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Digicon '83

It's not easy to picture Todd Rundgren, Robert Moog, David Em, Herbie Hancock, and Ed Emshwiller in the same place at the same time—even a place with the postcard appeal and glorious August weather of Vancouver, British Columbia.

But imagine, if you will, a convention—one that draws on a particular segment of the audience that would attend NAMM, or SMPTE, or Siggraph. Now shift the emphasis away from the dealers, the DSP freaks, and the hardcore hackers, and invite only artists and musicians, serious ones who are using the latest in computer technology to extend "the edge of the art."

That was the idea behind Digicon' 83, the first International Conference on the Digital Arts. The three-day conference this past August was the result of three years of planning by the Computer Science department of the School for Continuing Education at the University of British Columbia.

Why Vancouver? For one thing, that is where the University is. Maybe just as important, it is probably the only city on the continent with civilized weather at that time of year. But for me, the conference was a terrific excuse for visiting a place I have wanted to see ever since I saw this jeweled city appear just beyond the mountains in the 360-degree Canadian travelogue film at Disney's EPCOT Center.

Digicon was not a big conference; although attendees came from as far as Japan and South Africa, they totalled only about 300. The one public concert drew an audience of some 700. Despte its relatively small size, it was an intense experience, with lectures, demonstrations, public performances, commercial and artistic exhibits, and plenty of high-tech partying.

Sunday Evening: We Become Aliens

Interstate 5 from Seattle turns into B.C. Route 99 at the Canadian border, where the absurdly young customs agent pricks up his ears when I tell him I am attending a computer convention. "Do you have any computers?" he asks. There is a microprocessor in my camera and one in my tape recorder, but other than that my

data-input devices consist strictly of pens and paper. "Have a good time," he says unsmilingly.

Southern British Columbia is farmland, with unimaginably high mountains looming on the horizon. Route 99 takes you through fields, down into a tunnel, around a corner, and suddenly there is this metropolis, stuck precariously between the mountains, now quite imaginable but just as high, and the Gulf of Georgia. The rented car goes into an underground garage, an elevator takes me up 18 floors of the Four Seasons Hotel, and once again I am staring at mountains.

Downstairs in the Harvester coffee shop, I meet Ellen Lapham, president of Syntauri Corporation, makers of the AlphaSyntauri Apple-centered digital synthesizer. Both of us are extremely weary from travelling, so of course we launch into a heated and completely pointless discussion over keyboard-based synthesizers. I take a position against them.

Monday Morning: Our Education Begins

I feel like I'm back in college: half the convention delegates are lining up behind me at the coffee shop, anxious to grab some breakfast before running down the block to the Hotel Vancouver for the 9:00 a.m. lectures. Over at the hotel ballroom, it is more hurry up and wait, while an obviously overworked stage crew tries to get an enormous PA system going. The opening remarks, by various administrators and grant-givers, reinforce the collegiate atmosphere and remind me why I religiously avoided early morning classes.

Finally, someone with something to say takes the podium. Ed Emshwiller, dean of the School of Film and Video at the California Institute of the Arts and bearded guru of computer animation, shows his classic eight-months-in-the-making three-minutes-in-the-viewing film "Sunstone." It is a modest but beautiful little piece, featuring a pleasant androgynous face poking through 3-D surfaces, being transformed with color changes and solarizations and placed on planes rotating through space, all accompanied by dense minimalist synthetic music.

Emshwiller, who did the film while he was at the New York Institute of Technology, talks about its creation. He went to NYIT, he explains, to use computers to make images, not just manipulate them. When he first arrived, his colleagues asked him what he wanted to do, and when he started talking about a 90-minute film, they all laughed. The major problem in making the film was not creating the images; it was choosing among them. "Late at night I would get carred away," he says, showing a slide of a face drawn entirely out of eyes.

Next up is Bill Buxton, University of Toronto composer with an axe to grind. "It's time to rethink the interface between electronic instruments and the user," he says. "We have gained control, in that we now have a great deal of precision and a vast potential for making music, but at the same time we have also lost. We have to get away from the 'overblown electronic organ' syndrome." I remember last night's discussion and feel vindicated.

Buxton's solution for re-humanizing electronic instruments is "gesture controllers." "Gestures have meaning," he says, "for both performers and listeners. If we want to expand the range of musical expression, why can't we use new gestures—blowing, sucking, squeezing, kicking, caressing—instead of emulating the past?"

