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CIRCUITS CHINA
CAVITIES CAROLYN
CAROLS COMPUTERS
CASSETTES CORRESPODENCE

CARL VINE'S "Patent Little Marvel"

The "Patent Little Marvel" (PLM) is a composition/device: a machine that was designed with a view to its compositional potential. One of the starting points in the design was to eliminate the traditional concept of a sound generator as a device that accepts instructions for the generation of a specific sound or group of sounds. The PLM is programmed in its own (machine) terms, and although you can direct overall characteristic (static/dynamic, simple/complex, average harmonic content), the device itself determines *details* of sound production. The PLM is therefore not entirely predictable, and although this has certain drawbacks, the advantage is an enormous range of sound production with the barest minimum of programming. The basic waveform generator in the PLM is (figure A).

This circuit is a "pseudo-random generator". For any one setting of the bottom row of switches a pattern of O's and 1's is shifted through the shift register as the clock pulses. For instance, if only switch 8 is closed, then the following pattern is formed (figure B).

The bottom row of switches therefore govern the number of clock pulses before the pattern repeats (the *length* of the sequence) and the pattern within the sequence. They will be called the "Sequence switches". It is possible with an 8-bit register to have a sequence that does not repeat for a maximum of 255 clock pulses.

In the previous example (sequence switch 8 closed), if, of the top row of switches, only the first one is closed, then the output of the voltage follower will be HIGH for 8 clock pulses then LOW for the next 8. (Look at the output of the first stage in the shift register.) If, however, all of the top row of switches are closed, then the voltage follower will SUM the number of 1's in the shift register at each clock pulse (figure C).

The top row of switches act as a sort of filter on the waveform from the voltage follower, and will be referred to as the "filter switches". If the clock rate is greater than about 40 cps, the output of the voltage follower can be heard as a tone, and the filtering action of the filter switches easily demonstrated. With a clock rate of less than 30 cps, the pseudo-random sequence generator can be used as a sequential control voltage source.

The main sophistication I have added to the PLM is multiplexing that replaces both the sequence and filter switches with digital logic (figure D).

This would be ludicrous if there weren't some interesting side-effects. A PLM containing 4 pseudo-random sequence generators would require 8 sets of 8 switches (64 switches), but having multiplexed one set of 8 switches, it is relatively simple (and inexpensive) to arrange a series of digital memories to *record* multiplexed signals corresponding to different settings of the 8 switches (figure E).
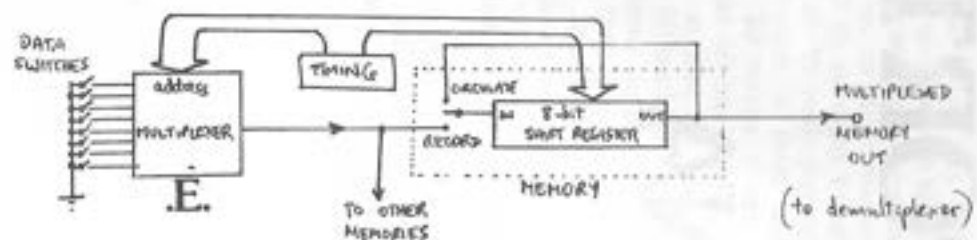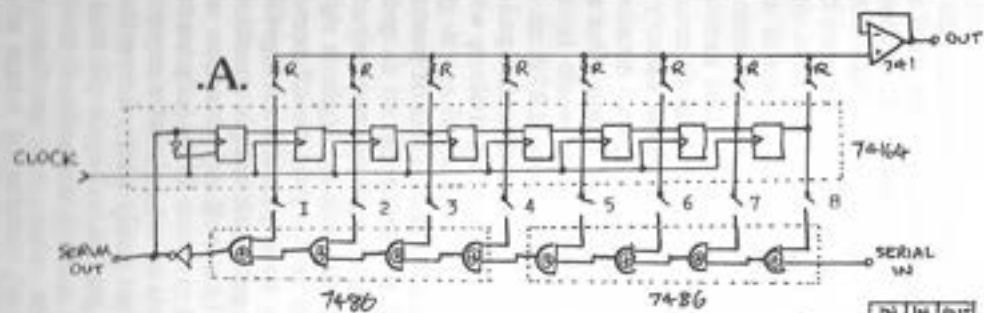
Each memory then replaces a set of 8 switches. To operate, set the Data switches to the desired position, and momentarily switch the desired memory to "record", returning to "circulate" to rotate the information through the shift register. This is very easy to manipulate, and very economical on switches, but the side-effects don't end there. Within the PLM, *any* set of 8 outputs can be multiplexed . . . such as the outputs of the shift register in each pseudo-random sequence generator . . . and any two multiplex signals can be manipulated against each other simply by passing them through a digital gate (AND, OR, NAND, NOR, EX—OR etc). In this way one pseudo-random sequence generator can have a multiplexed output (corresponding to the state of its shift register) which is ANDed (say) with a memory controlling another generator, so the first generator will control, at a digital level, the functioning of the second. Leaving the PLM "open-wired" (everything is connected by jack-plugs) allows an immense variety of interconnection: generators controlling other generators, "chains" of control between a number of generators, non-multiplexed digital signals being de-multiplexed for semi-random switching, and so on. The complete PLM looks like this (figure F).

