computer music knows immediately that the context in which you make your music largely determines the music you make. Nevertheless there is a spectrum of influence. At the other end of the spectrum there are systems whose influence is overwhelming, despite their frequent claims to the contrary. Perhaps these are rooms designed for someone else's comfort, but playing in them gives you insights into the views of the designer, and consequently expands your own frame of reference, and after all, isn't this what music is all about? Musical systems now become ways to listen, perform and compose through the mind of another. Or perhaps of many others. In ways an instrument builder becomes a subclass of composer. In other ways composer become a subclass of instrument builder. Whatever the formalization, however, it is clear that the number of ways in which the nodes are now capable of interacting has increased greatly.

Both sound giving and instrument building are essentially independent of social institutions. What is interesting is that it is now possible to incorporate the design of a social context in these activities. Musical survival now depends more on the appropriateness of this design to the music rather than the extent to which the music successfully occupies traditional venues. Consider sound installations, listening galleries, interactive systems, recording, intelligent software, for example.

It is often pointed out that in a family with two parents and only one child, there are basically just three modes of social relations, while in a family with two children there are six. Similarly, in a network with only three nodes

there are fewer lines of communication than in one with five. If we can begin to expand our musical-social consciousness to admit a larger variety of nodes, then we and the music we make and hear can only become richer in the process. The additional nodes I have added to the network are made possible only by technology. The elegance of this reconstruction is in the capability technology creates to recast and recolor the sending and receiving abilities of any of the nodes on the network. From this perspective the social implications of the classical model become much more cleanly aligned with the nature of the music it was designed to accommodate, and in our expanded social network the unique facilities offered by the technological agenda of computer music find a much more congenial home.

When we repaint our view of the present and the future only by coloring our consistent habits and perceptions with fancier paints, we are being definitively conservative. History is replete with such pathetic prediction. To be revolutionary means to fundamentally change the bases of understanding so that whatever it is that we formerly understood to be true, is not now necessarily false, but perhaps is rather no longer even a question, or an issue, or susceptible to the same logic. What is most interesting to me about speculations on the future of music does not particularly have much to do with how many machine cycles we can squeeze from a processor, or how sophisticated we can become about designing interfaces, or even how wonderfully close we can come to modelling nature, but rather what our understanding of our own, and particularly one another's minds will come to. Music is, after all, an imposition of one person's perceptions on the consciousness of another, and is as such, a model of mind and of communication among minds. Future music will be very interesting music if we are adventurous and revolutionary in implementing the power of technology and watch each other very attentively as we do.