The rest of the morning I spend at the Robson Media Centre, a subterranean exhibit hall-cum-lecture hall and cinema, complete with Tourist Centre and a bunch of fast-food counters. Downstairs a dozen or so manufacturers of various kinds of hardware are hawking their wares.

Roland is showing its CompuMusic 800R, a fairly useful device for synthesizing pop-music tracks. Although it contains six voices, a drum machine, and interfaces for microcomputers and slave synthesizers, it has no keyboard, and is therefore not programmable in real time (although it does have editing capability), and the preset synthesizer voices can't be changed. The demonstration, a painfully slow (and loud) version of some pop tune so obvious I didn't bother to write down the title in my notes, is driving everyone nuts.

A few feet away is Oberheim's booth, where a bunch of their synthesizers are hooked up to and playing each other, and this little orchestra, for a change, sounds pretty good. I mention MIDI, a recently developed serial synthesizer interface that will be discussed at length tomorrow, and the Oberheim folks put it down. "It's not fast enough to do 16-voice polyphony," says one. Oberheim has developed its own parallel interfaces, which it is not about to abandon. "We like them too much to give 'em up," he says. "Maybe we'll do both."

Yamaha is being represented by a local music store, and the personnel at the booth don't seem to know much about the FM synthesizers they are showing, the DX7 and DX9. FM is nothing new for big-time computer synthesists, but it is a relatively recent development in consumer level equipment. Handled correctly, it can produce some fascinating sounds, simulations of both real instruments and original ones. These units sound incredible, although no one can tell me why.

Syntauri is showing off its Simply Music education program, which teaches keyboard technique with a software disk, a song disk, and various music books. The nice part of

the program is that it simulates the old "Music Minus One" records: the computer plays one hand, and you play the other. But it also has a feature that stops the music until you play the right note, which one visiting music teacher vehemently objects to: "It's no better than hitting the kid with a stick if he makes a mistake," she argues. Unprepared for this verbal onslaught, Syntauri's Robin Jigour meekly promises to think about it, and offers to send her a copy of the program so she can be more specific in her criticisms.

Syntauri's closest competitor, Passport Designs, maker of the Soundchaser Apple-based synthesizer, doesn't seem to be particularly interested in selling hardware, although software catalogs are being handed out. Also being passed around is a puzzling questionnaire asking how folks feel about the concept of MIDI. Are they planning to implement it on their systems?" "We're just trying to see what people think," says one fellow vaguely.

There is a booth for the Fairlight CMI, the Australian super-synthesizer, but there is no way to get close enough to it to see what's happening. In the booth, manned by a single company rep, there are at least a dozen people crowded around the lone terminal, most of whom. I suddenly realize, are from the other synthesizer companies.

But there is satisfaction to be found on the floor: a German machine called the PPG Wave 2.2. It is being demonstrated by a local rep, who has the demo routine down pretty well. It is very popular in Europe, he explains, especially among syntho-poppers like Thomas Dolby, but it has been available over here for only about a year. It comes in two parts: a keyboard and a mini-sized computer. The keyboard combines digital waveform generation with analog filtering, which gives it the organic "feel" of the early analog machines. Any note can be run sequentially through up to 64 waveforms, giving the sound a sense of life totally impossible with single-wave synthesizers. The "instrument" programmed in for the demonstration is a motorcycle: it starts, kicks, over, roars, takes off, switches gears, and disappears into Doppler-shift oblivion.

The optional computer (Waveterm) uses a 6809 processor and two 8" disk drives to provide an incredible range of functions. On the screen, you can draw waveforms, equalization curves, and envelopes, and there is even zoom capability for zeroing in on and adjusting individual sections of the drawings. It can sample real sounds, and do off-line note editing, looping, and all the neat stuff most such instruments can handle. It can even, according to the rep, be hooked up to an ASCII keyboard and printer and used as a mainframe computer, but neither he nor anyone else on this side of the Atlantic seems to know any details.

He tells me that the price is about $60,000, which sounds steep, but the U.S. distributor sets me straight a couple of weeks later: the keyboard alone is $7950, and with the computer the price is $16,900. Compared to the others in its class, it is a veritable steal.

Monday Afternoon: We Approach The Edge

"Commercial applications" the conference schedule says, but no one expects an hour of Levi's spots and computerized disco. First up is Alvy Ray Smith, leader of the Computer Graphics Project at Lucasfilms.