All multiplexed signals are compatible, and the clock signals come from four voltage-controlled oscillators that may be controlled by the voltage outputs of the pseudo-random sequence generators. The PLM is obviously a very flexible device, although it is still in prototype form, and I have been unable to make a definitive decision on its full musical potential. (ie. the whole project may have failed). This article, then, is not submitted as a constructional paper, but in the hope that some of the underlying concepts and design procedures may be useful to others.
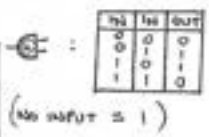
Carl Vine.
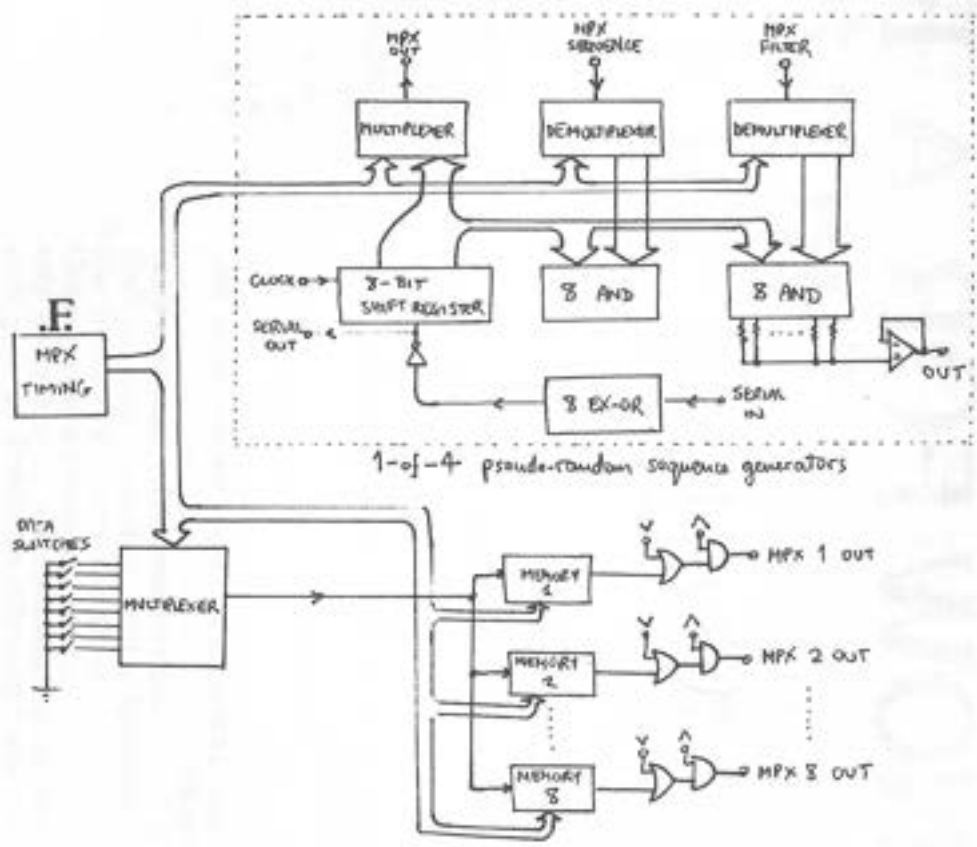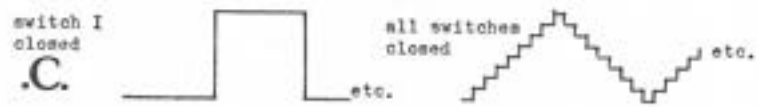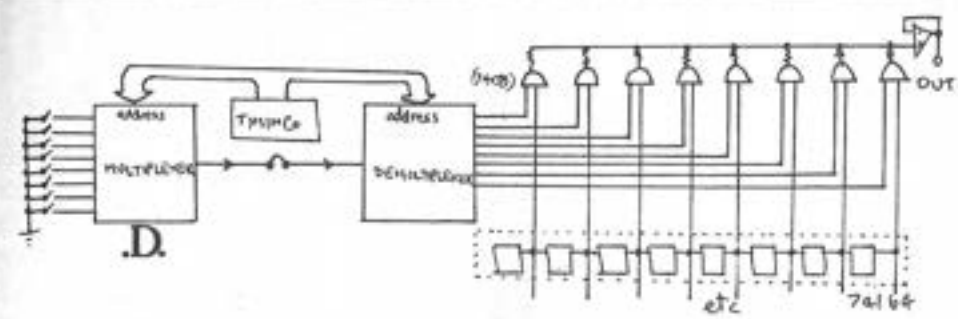2/12/77.

