# Chroma

*Newsletter of the Australian Computer Music Association*
*PO Box 561 Healesville Vic 3777*

**Number 1**
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## In This Issue



Finally... *Chroma*, the first issue of the ACMA Newsletter. As you know, we intend to get a quarterly newsletter out, but getting this first issue done has been quite a task. *Chroma* is going to reflect the interests of active members of the Association. That is, it will consist of members' contributions. This issue has been assembled from the contributions of a few; the next issue will contain a lot more, by more people. So consider this as a call for contributions. What kind of stuff would be useful?

Articles (say a description of a composition, your particular interest, whatever) letters, interviews, reviews (book, software, recordings, products etc.), 'news' of events, concerts and the like, directory contributions (resources, organisations), link up requests (anyone know where/who/what/how/when etc.?), invitations for collaborations. Closing date for contributions to the next *Chroma* is 31 July. If you intend to have something included, please telephone Graeme Gerrard on (03) 344 7457 BH.

## Annual General Meeting

The first AGM of the Association will be held on Monday 19 June 7.00pm in the Heinze Room of the Faculty of Music, University of Melbourne. All members (and prospective members) are welcome. We need to elect a Committee and discuss various possibilities for the Association. Please try to be there. If you won't be able to make it, but wish to nominate for a position on the Committee, don't be shy about nominating yourself. Nominations close on Friday 16 June. Send to ACMA, Box 561, Healesville, 3777.

## WORKING WITH THE TAPE MEDIUM

*- David Hirst*

Contemplating the position(s) of electronic music within the performance spectrum has always been a difficult task, and a source of preoccupation in the work of many composers and performers. Production of electronic music for radio or live electronic performance provides few difficulties in relation to the philosophy of communication with an audience. With live electronic instruments, models of performer action and audience reaction may be borrowed from the acoustic instrument performance tradition, and radio production carries within it an inherent assumption of intimacy between the medium and the listener.

Composition for the medium of tape has created problems in the concert performance situation for over thirty years. Audience reaction to these tape concerts has been mixed, but a common feature is the longing for the human to human interaction associated with traditional acoustic instrument performance practice.

The difficulties associated with tape performances are reduced in multimedia performances. The dance community, for example, has embraced tape music with a fervour exemplified by the performance, in some centres, of Graeme Murphy's Vast to Barry Conyngham's prerecorded orchestral sounds. Below I have set out a recent example of my own involvement with another art form, in the hope that it may encourage others to explore connections with other media and prompt fellow ACMA members to share recent multimedia experiences.

### NAMELESSNESS

"And when you asked, as all history classes ask, as all history classes should ask, What is the point of history? Why history? Why the past? I used to say... But your 'Why?' gives the answer. Your demand for explanation gives an explanation. Isn't this seeking of reasons itself inevitably an historical process, since it must work backwards from what came after to what came before? And so long as we have this itch for explanations, must we not always carry around with us this cumbersome but precious bag of clues called history." Swift (1983a)

In early 1988 visual artist Peter Cripps approached me to work on NAMELESSNESS. The play NAMELESSNESS and its accompanying theatre installation represent

one of a number of large, long term projects that Peter has worked on since the mid-seventies. He is constructing a personal archival documentation of this work, and it is this practice which attracted him to the work of Percy Grainger, who constructed a museum of his own work in Melbourne. A common interest in Grainger's Free Music led to the inclusion of electronic music in NAMELESSNESS.

A commonality in our approach to work also resulted in the collaboration on NAMELESSNESS. The project can be compared to that of the researcher, releasing from time to time, scientific papers of work-in-progress. In his approach to visual art, Cripps' art studio has become a laboratory. This is very simpatico with my working methods within the electronic music studio.

The art market demands stylistic continuity from the artist, or a 'signature style'. However, Cripps was attracted to and influenced by conceptual art. As such, his work coheres through the ideas and concepts which underpin it, rather than through style. Compare the minimalist wooden museum models with the socialist realism of the Chinese worker backdrop, which both appear in NAMELESSNESS. Conceptual art implies the experience of time, space and material rather than their representation in the form of objects, a position which is empathetic with music, which must move through time in order to be expressed. Thus references to musical minimalism appear along-side sound poetry, tonal works, and homages to Cage within the aural soundscape of NAMELESSNESS. Here, objects, props, and sound relate to ideas rather than vice versa.