"These are the early days," he says. "Interfaces between artist and the machine are still crude. The interfaces themselves are an art form." But we are not going to get a dry lecture: we are going to watch a piece of *Star Trek II*. Paramount Films contracted with Lucasfilms' Industrial Light and Magic to do special effects for the flick. ILM, in turn, gave the Genesis Project to Smith's gang. "We're mostly R&D," notes Smith. "We had to get permission to stop our research work and go into production."

The Genesis Project was a video, showed to Captain Kirk at the beginning of the film, demonstrating the effects of a special space probe on a planet. It instantly wipes out all existing life forms and starts the process of evolution all over again, in super-fast time. "Because it was supposed to be a video, Paramount asked us to do it with 500-line resolution," says Smith. "We went along, even though we could have done it with much higher quality, but you could only see the difference in the first few rows."

The 60-second segment took six months to produce. "They originally asked for a two-dimensional effect, but that was boring," says Smith. "So we did it in 3-D, with fancy camera angles which would be almost impossible with models, like the camera spiralling out and flipping over backwards." Fractal functions were used to "organicize" the effect, by introducing elements of randomness, and separate programs used for the various elements were laid on top of each other digitally.

"We now know how to solve aliasing problems, like the strobing that occurs when image boundaries are moving," he says. "We just compute in the smear. We figure out how far the image—a star or the edge of a planet—is going to move within the time that the 'camera shutter' would be open."

Smith goes on to describe Pixar, a machine his group is now building, that will all but eliminate the optical printer in the production of film special effects. "One scene in *Return of the Jedi* had 62 picture elements," he explains, "and it required 500 passes through the printer. That's a lot of multiple exposures, and if you make a

mistake, you have to start over." Pixar will eliminte all of these problems by doing all of the compositing inside the computer.

"It reads the film image with a laser, enters it into the computer, which can play with it and then put it back on film. It will make 85 percent of the film work unnecessary." But Smith doesn't imagine that film will be totally obsolete for at least five to ten years: "We'll still use real spaceship models.

"You can make any predictions you want, as long as you don't put a time limit on them," he says. He notes that the next development in any computer-related field is always "two years away." The audience takes this wisdom to heart: someone asks when Pixar will actually be on line, and the rest of the crowd, in unison, yells "Two years!!" Actually, says Smith, the first prototype should be operational by the end of '83.

The next speaker is Roger Powell, keyboardist with Todd Rundgren's Utopia, who describes two projects he has designed for himself. The first is a self-contained live-performance digital synthesizer he calls Databoy. It is built around an S-100 mainframe with a Z80 microprocessor. The choice of sound-generator (oscillator) card was easy; only one such card, made by Casheab, can plug directly into an S-100 chassis. It uses 12-bit D-to-A conversion, with 16 oscillators available. The voices are arranged in 32 registrations, each of which contains 12 instruments.

"The parts were ordered through ads in *Byte*," he says. "The machine is very reliable: all the parts are standard items you can get in any major city"—he pauses—"with a few months' notice. The most fragile parts are the disk drives, but since the operating system only takes up 8K, we could conceivably put it on EPROMS and do away with the drives all together."

The other project is Texture, an Apple-based sequencer. A multichannel D-to-A convertor is plugged into a port on the computer, and it feeds voltage levels and trigger pulses—corresponding to notes, keys, rhythms, and other musical parameters—to a variety of outboard synthesizers. All of the data remain resident in the Apple memory, so it is a fast system: there is no need for disk compilation. The computer can change notes and tempos in real time, and it even has a built-in random note generator.

Late Monday Afternoon: The Ultimate Audio System

Everyone is running late today, and the lecture scheduled for 3:30 doesn't get started until after 4:00. It is called "Production Techniques for Digital Music"—an innocuous enough title that gives no indication that one of the biggest bombshells in the history

of audio is about to be dropped. The speaker is James A. (Andy) Moorer, leader of Lucasfilm's Digital Audio Project. A conservatively dressed gentleman, he immediately gets the audience laughing by flashing a slide of a Moviola film-editing machine and announcing, "We meet the enemy."

Music for film, he explains, is totally at the mercy of the film editor, which makes it a living hell for the composer, who has only six or eight months to work on the thing before it is released. "During the editing of *Jedi*," he recalls, "there were four people who did nothing but carry reels of film back and forth between studios for recutting."