a sound generator that's not entirely predictable

CARL VINE
P L M

.A.

CLOCK · OUT · 741 · R R R R R R R R · 7464 · SERIAL IN · SERIAL OUT · 7486 · 7486

in1	in2	out
0	0	0
0	I	I
I	0	I
I	I	0

(no input = 1)

.B.

CLOCK PULSE	OUTPUTS FROM SHIFT REGISTER								SERIAL OUT	N° OF I's
	1	2	3	4	5	6	7	8		
0	0	0	0	0	0	0	0	0	I	0
1	I	0	0	0	0	0	0	0	I	1
2	I	I	0	0	0	0	0	0	I	2
3	I	I	I	0	0	0	0	0	I	3
4	I	I	I	I	0	0	0	0	I	4
5	I	I	I	I	I	0	0	0	I	5
6	I	I	I	I	I	I	0	0	I	6
7	I	I	I	I	I	I	I	0	I	7
8	I	I	I	I	I	I	I	I	0	8
9	0	I	I	I	I	I	I	I	0	7
10	0	0	I	I	I	I	I	I	0	6
11	0	0	0	I	I	I	I	I	0	5
12	0	0	0	0	I	I	I	I	0	4
13	0	0	0	0	0	I	I	I	0	3
14	0	0	0	0	0	0	I	I	0	2
15	0	0	0	0	0	0	0	I	0	1
16	0	0	0	0	0	0	0	0	I	0
17	I	0	0	0	0	0	0	0	I	I

etc.

.C.

switch I closed · etc. · all switches closed · etc.

.D.

MULTIPLEXER · address · TIMING · address · DEMULTIPLEXER · (740B) · OUT · 7464 · etc

.E.

DATA SWITCHES · address · MULTIPLEXER · TIMING · CIRCULATE · RECORD · 8-bit SHIFT REGISTER · in · out · MEMORY · MULTIPLEXED MEMORY OUT · (to demultiplexer) · TO OTHER MEMORIES

.F.