The NAMELESSNESS of the title, when translated for music, becomes "timelessness", the eternal present. In one sense the play and its theatre are a performance art museum with performing exhibits. The past, with special reference to twentieth century music's experimentalist tradition, becomes reinterpreted in the present, hence the eternal present.

A resultant by-product of histories and museums is a fact/fiction distinction that is not as clear as some may desire. Thus, history goes in many directions at once:

"It goes backwards as it goes forwards. It loops. It takes detours. Do not fall into the illusion that history is a well disciplined and unflagging column marching unswervingly into the future. Do you remember, I asked you a riddle - how does a man move? One step forward, one step back ( and sometimes a step to the side ). Is this absurd? No. Because if he never took that step forward...". Swift (1983b)

NAMELESSNESS has appeared at Hobart's Centre for the Arts, Melbourne's Australian Centre for Contemporary Art, Brisbanes's Institute of Modern Art, and will be performed on four consecutive days beginning Thursday 1 June, 1989 at the Art Gallery of NSW, and thereafter as an installation exhibition. The Epilogue from NAMELESSNESS can be heard on the NMA 6 compilation tape.

Swift, Graham. 1983a. Waterland Picador, London. p 92. ( ...quoting Tom Crick the history teacher).

Swift, Graham. 1983b. Op. cit. p. 117.

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## FOCM

In 1987 the Friends Of Contemporary Music was formed in Hobart to encourage the composition and performance of new, preferably Australian, works.

Following a very successful concert in 1988, which included Martin Wesley-Smith's *For Marimba and Tape*, FOCM has expanded its season in 1989 to include a concert of works that employ the electronic medium called "Electronic Alternatives".

If you have any ideas or works that could be included in this concert then contact:

Amanda Wojtowicz
FOCM
c/- Centre for Education
University of Tasmania
GPO Box 252C
Hobart TAS 7001

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### H.M.S.L

H.M.S.L. (Hierarchical Music Specification Language) is a music composition and performance programming language, which offers the user an environment for advanced experimentation in composition, cognition, perception, performance and electronic music. It is an object oriented set of extensions to the Forth programming language, and runs on Amiga and Macintosh computers. H.M.S.L. is fully extensible and customizable by the user, as it comes with full source code. (from Frog Peak Music, Box 9911, Oakland, California 94613, USA)

I've just taken delivery of H.M.S.L. and am beginning to explore it. I would be interested to hear of other's experiences through the ACMA Newsletter, and likewise keep you posted on my experiences as they unfold. [Larry Polansky, one of the co-authors of H.M.S.L. will be in Melbourne in August for a performance of one of his compositions by the Astra Chamber Society.]

David Hirst ph. (03) 479 1223

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## VMEbus DACs

Creative Strategies Pty. Ltd. has recently released their DAC-001 VMEbus digital audio system. This high performance VMEbus system provides 8 channels of 4 times oversampled CD quality audio digital to analogue conversion and digital to digital audio conversion. Enquiries should be directed to Creative Strategies Pty. Ltd. PO Box 635 Lane Cove, Sydney, 2066 ph. (02) 427-5526.

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## Multitasking MIDI: call for discussion

Now that personal computers are moving into multitasking we can look forward to patching MIDI programs together by software, rather than through that 5 pin serial cable. This assumes that all the MIDI programs running together on a given computer don't get in each others way when they try to send or receive MIDI data - that's right, we

need a software interface between the MIDI port and all the programs which access it.

If any program takes control of the port directly, rather than though the interface, then unpredictable and probably unamusing behaviour would result. The question is, can we set a standard for this software interface?