So his division built a self-contained digital audio processing station that could handle effects production, dialogue modification and replacement, sweetening, mixing, and music production and storage. It is known as the Lucasfilm Audio Signal Processor ("ASP"—a peculiarly apt acronym), a prototype of which has been around for 18 months.

At the heart of the ASP are eight digital signal processors, each one using up to eight Motorola 68000s and eight Studer D-to-A convertors. Storage is handled by eight 300Mb CDC 9766 hard disk drives per processor, each disk containing about 14 minutes of mono sound. The software is written in C for a Unix environment.

The system is built for flexibility: it can be run with any kind of front end that an engineer or musician might feel comfortable with, like a mixing board, an editing console, even a keyboard, violin, or touch-pad synthesizer. Likewise the machine specifications are variable: there is no limit to the number of oscillators available, and both sampling rate and word size are adjustable.

Moorer talks about a couple of specific applications: cleaning dialogue, in which the computer extracts the loudest signal (the voice) and eliminates all of the others, such as mechanical noises and people falling on the set and screaming; and "funny voices" for the famous alien creatures of Star Wars. He plays a tape that demonstrates a smidgen of the capability of the unit. 54 pitches on a cello were recorded and digitized; the computer then played them back at random, up to eight at a time. "We can take one tone and synthesize the entire range of the instrument—and more—from that, or we can record each note individually and call it up when we need it." Similarly, sound effects can be stored on disk and instantly called up.

But it isn't until someone asks, half-jokingly, if the unit is going to be commercially available that the audience realizes the implications of what Moorer is saying: "By Christmas of '84," he says quite seriously. "It will cost about $700,000. The commercial version of the ASP will record and manipulate 32 channels of audio, and will hold 800 minutes of monaural sound on line at a time. It will replace all of the

equipment in a standard recording studio—tape recorders, sound processors, mixing console, and even most of the musical instruments—except the microphones and monitor speakers. A bargain."

Monday Night: The Concert

In the spanking-new Queen Elizabeth Theatre, something called The Electric Night Show is scheduled for 8:30. When the doors finally open about 8:25, several technicians and performers are still scampering around the stage, so it is another half hour before the concert starts. At least one member of the audience, looking at the printed program, is heard to say "I thought we were going to hear the Electric Light Orchestra!" The opening number isn't on the printed program either: it is a spunky little video called "Act III" by Dean Winkler and John Sanborn, with music by Philip Glass. Then we are confronted by someone named Steve Miller, who claims to be the host of the program.

I figure I am missing something—that this guy is probably a big deal in Vancouver, but I find out later that I am not alone in my ignorance: conference organizer Cindy Noakes has never heard of him either. He is a perfect cross between a truly bad stand-up comic and a low-budget game-show emcee. He tells execrable, pointless jokes, and brags of his ignorance of what the concert is about, but at least he pronounces everyone's name right.

Someone throws a switch, and a rectangular area of the stage is surrounded by red LEDs. We experience "XT-N-BA," a computer-choreographed dance piece, that consists mostly of glides and turns, with some dog-like bending over and panting, by a half dozen dancers in two-tone leotards, accompanied by unusually static live and taped music. None of it makes any sense at all, and everyone on stage seems a bit anxious and confused. Tomorrow, at a lecture by the choreographer, we will find out why.

The next event, fortunately, is far more successful. The piece is called "Night Satellite," and features Vancouver composer Jean Piché playing a Fairlight CMI. Piché, it turns out, is not performing alone; two other composers, Osamu Shoji and Martin Wesley-Smith, are also working their Fairlights but we can't see them, because Shoji is in Tokyo and Wesley-Smith is in Sydney, Australia. They are linked to each other by satellite, which leads to some interesting problems: because of the built-in 300-millisecond delay of a satellite hop, Australia has to hold back its entrances for a beat after hearing a cue from Canada, which in turn must pause after getting a cue from Japan. The machines are also set to play each other, in a continuous round-the-world loop.