MPX TIMING · MPX OUT · MPX SEQUENCE · MPX FILTER · MULTIPLEXER · DEMULTIPLEXER · DEMULTIPLEXER · CLOCK · 8-BIT SHIFT REGISTER · SERIAL OUT · 8 AND · 8 AND · OUT · 8 EX-OR · SERIAL IN

1-of-4 pseudo-random sequence generators

DATA SWITCHES · MULTIPLEXER · MEMORY 1 · MPX 1 OUT · MEMORY 2 · MPX 2 OUT · MEMORY 8 · MPX 8 OUT

NOW FOR A REPORT FROM MANN IN CHINA

an opportunist on crossing out the case : mind the spelling

on trying to sell credit to he who has none : if I had the time,
              I'd ask you

to commit your sums you need take the fingers out of your mouth
 but to say nothing you need suck — better suck on profit, dummy, I'm told

some you bin stelin doubt
what is it didn't do nothin whole lot?

letters, cheque, all that job then we then we tmorra can ask nothin
 b describe

: I bin don know round here what you says then tellin tellin nothin
all crook
: shaddup crazy

a causal flirt with what ya got wont place intension in trying to find out what t keep — n you can always claim tactics, treat mean as some sort exchange t gloss th sumptions . . .
y gotta show how — tll m y goina too — so's understood th point — not all this bate breath waitin round, but knowin, be n abled to analyse, t work . . .
n with what y got t change th getting — sure, but maybe y better learn it first, survive, get up in th morning . . . there's only one heaven they say, n if this aint it I aint goin, yeah, one heaven, n I got a job, way of sayin please n thankyou n it takes 400,000 people t keep me in this job, but while we all say please n thankyou someone's goin t get paid . . n 400,000, it's only on paper, but so's th ads, th bureaucrats, th money, th profits, th language . . dunno what y need t make a language ceptin people n I got all th unemployed says I caint wrong, so

thing is words is like facts n facts is had n th word got out . .
it's a mugs game bein shopped in the party
Edison said he invented a business machine
Al Jolson made talkies thru th schlock of bothering how to pension soliliquies — ads
123 please pending
with and things
& hope t spit
th soon & late man
a casualty of tense
something clatter
propositions that have got to get into the language as statements

ok couple of examples ah spen an spen an afternoon wif a provincial opera company oh right so first thing I went to I saw this opera right ah since the since the gang of our about um Mrs Mao number 1 you know being arrested an ah executed by the KMT 1930 right ok so this opera comes out first 2 acts about her bit an then th last act is um her goin dyin goin to heaven an bein welcome t heaven by th moon goddess an th god of immortality I dunno so couple days later oh in th meantime get t spen a day in th um in some factory y know n there's this big thing on um amateur art right an in th factory we get taken over all amateur art activities that people work in th factory been doin especially since 1972 ah y know like a lot of sort of like social realist paintings poems literature thats all exhibited along with th books an what happen to it like where it got published an what happen to it in terms of posters distribution an that sort of stuff right so ah get t spen this time with this provincial opera company an its same people that did this other show right they spent couple hours sorta givin us all sorts f stories of y know how they put shows together that sort stuff right ah get t ask couple questions at th end of it things like well my question obviously was stuff like ok y know I basically wanna know what sort of amateur art activities anyones involved in ah they werent really sure y know they understood th question so I asked again no this is a professional company yeah I understand that I said ah I wanna know what non professional activities anyones involved outside of hours what sort of amateur art stuff exactly like we saw at th