If you've any thoughts on this, please write to the Newsletter. One multitasking MIDI protocol has been put into the public domain by Bill Barton (Pregnant Badger Software, USA). This program suite has been written for the Amiga, and is available on the Fisch disks and the Amicus disks. (If anyone has used these, or has access to them, we want to know about it!) The Pregnant Badger protocol uses the Amiga operating system's message queue in the usual way to manage i/o. I've heard this criticised as unreliable, by one party, who would prefer to bypass the operating system scheduled call and use a hardware interrupt for i/o. Mind you, this guy isn't offering to write the software. My interest is to see how far we can make a MIDI multitasking protocol independant of the computer it's destined for. Looking forward to your comments.

- *Douglas Ray* ph. (03) 484 5641
(ACSNET ray@latcs1.oz)

## Audio Systems for the Macintosh

*- Graeme Gerrard*

As the speed and power of the Macintosh series increases, so also does the availability of add-on hardware for "professional quality" audio work. Defining "professional quality" is more difficult than one might at first think; skilful handling of domestic or toy gear can produce good results. But 16 bit samples with 44.1kHz to 48kHz sample rates per channel has become the minimum professional standard in most commercially available audio equipment, from CD's, to RDAT's to digital amplifiers. Therefore, we'll ignore 8 bit systems, like MacRecorder and the associated SoundEdit software.

Probably the best known system for the Macintosh (and the most expensive) is the Dyaxis System from Integrated Media Systems (IMS).

The Dyaxis machine houses a large capacity hard disk with D/A & A/D converters and filters in a separate box that connects to the Macintosh via SCSI. It enables real-time transfer to and from the disk, under control from the Mac. Samples are 16 bit, stereo, variable sample rates including 44.1 and 48kHz. Software is available for visual wave form editing, mixing, looping, resampling, wave form resynthesis etc. (Alchemy), and for setting up play and edit lists, SMPTE control etc. (Q-Sheet).

The new Dyaxis machine has a number of digital I/O formats as well as analog (> 92db SNR). These include AES/EBU, Sony SDIF 2(1610), S/PDIF (CD/RDAT), enabling digital transfer of data direct from PCM, CD's or RDAT's.

You'll have to contact IMS for prices on their latest products, but $AUS10,000 would have got you a modest Dyaxis about a year ago.

IMS
1552 Laurel St
San Carlos, CA 94070
USA
ph. (415) 592 8055
FAX (415) 593 4379

Micro Technology Unlimited (MTU) make a basic D/A, A/D box, with antialiasing filters, called the Digisound-16. This system has been available for some years now for a variety of computers, but only recently for the Mac (II only). They offer a 16 bit stereo system with 10K, 20K, 25K, 44K and 48K sample rates, with > 90db SNR. Cost of a basic system is around $US4000, and includes a pair of filter modules for your chosen sample rate (@$US200 ea.), and software for recording and playback to memory and disk.

Other systems that you can use Digisound-16 with are IBM (PC/AT), SUN 3 & 4, and DEC Microvax II, Micro-11, PDP and VAX computers.

Incidentally, MTU offer several complete audio workstation packages, including their own system based on an 80386, the Micro Audio 3200. It includes 1M RAM, 100M HD, 80387 maths coprocessor, A/D and D/A with filters for 48kHz. Software included: CMIX, PCMIX, CSOUND, CCSS and MIXER.

Micro Technology Unlimited
156 Wind Chime Crt
PO Box 21061
Raleigh, NC 27619-1061
USA
ph (919) 870 0344

GW Instruments, Inc. have a wide range of hardware and software products for the Mac, for general data acquisition applications, including physics, medicine, meteorology, robotics etc, as well as speech and music processing. Their systems consist basically, of a NuBus card (MacII; with adaptor for SE), with special purpose "daughter boards", like 12 or 16 bit A/D or D/A, filtering, timestamping.

One option includes sampling direct to disk at a maximum sampling rate of 150kHz. Software range is extensive, and includes real time spectral analysis and oscillator simulation, LPC and FFT time slice windows, fundamental frequency plots, energy plots, spectrograms etc. They claim their library of functions is compatible with LightspeedC, MPW C, Pascal and Fortran, Turbo Pascal, Microsoft QuickBASIC and other languages.