Some of us get a little uneasy before the piece starts—the communication line between the three performers is piped onto the house PA, and it has a bad echo and sounds dreadful. There is no such problem with the audio lines, however, and the sound is remarkably clean. It is hard to determine exactly who is playing what (a situation exacerbated by an unbelievably inept video cameraman who insists on showing images of Piché's feet on the projection screen), but it seems that Piché likes to play Morse-code like patterns and percussive riffs, while Australia is into sounds of guns, whips, and ripping metal, and Japan is predisposed to heavy synthetic rock and roll. Although the music seems a little disjointed, there is no mistaking the energy of the performance, and when it is over, the usually unsmiling Piché cracks a wide grin. The communication line is put back on the house PA, revealing that all is not perfect: "Do you want the bridge again?" asks an Australian voice. As the three audiences, thousands of miles apart, applaud each other, Piché proclaims, "Next year, Africa, Europe, and South America!"

After intermission comes "Scenes from the Reflection Afterwards," a piece by Bill Buxton and John Celona, a composer from Victoria. We know we are in trouble when one of the speakers of the "octophonic" sound system starts buzzing and crunching uncontrollably. A few minutes into it, Buxton reaches over to play his custom-built touch tablet (called Drum), but it refuses to make a sound. His hands are visibly shaking as he wiggles the cord to the thing, to no avail.

Celona, meanwhile, is playing a four-chord rock riff on his Synclavier, which is getting louder and more annoying by the second. This apparently is supposed to be Buxton's Drum solo. The audience is getting restless, and someone (reportedly Todd Rundgren) throws a paper airplane at the stage.

Finally, to everyone's relief, it is over. Buxton isn't talking, but a few days later Cindy Noakes explains what happened: the Drum, which was not designed to go on the road, was shipped across the country by Air Canada, who for some reason decided to disassemble it before Buxton could pick it up. Most of the rehearsal time Monday afternoon was spent trying to put it back together.

The finale of the program is "Visual Music," performed by Roger Powell and laserist Richard Miller, and accompanied by a dancer. The piece features Powell's Texture machine controlling a bank of Roland synthesizers. The first movement, music only, is funky and oppressively loud. In the second, the lasers come in, and throw a few red and green patterns on the balcony.

For the final movement, smudge pots fill the stage with thick, black smoke, and the dancer starts to walk on the stage. She never gets to the front, however, because the lasers keep going off and Miller keeps running to the back of the stage. It seems that

somebody has plugged all of the lasers into one 15-amp electrical circuit, and the breaker keeps tripping. Finally, he gives up, and the concert sort of ends.

Late Monday Night: We Realize Why We're Here

After the concert, most of the participants go off to get drunk, while Ellen Lapham and the rest of her Syntauri crew head over to the Garden Lounge at the Four Seasons with me tagging along. Also along is Herbie Hancock, a Syntauri user, who slipped into town earlier in the day.

After a couple of rounds and some breezy talk about tax brackets, German Steinway pianos, and plastic oboes, the waitress announces 'last call' and the elderly black gentleman playing the Yamaha grand piano over in the corner starts to lock it up. Hancock calls over, "Please don't!" The gentleman asks Hancock if he is a musician and where does he work? "All over the world," smiles Hancock. "And what is your name?" inquires the man. Hancock stands up and introduces himself, and even after the gentleman sees Hancock's name on his conference badge, he is still skeptical.

Hancock sits down and starts to play: two beautiful melodic improvisations on tunes I can't quite name. The other pianist watches him intently. After about 15 minutes Hancock stops, and the older man reaches out his hand again. "My name is Linton Garner," he says. "My late brother Erroll and I have been following you for years." The two musicians talk quietly, while the rest of us drink in the moment—technology or no, art and music are about people communicating with people, and we have just experienced that in its highest form. Not even the drunk American in the corner screaming, "Do you know any rockability?" can break the spell.

Tuesday Morning: MIDI, Moog, And More Moorer

Once again, we are dragged out of bed for an early morning lecture, this one by Dr. Robert Moog, father of the keyboard synthesizer, a conception for which some purists will never forgive him. The lecture hall at the Robson Media Centre is packed to hear a living legend talk about the next step in the development of electronic instruments: MIDI.

MIDI is a digital, serial, bidirectional data stream, with a transmission rate of 31.25 kilobaud. It runs over standard audio cable: two conductors and a shield. Through it, properly equipped synthesizers can talk to each other: notes played on one can sound on another, rhythms set up on a keyboard can play a drum machine, etc., etc. Up to 16 data channels are available. The whole shebang costs about five bucks at the manufacturing level, and it can be hooked up to any synthesizer that uses microprocessor control.