factory th other day right yeah ok they understood th question an ah all hysterical stuff anarchy broke loose they were absolutely mortally offended ah no no no no noone was involved in amateur art stuff th sidelight t that which is also interesting is that ah th yeah payscales in China the 8 scale wage system is from about 20 to 50 bucks a month 20 bucks y can live quite comfortably 20 bucks 50 bucks Id be a real good salary about as high as that 2½ times ah th difference right ah 100 ah 50 bucks a month is 2½ times it used t be 3 3½ times theyre narrowin th gapp of th difference so that theres some sorta progress right ah top salaries found out in this opera company were 90 bucks a month fuckin outrageous its yeah art is yeah y know so ah oh well y know there were well th leadin th leadin lady actress had a like silk scarf an like th secretary of th revolutionary committee of th opera wore very very fancy duds had parker pen an yeah very snazzy dresser ok so weve got those sort of problems y know oh I asked th same problem question later at at at th radio station at Peking radio sort of given a revolutionary society ah y know revolutionary content is very important ok what changes have they noticed as to form an what work they doin towards revolutionising what experiments they doin an th answer in both cases was content s th most important yeah ok given that y know what are they doin about uhuh nothin so th other story which is which is sorta y know which is also confusing but ah th Ming tombs oh comin comin back out the Ming t oh th Ming tombs right there were 30000 people guarding thats 30000 soldiers guarding 60000 workers for a period of 6 tears t build this tomb ah they spent as much on this tomb ah as itt would cost t feed 1 million people for 6 years right um which is sort of information which is reasonably hard t find out um not reasonably hard there s th big thing like th legitimisation of the legitimation of history um of traditional culture ah theyve just been reprinted Lao Tzu an y know an an th Tien Wen an Tien Duei an all the since 76 the um like all these early mystical texts um quite spurious weird rebuilding since the cultural revolution like summer palace ah y know all th Ming tomb sorta stuff ah so coming back out of th Ming tombs walkin back out across th courtyard with th local guide chappie ah he says ah what is it about you n I says what is it about me n he says th way you walk I said y how do I walk so you walk like a like a like a leading cadre or a or a fat capitalist what he says you walk very arrogantly so th th th its not that its this I m interested in this thing leading cadre fat capitalist I mean I think youre due for a bout of self criticism this is crazy ah yeah Han chauvanism is still really strong y know ah about th minorities y know people ah come from like ah minorities come to China a bit ah y know apart from things like that oh its incredible place like hyper relaxed y know ah absolutely relaxed absolutely civilised most relaxed place Ive ever been ah what stuff like I dunno oh funny sort of thing in this relation is is th everyones really proud about having a watch I dont really understand that one I mean theres some sort of contradiction there its weird ah y know punctuality is hyper important ah doen ah doesnt make sense everyone gets up at 6 thirty y know working day is ah y know its its a standard

8 hour day if youre working in th city ah if youre in th country y work longer ah but a standard 8 hour day 6 days a week very lot of of y know very routine stuff um strange y know th preoccupation with watches in that sort of situation y know maybe theres something universalising about th the privatization of time like theres sort of y know its weird ah an th competition y know kids competition lot of rote stuff still in school which is very weird um ok um theres other sort of stuff bein like um gettin gettin um um behind right get gettin in ah behind th desk where this blokes doin th passports y know visas n stuff n stampin behind th desk theres 2 photos of a bloke gettin his passport stamped um oh first first things oh yeah I mean standard standard stuff of y know ah as soon as you hit the bridge people start gettin their y know photos taken with their first red guard ah things happening like y cant figure out like the notion of production as theory um gettin o ge arriving at the station at at Canton um y y know those white characters on red banners y know those big things r right I was really knocked out ah to find there was ah they were pinned paper characters on this red banner oh yeah th other yeah goin goin round in th bus I point I whats that I said to the guard oh n he says oh thats thats a y know a mercedes benz yeah b but what is it oh thats a a german car ah yeah jus didn work incredible number of mercs though an toyotas an th Chinese make a limosine like which is a big cadillac very heavy sort of wooden dashboard stuff crazy stuff yeah th other thing like all this thing on on the rebuilding of since since the since the red guards um y know th y know th historical sort of sites y know n the summer palace sort of stuff y know the assumption an then the protection of of of the history which was quite sort of specifically oppressive y know like making oppression ah sort of making oppression a museum piece its sortv of like like legitimising it in sme way oh other hits were sort of yeah were th ah I saw y know they they were th standard issue sort of 2 paintings y know y know y the the twin portraits y know th bobsey twins of of of Mao n Hua right ah an there are some posters where they are actually printed on the same paper theyre not theyre not 2 which are hung y know next next t one another its th one print ah an one I saw which was a painting y know 2 2 paintings portraits of the 2 chairmen an it was at an airport an it was it was very weird it was th only one I ever saw where where Mao was had this sort of smile that he was yeah a flip flop n how t fold he who is asked questions is made an example of in a concert in Canton th pieces most enamoured by th audience the ones which they actually clapped an shaddup for I mean they knew why they were coming n thats what they came to hear was a ol man river and um my mother was Irish so we got a change which is not recognizable ah an weve got description of th change which is examples the incompetance of examples yeah th classic example bein personal so you use th obsolete in pursuit of th incompetant ah stories an exists from from examples so I mean real fav real favours can only ever be incomplete ah there is a grammar of words there is a grammar of words that is to say theres statement and there are joke jokes we have dialogue and definition is a strategy

