Center for Computer Music
Stanford University
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An old familiar song, printed using a computer production system

Applying new technology to an ancient art

By Michael Walsh

THE VERY NAME seems a contradiction in terms: computer music. Surely the embodiment of soulless 20th century efficiency cannot produce music. Or can it?

"When people talk about the dehumanization of music, I talk about the humanization of computers," says John Chowning, the director of the Center for Computer Research in Music and Acoustics at Stanford University, one of the most important institutions of its kind in the world. "The computer is simply a machine, like a piano. It just yields dimensions of musical control — synthesized sound, timbral transformations, 'unworldly' tones — that are not available elsewhere."

Chowning hastens to point out that computers are not composers themselves, only tools of composers; music written by computers is neither very interesting nor very good, because it lacks the human creative impulse. "It's kind of like trying to write poetry with a computer," Chowning said. "The computer can write prose, after a fashion, but poetry is beyond it: it just can't be done.

"Music is even more obscure than poetry: The physical event reduces to mathematical expression, but not the emotional. When composing with a computer, you have to leave holes in your program so you can get your intuitive hands in it. Using the computer simply helps the composer avoid drudgery: "I'm convinced that Bach would have loved the computer."

Bay Area audiences will have a chance to hear some "compuger-generated sound" (a more proper title for the music) Thursday and Friday at 8 p.m. in the Stanford Museum of Art. The program includes Chowning's own "Stria," Andy Moorer's "Perfect Days" and "Lions Are Growing," Paul Wienecke's "Oracle 4 a.m.," Michael McNabb's "Dreamsong," Stuart Dempster's "Standing Waves, 1978" and Bill Schottstaedt's "The Gong-Tormented Sea."

The Center for Computer Research is part of Stanford's Artificial Intelligence Laboratory. Although work in computer music has been going on at Stanford for some time, the center itself is a fairly recent
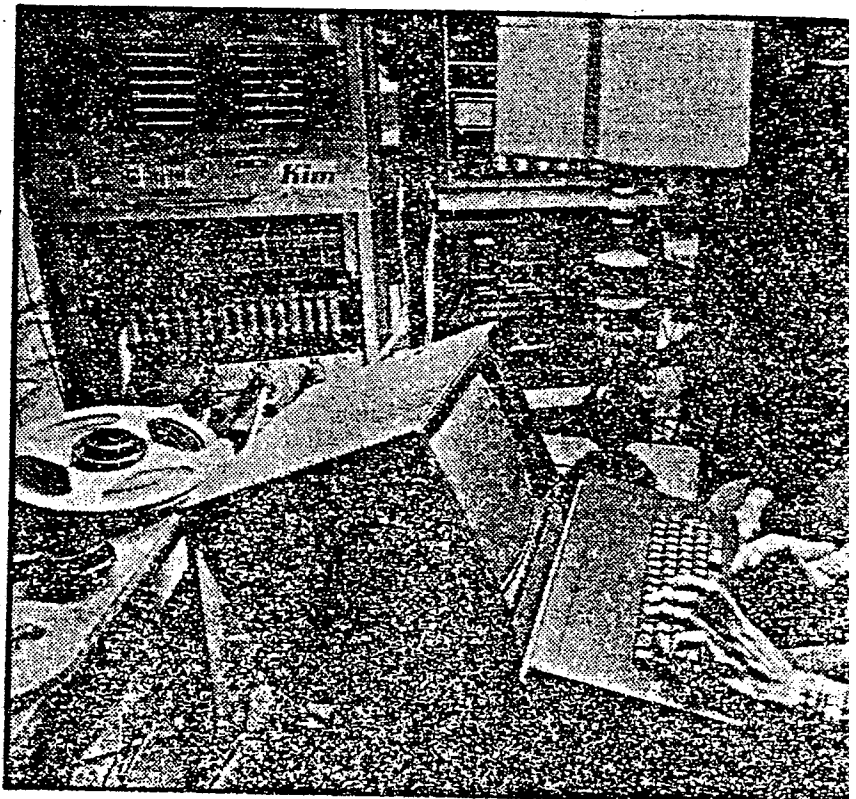
John Chowning, director of Stanford's computer music research center, at right; two students, Paul Wieneke and Bill Schottstaedt, at the computer keyboard, above

development, founded in 1975 with grants from the National Science Foundation and the National Endowment for the Arts.