Half of the audience is rapt, while the other half is yawning uncontrollably. Moog's delivery unfortunately, is full of long hesitations in the middle of sentences, and that is especially hard to take first thing in the morning. There will be another lecture on the subject, with a demonstration, this afternoon, so within 30 minutes half the audience, including me, sneaks out the door.

In the lobby is a wall of stunning computer paintings by David Em with titles like "Stargate," "Trans Jovian Pipeline," and "Donuts in Space." There is a mobile called "Emitter Follower" by Doug Back, which has four balsa wood sticks spinning atop an Apple computer with a transparent cover, usually avoiding each other, but occasionally colliding and reversing direction, and every once in a while hanging up completely. "Golden Gate Buzz" is a perfect title for a painting by D.J. Cox, which looks like a video still of the Golden Gate Bridge after it has been plugged into an electrical socket.

Back in the lecture hall, Andy Moorer is substituting for John Chowning, who unfortunately had kidney stone troubles enroute and is now lying in a hospital in Seattle. Moorer's delivery is short, sweet, articulate, and coherent. The talk is a simple plea that in the rush to perfect the ultimate live-performance synthesizer, we should not forget the advantages of offline synthesis. As the complexity of a composition increases, he reasons, it becomes necessary to get away from real-time synthesis, so that the composer can maintain proper control over a larger number of parameters.

Late Tuesday Morning: Jody Gillerman Takes It Off

"Performance in Visual Media" doesn't exactly sound like a strip show, but it's about as close as this conference is going to get to anything on the prurient plane. A corner of the ballroom is filled with Jean Piché's music equipment, a mean-looking aluminum patch bay, and TV cameras, monitors, and lights. California video artist Jody Gillerman is walking around dressed in black leather and a huge red LED bracelet, and Piché shoos away a flock of photographers.

Gillerman sits down on a stool and takes off her jacket, revealing a black leotard, Piché starts playing string-like drones, punctuated by tiny explosions. A tape of computer graphics can be seen on a small video monitor and on a projection screen, and slowly the image on the larger screen starts to change. Cameraman Jim Whittaker is tightly focussing on Gillerman's neck, and the image of her caressing her bare skin starts to mix with the taped graphics. The music builds, and Piché begins to coo and sigh into a microphone. The camera angle of Gillerman is so tight that unless you can see her in the corner, it is hard to determine exactly what she is doing. It is an exciting, very sensual performance, and the audience applauds enthusiastically when it is over.

The patchbay, Piché later explains to us, is a custom image mixer that responds to incoming sound as well as its own internal program. "We rehearsed everything on headphones," he says, "so an unexpected thing happened just now—the sound coming out of the speakers was getting into the microphone and setting up an extra loop. Actually, I think it came out better."

Tuesday Afternoon: Labanotation, More MIDI, and PODX

An addition to the schedule has been announced: choreographer Maureen McKellar and programmer Dianne Thomson are to speak in the Media Centre about computerized choreography. Actually, the lectrue is little more than an apology for the previous night's dance piece. Besides the problems that often accompany a dance performance (the venue was switched at the last moment, and a suitable floor for the dancers was never installed), there were technical difficulties in the creation of the piece.

The choreography program itself was tedious to work with: every movement of every limb had to be analyzed using an abbreviated form of Labanotation, a notoriously difficult dance-notation scheme. The only parameter it dealt with well was time. "Its applications are mostly educational," says Thomson, "such as biomechanics and hospital clinical work. A production company in L.A. is using it to analyze motion patterns of a roomful of people to help them write film scripts."

Worst of all, she explains, the computer broke down part-way through the project, and she had only 60 hours at the machine to do what was her first experiment in computer choreography.

Over in the ballroom, Barry Truax introduces us to PODX, the synthesizing language he wrote for his lab at Simon Fraser University on the outskirts of Vancourver. He has a few important points to make: "The music we hear today is incredibly traditional—as if 50 years of experimental music never happened. We now have the ability to design the process of composition. Among the tools we can use is the incorporation of randomness in meaningful ways."

One of the more interesting functions of Truax's program is developing "tendency masks:" parameters within which random values can be generated. The boundaries can change over time, so that, for example, a piece can start out with a series of random pitches in a low octave, and gradually get higher, without sacrificing the random quality of the sound. A special application of the tendency mask is a "trajectory map," which indicates left-to-right and front-to-back location in space of a sound event.

