

"Computer Music" Illustrates a Confusion
of Goals--Instant Virtuosity or
Disciplined Satisfaction

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I have often wanted to discuss music in *Current Contents*®. I waited for a suitable occasion that would excuse my limited competence to do so. I have no doubt that music is, in one way or another, important to many CC® readers. Music has been important to scientists and scholars for generations. A recent article we digested discussed several famous physician-musicians.¹ And it is well-known how frequently competence in physics and mathematics is associated with musical talent. Incidentally, Mozart is said to have been an excellent billiards player. He might have made a great physicist, but most of the pool hustlers I've known were practically tone-deaf.

However, yet another article convinced me with some trepidation to deal here with music and computers. The article was written by Steve Aaronson, a young science journalist who just joined ISI®'s staff.² It is a fine display of his talents. But the views of some of the "technologist-musicians" whom Aaronson interviewed distress me somewhat. Among such 'techno-musicians' there seems to be confusion between sound and music, between performance and composition. There is also the promise of a technologically simplified road to a dubious sort of virtuosity, the value of which I question.

The confusion created by certain techno-musicians is unfortunate, because it gives a wrong impression of what so-called "computer music" is, and just what it may accomplish in the right hands.

Aaronson quotes Dr. M.V. Matthews of Bell Laboratories: "Instruments are hard to play. Part of the problem of an instrumentalist is to become a good enough machine to be able to transduce a musical score into sound. Now, I see no great charm in this process (my emphasis). If we make better instruments that are easier to play, then more people spending less hours practicing mechanical skills can play interesting music."

On the other hand, Aaronson also quotes the composer Edgard Varèse: "I dream of instruments obedient to thought--and which, supported by a flowering of undreamed-of timbres, will lend themselves to any combination I choose to impose, and will submit to the exigencies of my inner rhythm."

I disagree completely with Dr. Matthews' view. I say this even though I have suffered agonizing moments when, not being "a good enough machine," I could not with either of my saxophones make them, through me, or make myself with them, obedient to the thought of the composer whose score confronts me. Despite the difficulty and the frustration, I simply cannot agree with Matthews that "there is no charm in the process." There is both charm and value. As a matter of principle, the development of a skill, especially when it is one hard to acquire, is a valuable thing.

Not enough young people know how "valuable" they might find a skill acquired with some difficulty. Even modest achievement by some professional standard is worth the effort. This is no special recommendation of the Protestant ethic and the value of work. That the beautiful is difficult is an aphorism attributed by Plato to Solon. As far as personal effort and reward are concerned I think it still holds true, and always will. There is charm, even as one learns, in the pursuit of a skill, whether the skill is athletic, academic, or musical. In the latter case, I admit the charm may be unappreciated by any but the would-be performer. I am sure few people would enjoy my saxophone playing as much as I do. That is why I keep it largely to myself. I am equally sure that no one more than myself is as dissatisfied with it as I am. I say this having heard some horribly incompetent musical performances in public. Obviously, I am dissatisfied with my inability to be "a good enough machine,"

to translate a score into the 'perfect' sound that a computer can be made to produce. But the effort is, nonetheless, worthwhile. The computer generation of that sound would be amusing but frustrating to me.

How many generations of parents have grimly appreciated that there is "charm" in the effort of acquiring a musical skill! How many have suffered in great discomfort the horrid sound of their offspring attempting piano, violin, or saxophone. They recognized that their suffering is the price of finding whatever talent, large or small, might be there. It is also the price we pay for inculcating the development of self-discipline.

The computer can be made, with more or less complicated instruction, to produce the saxophone sound with perfection. It is, of course, an inhuman perfection and the techno-musicians have faced up to the fact that they must program into sound production not only the physically exact parameters of saxophone acoustics, but enough variation from them to make the sound pleasing to ears unaccustomed to perfection. They may be able to do that, but they will never, except perhaps in some intellectual equivalent that I cannot imagine, be able to enjoy the particular fantastic feeling that comes from handling and using a particular instrument—a combination of sensations in the fingers, mouthpiece and vibrating reed, not to mention lungs and skin. My son would say the same about his guitar or harmonica.

There is no doubt that a computer can be programmed to play any score for any combination of instruments, with an absolute technical perfection. It is the "good-enough machine" that Matthews talks about. But does that really mean that more people will now be able to play more interesting music?

I am somewhat confused by what Matthews means by "more interesting music." Does he mean that they will be able to play existing music in a "more interesting" manner using a computer to produce the sound of musical instruments they never learned to play? Why not just elaborate on the old piano-roll or use the phonograph? Perhaps quadraphonic sound cannot yet match the output of a computerized orchestra but I suspect that Handel's *Messiah* played by computer is vastly inferior to its performance by traditional orchestra and choir. Perhaps a rendition of *Messiah* on the

Moog appeals to a generation that has grown up with the electronics of pop music. My ear has not been trained to it, as theirs undoubtedly are, and as the ears of future generations will be trained to accept even more outlandishly perfect and outlandishly mixed sound.