A MacADIOS II board, with 2 16 bit DAC's, 1 16 bit ADC, filters and software is around $US4000. MacSpeech Lab II is their speech analysis and processing package for the MacII, It comes with a Data Acquisition Board, Antialiasing Filter Board, mic, speaker, record and play amplifiers, cable and documentation for $US6999. The SE version is $US3550.

GW Instruments, Inc.
35 Medford St

Somerville, MA 02143, or
PO Box 2145
Cambridge, MA 02141
USA
ph. (617) 625 4096
FAX (617) 625 1322

The final two products make use of the Motorola M56000/1 DSP chips. These are relatively cheap processors, capable of very fast (34MHz), accurate (56 bit) arithmetic, and I/O.

Digidesign markets a card for the II and SE series Mac's called the Sound Accelerator. It offers 16 bit stereo D to A conversion at rates up to 44.1kHz, (higher rates are possible with an external clock). It comes bundled with Softsynth, an additive and FM synthesis package. Sound files created with Softsynth can be sent via MIDI to a wide range of popular samplers. This package comes for $US1295 retail.

Other software compatible with the Sound Accelerator include Digidesign's Sound Designer, a wave form editing/processing package and Turbosynth, a general sound synthesis and treatment program where delays, oscillators, filters, spectrum inverters etc. are represented by icons on the desktop, and can be patched together with a patch cord tool, sort of like a graphic version of MUSIC V.

Digidesign have announced a new package called Sound Tools, which consists of a Sound Accelerator, ADin (an A/D box), and Sound Designer II. This new version of Sound Designer is multi-channel, with direct to disk recording, editing, parametric and graphic EQ, FFT analysis, time expansion/compression, multiple loops of sound file segments, crossfades, cuing of sound files for playback etc. Prices: Sound Designer $US395, (Sound Designer II, around $US1300?), ADin $US999, Turbosynth $US349.

Digidesign have also announced a forthcoming AES/EBU interface, which plugs into their Sound Accelerator for direct digital transfer of audio signals to AES/EBU compatible equipment, such as RDAT's.

Digidesign Inc.
1360 Willow Road, Suite 101
Menlo Park, CA 94025
ph (415) 327 8811
FAX (415) 327 0777

Another DSP chip based system is MaxAudio from Southworth Music Systems (The JamBox people.) This is a set of NuBus cards, each with a special purpose. The A/D-D/A conversion card ($US1395 retail) uses a M56000 chip and sigma-delta modulation to convert 20 bit samples. This gives 104db SNR on record and 120db SNR on playback. It includes ROM routines for record and playback, spectral analysis, data compression, digital filtering. A Phase Vocoder implementation will be also be available.

A second AES/EBU Digital Audio/SMPTE generator card ($US995) enables digital transfers to and from DAT and CD, and includes decimation and interpolation programs for sample rate conversion between 44.1kHz and 48kHz. This card can also generate and read SMPTE. There is also a Video SMPTE card for video syncing($US795); both PAL and NTSC formats are available.

The fourth type of card is the Quad DSP card, with 4 X 56000's on each, running at a clock speed of 34MHz ($US1395 retail). These cards can be configured in various ways, and are capable of performing a whole range of audio processing functions, including reverberation, additive synthesis and other DSP functions in real time.

Southworth Music Systems, Inc.
91 Ann Lee Rd
Harvard, MA 01451
ph (617) 772 9471

Rumour only: Apple is releasing their own professional quality audio board for the Mac. Surprisingly, it will use an AT & T DSP chip instead of a Motorola chip. The board, which has 16 bit stereo A/D and D/A capability and 44.1kHz sampling rate per channel, will cost below $US3500, when it comes out. This looks like a "catch up" on the NeXT machine, at an added cost.

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## The "vs" Voice Synth Sequencer

*-Douglas Ray*

This project started from the need to write a program to control a speech synthesiser. I'd built a basic speech synth and needed software to drive it. To get the thing running with a minimum of effort I first wrote a program that copied lines of text directly from the terminal to the synth, with the option of repeating the last line.