Mann continued..

of of distribution socks t go fesrering a failures not as good as th real thing police are th states right t complain coppers are th ideology of distribution distribution is th pragmatics of waste you coin noise but y buy silence wispering is th technology of th dummy that is if y can speak back y got nothin t say n modal syllogismis only ever an apology a piddler of syntax a suck of punctuation n its still all the same ol shit why is it that th only people that shoot are those that either know or have enough time to reload an obsequious line t jam bread a slag of coppers t strut we dunno where th chuck come from wes jus brickies th absolute badest crazy models is middle class complaint mother can hit harder n your teacher can you this bigger hes a littler went this is the itsesty it lets went get big aint not got just about this much little bit wes good n clingier sure sure n pull their ears t make m forget n hes jusso late n I took fright t get look like so aint mother he bin found out somewhere round here you damn rightI you were here right oh somewhere like at whatya useta cra pesson up screwy irrelevance of what tongue nothin slag why ask for descriptions or excuses if youve got questions spose its like rent is th understudy of politics 3 yards for show definitions of history an observations of progress we no longer have to school th books in upper n lower case n

heres me tryin t come t grips with how do y say dole chuck it go n set th rent ok thats what th wash said its not what words but words rather its not what but words like for example given words th rest is silence without words y only have articulation not what but words a description come off t lets went home y better like it or y quit pussycat t smoke n when asked why conversation he replied with a murmer n there are those of course that maintain that vocabulary is a grammar y lookn for ball t play with try his shut yr bum y gotta be you kiddin brother you like adenda or adendas to gossip but then n there are those say some excuses work th embarrassing thing is that all cons are pragmatic if there is a tactic in relevance it seems t have escaped you n at this very moment y see even time is comparative y see n if I give examples theyve gotta be part way competent which means no were not tryin t prove that an understanding is a revolutionary tautology ay you dull bitch you makin out a fallacious grammar of sorts a phonology of dribblers how arrogant can you get agreeing with somebody else n teasin aint changin th peculiar thing about masochism is that its always serious n t screw th system is only vindicti ve necrophilia for todays pig latin is tmorras copper th noise cure f stutterers

Chris Mann

GO ON, BUILD IT YOURSELF

This is the first part of a series of articles dealing with electronic hardware for sound generation and processing, hopefully covering general audio electronic theory, voltage control (VC) techniques, digital and hybrid computers, methods of modular construction and general hints on where to buy components or ready-made modules, debugging etc.

Since I wish to share the information at my disposal with you in the most mutually satisfying manner, I shall try to avoid repetition of material which can be readily accessed at public and university libraries. To this end, we'll try to give comprehensive bibliographies, references and discographies, to open the eyes and ears of the uninitiated to the world of electronic music. This issue will outline in summary form some of the data and circuits which are available. We can provide:—

a) the original source of data, and where to get it;
b) a reprint or photocopy through the mail (for a charge);
c) a complete reprint in the *New Music Newspaper.*
  Let us know which you prefer. So, briefly, we can tell you about:

Signal Generation
audio oscillators, sine, square function generations, sine, square, triangle, pulse, noise generators video pattern generators, simple oscillating devices.