Back at the Media Centre, the lecture hall is once again packed, this time for a MIDI demonstration by Ralph Dyck, a well-known Los Angeles studio musician (Elton John, Toto, Average White Band), and now also a designer for Roland. On stage with him are assorted synthesizers, a couple of Roland electronic pianos, and an IBM PC. In a laid-back, sardonic tone, he tells us that he has been "kluging" synthesizer interfaces for years, but since each design was unique to a specific application, they were all "dead ends." MIDI, he hopes, will change all that. "What you are seeing now is already obsolete," he says. "It's slow, it has no editing capabilities, and it uses only one data channel."

For Dyck's first demonstration, he plays on the piano keyboard, but we hear the notes from one of the synthesizers. The second demo is a piece recorded on the computer and played on the piano. He won't tell us who recorded it, but after a few bars it becomes obvious: Oscar Peterson. "He's digitized," Dyck smiles. "We can analyze his playing at any time, slowing it down without changing the pitch.

"With MIDI, the producer and the synthesist can get together at home with a rough mix, and work out the voicings and the parts, and then record all of them into a microcomputer. When the musician gets into the studio, all he has to do is set up and push the Start button."

The third demonstration manages to convince almost everybody. Dyck sets up two synthesizers, one generating brass sounds, the other strings, and instructs them to respond to key-velocity data at two different levels. He plays a chord progression on the piano, then repeats it a little louder. The brass comes in, giving the sound a nice fat character and spreading it out across the stereo image. Then he plays it again, still louder, and the strings an octave above and below soar. The audience, having just experienced a new definition for the phrase "conducting from the keyboard," quietly freaks out.

Tuesday Night: Out Of This World

The MacMillan Planetarium, across a narrow channel from downtown Vancouver, has just reopened. For the past several months, asbestos insulation was being removed, and the technical staff has taken the opportunity to redo all of the sound and visual systems. In the downstairs lounge, conference delegates line up to buy tickets for the wine-and-beer cash bar while they stuff themselves on obscenely rich (and free) cakes and chocolates. After an hour or so, the whole crowd moves upstairs for the specially commissioned planetarium show.

But the view of the sunset over the city is spectacular, so many of us figure we can wait for the second show. The planetarium staff have pulled out a bunch of stock

slides and fired up a couple of lasers, but even given the quickie-production approach, the show is pretty impressive. The first piece of music is "Phoné" by the absent John Chowning, which has an interesting story behind it but to the untrained ear is a collection of computer bleeps and bloops. The last piece, on the other hand, grabs everybody.

"Love in the Asylum," by Michael McNabb, may be the most emotionally effective piece of electronic music (computer or no) I have ever heard. String-like pulses build to a frightening climax, horrifying pseudo-human cries emanate from various corners of the dome, and the whole thing finally collapses into a beautifully crafted pseudo-calliope. This last creates the impression you would get hearing a calliope at a great distance, but perfectly clearly—like an audio afterimage. Charles Ives would be proud.

The visuals are just fine, too: green and red lasers chase each other around, patterning higher and tighter as the music builds, and then disappear, leaving a grainy, sepia-toned 360-degree image of a sleazy country carnival. Syntauri software designer Robin Jigour whispers to me in the darkness that this is not McNabb's best piece. I'm not at all sure I want to hear his best.

After the show, everyone crowds around the planetarium's new computerized image console, and the operator, obviously delighted at the attention, launches into a zippy dissertation on its workings.

Wednesday Morning: Gourmet Food For Thought

The program promises "When is it art, and what is technology doing to it?" certainly a question for the ages. First up is Chicago graphic artist Joan Truckenbrod, who gives us an overview of the state of computer graphics. It is important, she says, for artists to "fool the systems—to keep a perspective beyond what the machinery can do." She also notes that "absorbing the character of the system—like jaggies, color changes on film, Xerox distortions—can help determine structural elements."

The next speaker is composer Herbert Brün who, after 20 years in the field, is one of the undisputed fathers of computer music. Brün speaks with a thick German accent, but his comman of language is described by one observer as "way beyond English." The way he uses his adopted tongue is highly reminiscent of Victor Borge—full of outrageous puns, bitter irony, and wild similes—but unlike that Great Dane, this man is dead serious.