Even with this crude level of functionality, it was immediately apparent that the thing had a potential for musical performance. It was fun to use. It was quick. It was versatile. I invited some friends to play with it, and they spontaneously found ways of using it that I hadn't thought of. Carl Polke became a virtuoso speech synth artist in ten minutes. I used this program, "quicktalk", in making a synthetic speech montage in a multimedia performance ("...adds life": performed at La Trobe University 22nd June '88; Linden Gallery, 3rd July '88). The montage was a tape piece: IBM pc's are not conveniently portable.

The speech synth source sounds for the tape interlude came from one evenings work, which turned out to be very much play: I was playing on variations in various advertising slogans, rearranging the words and syllables. Type it in and hear the result ... it was often surprising. So, with this experience, I started contemplating a program that would exploit this mode of using the speech synth. I wanted to emphasise the improvisatory aspects of the thing - to make a system flexible enough to uncover surprises, but with controls sufficiently concise and fast to enhance the responsive, playful character it had inspired. I decided on the following elements:

*to be able to edit a block while it is playing

*a command interface structured around single key

combinations, for speed.

*a flexible and powerful text editing facility

*the ability to play blocks of sound ranging from single syllables to lines of text;

*sequencing functions: specifying numbers of repetitions, or indefinite cycling, of a given block or series of blocks of sound

*to be able to send text directly from the terminal to the synth in the midst of playing a pre-edited block.

To be able to first define a phonetic sound unit, and then incorporate that unit in a string of other text, my solution was

*a named buffer environment, with the capability of quoting another buffer within a given buffer. Using single character labels for each buffer, any buffer can be concisely quoted within another buffer. (Note that this is a recursive facility.)

My bias is towards command-driven rather than mouse-driven control: given a competent typist, and familiarity with the program, the command driven approach is faster than the mouse/menu system. As text was the thing to be manipulated, it seemed appropriate to model the user input on a text editing program. I chose the UNIX 'vi' editor, for its power and conciseness.

Vi's flexibility comes from a well designed instruction set. Most instructions can be applied in about five comprehensive modes: by line number (or range of numbers), by object (letter, word, sentence, paragraph), by content, by symbolic label ('marked' points in the text), and by screen position or file position. To date, movement by content (text searching) and normal cursor movement have been implemented.

Vs's potential efficiency comes from single key (mnemonic) commands, and the ability to define a string of commands as a single key "macro". Potential efficiency becomes real efficiency only with practice! The trade-off for this flexibility and efficiency is a user interface that can be described as anything from arcane to cryptic. The only way to learn vs, and vi, is to use it. And this is applicable to any real-time performance software: if one wants the quickest, most responsive control of a computer, and still wants an interface addressing a large number of parameters, there is no substitute for single key commands. And this implies an interface that takes time and practice to learn. It's easy to add menus and rodents, but they won't let you use the computer at a comparable speed.

At the moment the program is maybe half done.A functional minimum subset of vi's editing facilities has been implemented; a window display environment effected, using the "curses" display package, so it can be ported from the IBM to a real computer; a rudimentary device interface completed for the GI SPO-256/CTS-256 speech synth, and a help facility best described as marginal.

By fluke I know another IBM user who has the same speech synth as I, and this intrepid person is having a go at the version 0.00 prototype of vs. I want to port the program to the Amiga "real soon now"and am looking for Amiga owners who can make machine and (ANSI) C-compilers available..If anyone has another voice synth they'd like to try vs with, I'd be happy to look at it. *Thornbury 21 April*

## Warren Burt Talks About Music, Dance and the 3DIS Collaboration

*-with Alistair Riddell*

From the 15th to the 18th of March 1989, the 'Hear the dance, See the music' collaborative dance/music performances took place at St Martins Theatre in the Melbourne suburb of South Yarra. The collaborators were, musicians Ros Bandt and Warren Burt, and dancer/choreographers Shonna Innes, Jane Refshauge and Sylvia Staehli.

In this interview, made shortly after the performance series, Warren Burt talks about the 3DIS (3 Dimensional Interactive Space) system developed by Simon Veitch of Perceptive Systems Pty. Ltd., and reflects upon the pragmatic, philosophic and aesthetic implications of the project and music technology in general.

AR Warren, could you begin by explaining what the 3DIS system is and how it works?