But even perfect sound is not music, neither Matthews' perfectly made sound nor Varèse's imagined sound of instruments obedient to thought. But Varèse, at least, does have a point. As a composer he says what Keats has said before: "Heard melodies [not sounds] are sweet, but those unheard are sweeter." Mr. Varese wants others to hear them, as he has heard those unheard melodies, and to permit him to accomplish it, he wants his new instruments, "obedient to thought," instruments that will "lend themselves to any combination I choose to impose and will submit to the exigencies of my inner rhythm." With the italics I have attempted to indicate what the computer's perfect instruments cannot provide—the composer's choice and his need for expression.

I do not mean to discount the role of skill in creating or combining sound in orchestration of music, even computer music. Some composers have been much better 'arrangers' than others to whom, as composers, they were nevertheless much inferior. Such great arrangers, for example, as Tchaikovsky or Berlioz, used the orchestra to make bigger, more varied, "more interesting" sound by imaginative combination and contrast. But Berlioz, for all his stunning accomplishment (and enlargement of the orchestra) was no Beethoven, and even the limitless acoustic potentials of the computer would not have made him one. The intricacies of sound, even the unlimited sounds the computer can be made to produce, have aesthetic limitations. They are limited by what the imagination of the performer or composer can do with them.

Just as the computer would have made no Beethoven of Berlioz, I am afraid a computer-perfect saxophone will make no Charlie Parker of me. The "ill wind that no one blows good" has become in the hands of the great jazz improvisors a medium of terrific musical expression. The operative word is *expression*, whether the instrument is a kazoo, a piano, a sax, or a computer. To use any of them to make music with sound requires more than the mechanical dexterity, which, in the case of computer music, be-

comes unnecessary. Wit, intelligence, insight, and of course, something to express and the drive to express it--whether in the most formal string and woodwind quintet or in the wildest riffs of jazz improvisation--will always be essential.³

Not having grown up with synthesized music, (the electric organ, the Moog) or computer-written music, I discussed the matter with two young 'electronic' musicians employed at ISI. They assure me that it is just as difficult to master the nuances of the Moog as it is to master the violin.⁴ In their opinion, the "seduction of perfect sound" available from these instruments too often lulls the performer into a false sense of accomplishment. Hence, only true musicians really explore the potential of the instruments, just as in the case of instruments with which we are all more familiar.⁵

It was interesting to learn that, for the most part, these young artists consider it fruitless or pointless to transcribe older compositions for use in electronic instrumental and computer-generated tape perfor-

mances. Those compositions were written for a combination of instruments that the composer found best suited to his purpose. I do not mean by that to call all transcription useless, or without purpose. Transcription can be a matter of taste (Mozart rescoring *Messiah*), of cultural translation (Stokowski's orchestrations of Bach), of necessity (piano transcriptions of any march you can name for high-school processions), or of virtuosity (Liszt transcribing for the piano things only he could conceivably use the piano to play). But transcription does not exploit the potential of the synthesizer or of the computer in "generating music." In the latter case, the composer exercises his imagination in selection of the thematic patterns his purposes demand and in the creation of the model the computer will use to generate music. In this process, my computer-musician friends tell me they feel just as ecstatic as I might, were I to generate a series of sounds that, in my fantasy, even Charlie Parker would applaud.

1. Strohl, E.L. *et al.* Physician-musicians. *Perspectives in Biology and Medicine* 17(2):267-85, Winter 74.
2. Aaronson, S. With a song in his digital computer: behold the ultimate musical instrument. *The Sciences* 14(4):13-16, May 74.
3. Having just returned from a jazz concert at sea, I am acutely aware that some readers may not know just what goes on in jazz improvisation. Jazz provides the 20th century counterpart of the virtuoso improvisors of classical music in previous centuries. All that remains of classical improvisation is the embellishment sometimes attempted by singers, and the rarely improvised cadenzas of concerti. Thus, there is nothing in the performance of classical music today that can compare with the improvisations, the true cadenzas, of the great jazz musicians. They start with the statement of some simple melody or theme, usually from a popular ballad. Then, in a manner that is much more 'formal' and structured than most people realize, they explore, expand, and exploit the rhythmic and harmonic potential of the simple theme in

- brehtaking flights of musical imagination and virtuoso skill. The best and most illustrious jazz vocalist I could cite is Ella Fitzgerald. Any CC jazz fans will agonize with envy when I say that she was accompanied by Oscar Peterson, Dizzy Gillespie and Bobby Hackett on the above mentioned cruise.
4. I'm glad to acknowledge by indebtedness in this matter to Ira Yermish, a member of ISI's R&D staff, and to Thom Holmes, of our Journal Processing Department. A concert including some of Mr. Holmes' music was recently reviewed by John Rockwell in *The New York Times* (19 May 74).
 5. As much as I may be unable to appreciate the finer points of electronic music and computer-produced sound, there is something the computer can do that I might like to hear. It involves one of the oldest of all instruments--the bell, whose sound should, I imagine, be difficult to program. Perhaps some reader can tell me whether a computer has been used to generate the sound of a set of bells in courses for chattering, and even, perhaps, gone on to produce new peals of unlimited extent.