Chowning's involvement with computers goes back to 1964. "I attached myself to the Artificial Intelligence Lab because the AIL was the only department that allowed music experimentation with computers," Chowning said. "In 1964, it was all very speculative. There was no reason to believe that computers would offer more than synthesizers," the sound-generating electronic instruments popularly associated with the name of Robert Moog and heard on such records as Walter Carlos' "Switched-On Bach."

Chowning, a student of composer Leland Smith at Stanford, began teaching there in 1966. Their "home-grown" staff today includes John M. Grey and composers Loren Rush and James (Andy) Moorer. All five are musicians; Grey has a doctorate in psychology and Moorer one in computer science. In all, there are about 22 staff and students currently working at the center, including a couple of guests from France and Germany. "We try and treat the lab as a national/ international resource," Chowning said.

To that end, the Stanford Center for Computer

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Examiner / Nicole Bengiveno

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Research in Music and Acoustics has an association with one of the world's other great computer-reserarch centers, Pierre Boulez' Institut de Recherche et Coordination Acoustique/Musique, known as IRCAM, in Paris. Moorer is currently in residence at IRCAM, and next month Chowning leaves for a 10-month stay. "When Boulez was putting together IRCAM, our staffs had a lot of contact," Chowning said. "The result was a system compatible with Stanford's. "We have a creative interchange — many of our pieces have been done (performed) there."

At the heart of the Stanford system is a Digital PDP 10 computer, which can handle a multitude of tasks, thus allowing both composers and scientists to share it. More important from the composers' point of view, its capacity enables them to work on their compositions simultaneously, something that would be impossible in a conventional electronic-music lab.

Composing is done at the more than 100 terminals located around the lab. Pieces can be inspired by or derived from a "compositionally suggestive" series of tones synthesized on the computer. Or they may proceed from pre-established structures programmed into the computer by the composer. Composers may also "build" their own "instruments" on the computer to produce special sounds. "It's more like composing for orchestra than playing jazz piano," Chowning said of the process.

Composers also use the new "Samson Box," described by Chowning as "a special-purpose digital synthesizer-processor," designed and built by Systems Concepts, Inc. of San Francisco and named after its inventor, Peter Samson. ("WARNING: The Surgeon General has determined that listening to the Samson Box may be dangerous to your health," reads a gag over one of the speakers in Chowning's office.)

But all of the composers emphasize that the music, not the technology, is the thing. "The computer shouldn't be visible through the music," Chowning said.

More than computer composition goes on at the center. Leland Smith directs research into computer production of musiccal manuscripts, which could revolutionize the way music is printed and published. John Grey's speciality is psychoacoustic research. There are also projects devoted to digital recording. editing and processing, directed by Loren Rush; digital signal processing research, directed by Moorer; and advanced synthesis techniques research, directed by Chowning, Grey and Moorer.

"But all of this is compositionally motivated." said Chowning. "This is not an acoustical lab. We define our problems as 'real-world' problems; we don't use anechoic chambers because nobody listens in one. Most of the staff are composers. It's important that all of us here have traditional musical training — none of us comes out of technology to music. Our commonality is that we are all musicians and all programmers."

And what of the future of this forward-looking field? The quickening pace of technological change inevitably will affect electronic and computer music — already, in fact, the electronic-music studios and synthesizers of the '60s seem primitive. "A lab of this sort should be available to most junior colleges in a few years," Chowning said. "It bodes well for the future.

"And the decrease in cost and size of computers makes it possible for us to imagine 'real-time' performing instruments, creative interaction between players and machines in concert situations. It's only because computers are big and bulky now that we can't put them on the stage and have people play them."