WB 3DIS is a computer vision system which actually accepts many kinds of sensory input not just vision. Based on the input, the system can make decisions and send signals to other equipment usually external to 3DIS itself.

In the application we've been working on [the one used for the 'Hear the Dance, See the Music' collaboration] very small, about matchbox size, CCD [Charged Coupled Device] video cameras look at an area. This area is continually updated into a frame grabber thirty times a second. So each video frame gets put into computer memory, analysed, and then the next frame comes along and so on. The whole area can be seen on a TV monitor and with a mouse you can draw rectangles around particular areas. So if, for example, on the screen there was a dark vase on a white table you could draw a rectangle around the dark vase. What the computer does is to add up the brightness levels of all the pixels [picture elements] inside the box area called a 'gang' (from a number of points acting in unison), averages them and you get the average brightness level for the gang. With each new frame every 30th of a second, the computer updates the brightness level and compares this with the brightness level at the beginning. When the brightness level changes more than the amount you set in the program then something will happen. For example, we've got this black vase on the table and I put my Caucasian hand in front of the vase, the light level changes dramatically. If the average level was say 120, it might now be 30. If we have a brightness threshold of more than 20 levels of brightness triggering something off, the computer now knows to trigger something off.

If we have more than one camera looking at a scene from different angles we can actually define space three dimensionally. So, if for example we had a camera directly in front of the vase and one aimed 90 degrees away on the left and I put my hand only in front of the vase you might not get a signal to do anything because there was no change in the other camera. However, if I put my hand around the vase and the brightness level changed on both cameras we would now get a signal. So you could have any areas that you can define with a video camera, divided into any 3 dimensional space and activities triggered off when the light levels

there is absolutely no tactile feedback whatsoever. This was exacerbated in the case of percussion sounds which are so incredibly tactile. So it took a long time for all of us to come to terms with making tactile sounds in a very non-tactile way. This may be a contradiction in the design of the system or it might also be an aspect of the system.

In 'Mungo', which was probably the most creative use of the system in terms of a one to one use of it, that is, where one gesture produces one sound, they actually got beyond that [non-tactile interaction] by saying OK, there is a particular sound at this particular spot. I have to travel through this spot to make that sound. Now what motion can I make here which is going express something about the piece and it is not really germane to the production of the sound. So, for example, there was a wind chime sound that was produced by two different dancers at different times using very different gestures. The gesture therefore was not physically linked the way of making the sound. Hopefully, the audience can get their eyes educated enough so they can see the correspondence of place and sound production.

That was the biggest difficulty - the system is very non-tactile. No one had ever worked like this before so we had nothing to go on. We had to improvise our methods of working every step of the way.

**AR** Since dance involves movement which is the rate of change between objects - sometimes slow, sometimes fast - it seems that velocity detection would be an important part of the system but it does not appear to have it..

**WB** Actually it does. There is a thing called 'motion sensitivity'. Basically the system not only looks at the background light level it actually updates its memory of it, and at a particular rate. If, for example, the sun were to come out, gangs would not go off even though the brightness level had changed because the system is updating the average level. It's something to do with that that it can actually detect motion and detect velocity. I'm not au fait with the algorithms, you'd have to ask Simon Veitch about it for more detail.

We weren't using that at all in the pieces. We actually found for our purposes that motion sensitivity was the least useful of the algorithms.

**AR** On that point about your work, what do you see as future performance developments with 3DIS? For example, larger spaces, more dancers, etc. How do you feel that would explore the possibilities of the system?

**WB** All of the above would be interesting. The most interesting thing for me, we really only explored in the last piece 'Random' on the program. In every piece, up until that, one gesture triggered off one sound. In 'Free Trade Zones' there was a random delay on the start of a sound so it didn't seem like one gesture producing one sound but it still in fact was.

In 'Random' what happened was that the system produced a random selection of sounds for which the dancer's presence aided in the production but didn't actually produce it. That is to say, the presence of a dancer would mean that there would be a higher probability of a sound occurring but an individual dancer couldn't trigger anything off on their own. In some parts of the piece the system actually played itself, relying on random light level changes. That's the most exciting direction in the future, as far as I'm concerned. The other people in the project might have very different priorities.