"With most compositional systems," he contends, "it's difficult to avoid drones, sequences, and infinite loops. Music V (a popular mainframe composition program) is

ingenious, but it helps to perpetuate existing compositional techniques, which are obsolete."

In the process of creating an alternative, he decided "People who are always squeaky-cleaning never see the message written in the dust." Therefore, he named his new composing language "Sawdust."

"I don't like sentences like 'You're late, Herbert,' or 'I told you so,'" he proclaims. "I can't shoot the people who say them, so I decided to bury the phrases alive; musicologists won't touch anything that's buried alive." He proceeds to play a piece composed with Sawdust called "I Told You so," which consists of little FM-like structures that follow the spoken pattern of that hated phrase. Unfortunately, the sound system is breaking up something fierce, so he stops the tape. "Some other time," he mutters.

He is not done. The audience fires questions at him, like "What about aesthetics?" "Aesthetics is the listener liking himself in the presence of art," he rejoins. "'I didn't like myself while I was listening to your piece,' is the beginning of a worthwhile discussion. 'Your piece is lousy,' is not."

David Em, traveler on the Trans Jovian Pipeline, et al, talks about "demystifying and demythifying" the computer. "It's not that the technology is not available for 'organic' art," he says, "it's more a consideration of who's been using it—mostly engineers building bridges.

"The computer is good at grids, radials, and replication. It's like The Force: it controls you, but obeys your commands. Ten years ago, I never thought that in 1983 I'd be playing with grids."

Wednesday Afternoon: Last Dance

In the Cinema at the Media Centre, Bob Moog is giving a brief history of control devices for electronic instruments. "Leon Theremin experimented with different control devices," he says. "The sound-producing circuits were not as important as the electromechanical devices used to control them. He devised a dance platform whose capacitance varied with how much of the dancer's body was on the floor. Unfortunately, he couldn't find any dancers who could 'carry a tune,' and Theremin players were not a graceful bunch. Apparently, the only performances was by Clara Rockmore, who played *Ave Maria* by standing up and sitting down."

He then talks about his current work. "By the late '70s," he says, "the big guys had gone into making synthesizers. We didn't want to go head-to-head with them, so we picked a small corner of the market: gesture controllers."

He shows a Trazer: a cursor controller that responds to finger position on a tablet. He has been working, he says, on putting such a controller on each key of a keyboard. "It's a close as you can think of to using all of the functions of the finger: it's sensitive to left-to-right, front-to-back, and up-and-down position, as well as the force of the motion." The scanning program for the keyboard is so complex, he says, that so far the largest working model he has made has only eight keys.

Bill Buxton then offers the opinion that the only way to get support for new music systems is to call them something else. On a pre-produced videotape he makes the case for Drum, his touch tablet that refused to cooperate Monday night. On the tape he discusses only home computer, industrial, and engineering applications, not music.

Rensselaer Polytechnic Institute video freak Tom DeWitt follows, discussing a system that generates images with live action. Dancers on a stage wear small infrared generators whose motion is picked up and processed by fixed sensors. A variation on it, called "Painter Power," written for the Apple, lets the movement of the dancer control the direction of movement of video brush strokes, the character of which are predetermined by an artist.

It is this last program that we get to see in action. A dancer flits around the stage, while thick colored lines fill a large projection screen behind her. Moog and Buxton make weird noises on their various devices, which all seem to be working for a change.

Epilogue

And so Digicon comes to a close. Although Cindy Noakes is exhausted, and although she says the attendance figures didn't fulfill her "dream scenario," she is mightily pleased.

"Art and music people were talking to each other," she says. "I heard someone say, 'Boy, I would have stayed on the same track the rest of my life if I hadn't met the guy sitting next to me.'" And of course, that is what it is all about. Computer artists and musicians are a solitary bunch, and any opportunity for them to come out of their basement laboratories and see what everyone else is doing is welcome. "I don't know if Vancouver was ready for this," she says. "But this one won't be the last. And we can't see giving it over to somebody else to do—that's like giving away your baby." A

few weeks after it is all over, she calls me to announce that Digicon II will take place in Vancouver, in August, 1985. She makes me promise to show up.

And I'm pretty tired too. Now I go home and digest 100 pages of notes, no doubt exhausting the capacity of my word processor. I also have some ideas about tricking my AlphaSyntauri into making sounds it is not supposed to be able to. But first, I think I'll head for those mountains.