In 'Random' the dancers were free from having to be in a particular place at a particular time to make a particular sound. They could move much more freely. In the future I could see the 3DIS system controlling say something like 'Sound Globs' or 'M' and the brightness of a dancers costume would then be influencing the distribution of notes. So that if a dancer was closer to the front of the stage they would get more high notes than low notes, and closer to the back of the stage, more low notes than high notes. That's a very simplistic idea but something of that order. That way they could be free to move around the space and free to explore all those "Dancerly" things which don't rely on precision like being in one place at one time to make one sound. Then I think we would have a more fertile relationship between dance and music where the dance could be free but its general sense of motion, its general sense of direction would be influencing the general compositional logic of the piece.

**AR** On that point, do you think that given the trend in performer/machine interaction we've arrived at a point where we are looking beyond the traditional compositional approaches, both conceptual and physical, of computer music?

**WB** The first thing to say there is about the nature of the keyboard. Once you introduce 'keyboard splitting' the keyboard changes and it becomes merely a series of switches to turn on and off any sound. The logic of low to high is broken. Therefore, any physical controller can produce any sound. It would be funny, for example, to have a band - in the pop sense - which had a MIDI wind controller, a MIDI keyboard, a set of MIDI drum pads and a MIDI guitar, none of which were producing instrumental sounds. All of the above could be used as controllers for anything; so wind pressure could control whatever.

At the moment 3DIS is a system in its infancy and so the MIDI controls are not as developed as they will be next week for example. However, any MIDI continuous controller would be very interesting to work with. At the moment I would say that any sort of performer interface that can be developed, even when they're fairly simplistic as 3DIS was for this dance concert, is something to be explored because the whole nature of producing sounds is now changing. The nature of what sort of gesture produces what sort of sound. So when I was saying earlier that the kinesthetic nature of say a percussion sound has been broken, that's something we feel because we've been doing it for eighty thousand years - hitting drums. That now becomes an option and not a necessity. So any sort of physical controller that can confuse the issue at this point, is going to be very valuable.

**AR** But the actual percussion sound is artificial. OK, it sounds like a percussion sound but in its own right it is only a psychological illusion on the listener's part that they associate the sound with a percussion instrument.

**WB** Right. However we've got to remember that the psychological thing on the listener's part is indeed the very stuff of music perception. That's what we're dealing

with.

In terms of compositional logic - it's interesting because I don't think of myself as that much of a performer yet, although a lot of my work is live performance of electronics. So, in terms of compositional logics, all these performance things while seeming like a side issue to me are actually fairly central, in that, you're actually also altering the compositional logics if you're altering the physiology of the production of the sound. So we may have to begin to think very differently about composing.

Well, for example, in this project neither Ros Bandt nor myself could actually think like composers and nor could the three dancers think like choreographers. We found we had to evolve a new way of thinking that was very co-operative and came out of ideas and aspects of the system that would then lead to the works.

AR That's a very interesting point. What you are saying is that technology has afforded us a break or new opportunity to explore or step away from the traditional processes and rethink for a moment what we are actually doing. I think that more should be made of that in the development of computer music systems. It seems to me that people are still approaching technology with all the gathered techniques and psychology from traditional instruments.

WB Right. Since 1968 when I first started working with technology, I've always felt that there was clearly a difference between the logic of writing for say a Clarinet and the logic of using a synthesizer. Its called 'good compositional practice', i.e. being idiomatic for your instrument and a Clarinet is Clarinet and a synthesizer is a synthesizer. To try and put the logic of one on the other seems rather silly.

Now with the marvelous transonicalism (a pun on transexualism) of computers as they exist today where anything can be a simulacra of anything else, this may be getting mixed up a lot. Getting mixed up is perhaps very healthy but even so the fact that we are faced with all these simulacra means we have to think differently. I'll be controversial and I'll say that instrumental writing is pretty much of a dead issue for me anyway. Even when I now write for acoustic instruments I'm thinking with an electronic music head which in my case has led to simpler instrument lines not more complicated ones.

AR Are there any new works or further performances with the 3DIS system in the near future?

WB At the moment I don't know. With the dance project, if someone comes up with about $50,000 I'll do it. But with the 'Hear the dance, See the music' project there was an enormous amount of effort, a budget of only $26,000 - which was 5 months of rehearsal and two weeks in the theatre.

Just to give some idea of expenses, for all of us who live in the fairy land of music, to walk into that tiny theatre [St Martins in South Yarra] cost a thousand a week; every hour you were in there you had to pay a technician $13. Unless certain very stringent labour rules were gone over in which case it went quickly to time and half, and double time. So all in all it cost us about $4,900 to be in that theatre for two weeks. So we're not talking small budgets here. Theatre and dance especially gobble money ferociously.

That we put on a project like that for only $26,000 which lasted almost 5 months, is indeed astonishingly small budget. We were all working for bargain rates because we wanted to work on this project this way and sociologically it was very important for us, as it was a real collective endeavour.

It take a lot of bureaucratic nonsense to get that money together and I'm not at the moment feeling like more bureaucratic nonsense to get the money together again. However, if someone were to come up with the money I would be more than happy to do the project again.

As for the 3DIS system itself there are a couple of projects coming up which seem very interesting. One is a project involving Chris Mann which will be at the Australian Centre for Contemporary Art in July.

Chris Mann currently wants the 3DIS system looking at a bowl of gold fish and gangs to be set up inside the bowl which simulate the shape of the human vocal cavity. So a gang which would be near the front of this imaginary mouth would be linked to HMSL and produce a weighted percentage which might usually result in the phoneme 'f'. Whereas a gang at the back would produce a percentage weighted towards say an 'argh' sound which comes from the back of the throat. So the gold fish swimming around would produce this scatter of phonemes. He'll also be doing other things. He is thinking of having a person read a text of Rene Descartes which would be on a tape loop and then digital signal processing - just like simple pitch shifting and things - of that would be produced by the position of the fish. An old piece of Chris' is called 'Position as Argument' and this is developing that even further where there is a physical position which becomes the argument the piece advances.

AR It's good to see that the system is being exploited in different areas and different applications as such.

WB Yea, well the system itself - giving Simon credit where credit is due - is general purpose. It's a very simple principal, right, light levels change, you get a signal. As long as one can come up with the proper sorts of signals one can do pretty much what one wants.

It's a matter of then compositionally thinking - not necessarily the end product but the nature of the process. Which is what we found during the dance rehearsals continually. We had to come back to - OK, I see when I'm wearing this colour clothing in this kind of light, the shading I'm getting is producing a signal which is not the kind I want therefore how do I have to react to get the kind of light sensitivity I want and the kind of sound change I want?

Despite the fact that computers are a very head orientated thing and dance is a very body orientated thing we found in this project that we really couldn't have a mind/body split. Although we had to be using our minds a hell of a lot more than we might be for normal choreography - in an analytical way that is to say. We were continually referring to what the system did yet the system kept influencing the way we used our bodies. I don't know if it is an integration of mind and body but it's sure a process where both had to be used continually in feeding back into each other.

AR From your observations could you give a

synopsis on the views of performing artists and musicians to the project? Were there clear differences expressed from those two groups?

**WB** I haven't actually tallied up who said what yet. I did notice that generally from musicians so far I've had many more comments that are related to the technology and generally from dancers I've had many more comments that are related to say kinesthetics, but it seems simply to be a result of what field people are in - on the most superficial level. Some of the most interesting comments on the emotional content of the evening have been from musicians. So I really don't know, as of yet, if people are actually approaching it differently.

What we found out at the very beginning of the process was that dancers said "we don't need anything. We can just go out there with a naked body and make art". Whereas a musician, unless they are only singing always needs technology. The minute you've got a stick and a drum you're stuck with technology. Even with a stick you're stuck with technology.

So there was that basic thing of the dancers feeling that they were above the use of tools and thus condescending to use them. Whereas for the musicians it was just another tool which may or may not be applicable to this particular process. So musicians generally have the view that they have to use technology of some sort, where as dancers don't.