Voltage Controlled Signal Generation
— simple 1 transistor low cost VCO
— basic v.c. multivibrator 4 transistor
— one chip oscillators, sine, square, triangle of 8038 or XR2206 type
— sophisticated high stability wide range types .03HZ — 250 HZ, 1V/OCT sine, triangle, saw, pulse, linear FM.

Processing Circuits
— audio amplifiers, mixers, power amps
— voltage controlled amplifiers, 3 transistor type, up to 12dB/volt balanced type with 70dB range.
— guitarist type distortion devices
— active filters 20HZ—20K. Highpass, lowpass
— VC filter Moog ladder type 20dB/dec.
VC filters with HP, LP, BP and VCQ
VCF's with voltage control of cutoff slope

— delay modules using bucket brigade chips
— phasers, flangers
- analog shift registers, artificial reverb.
— envelope generators
  simple AD 4 transistor
  ADSR type
  ADSR type with VC of all variables
— pitch followers, envelope followers
— frequency shifters
— video synthesis techniques,
  PAL encoders
  PAL decoders
  colorizers
— microcomputer techniques in hybrid and video synthesis.

Please write C/- La Trobe University Music Department, Bundoora, Vic. 3083 and state your interests and preferences. Should numbers be interested in a certain project or module, then printed circuits may be designed and sold cheaply, also components may be bought in bulk at considerable saving. If you don't understand some of the terms used above, let us know, and we'll explain them. So, it's over to you until the next issue.

Julian Driscoll.

COATHANGERS & T.V. CIRCUITS

Coathanger Event — Environment - Exhibition.
November 12–13
Clifton Hill Community Music Centre
Music for Winds & T.V. Circuits by Ros Bandt and Martin Harris.
Surfaces and Cavities by Ros Bandt.

A number of recent programs staged at the Organ Factory have provided unusually close contact with the intimate lives of performers. These have included Warren Burt's Music for the Amateur Pianist, my own Songs without Foundation— and Coathanger Exhibition by Ros Bandt and Martin Harris.

Coathanger Event ("exhibition, in the circumstances. appears an unfortunate choice of words) was an attempt to involve people in self-exploration using as medium a number of carefully prepared environments. The coathangers were of course the main focus of the explorations-in-sound-and-touch and the environments themselves, given the titles: Music for Winds and Circuits; Surfaces and Cavities.

Music for Winds and Circuits consisted of a fascinating curtain of hangers strung across one of the rooms in the top floor of the Organ Factory, attached to one another and to polysytrene resonators so that whenever one set of them was struck a chain-reaction sound event would be triggered. Ros provided a great deal of encouragement for participants by showing how she liked to manipulate the environment, herself. Part of the Winds and Circuits piece (perhaps the "circuits" part?) were two disused television sets in front of which Martin Harris had positioned colour wheels. By means of an apparently simple electronic system impulses from struck coathangers were amplified and transferred in different colours to the screens. People participating were able to explore the possibilities inherent in such a set-up.

Willing explorers were also asked to investigate Surfaces and Cavities, the environment most suited to the term, exhibition. Visually this was very satisfying, containing various sheets of suspended material and a rusty but sonically very alive bell-all arranged to appear seductive to eye as well as ear. As a personal sound exploration — or to some, discovery! — it was more structured than Winds and Circuits, and guests could read elaborate instructions whose detail was nicely offset by Ros Bandt's characteristic enthusiasm for her own work. The environment was indeed of her own making, but the focal idea of the piece-strings attached to hangers to be used as beaters, and inserted in the ears was far from new. Nevertheless it was very much in keeping with the artist's current interest in resonance and provided, for a short time at least, a rare opportunity to compare the varying resonance characteristics of her Surfaces and Cavities.

In retrospect, Coathanger Exhibition was an event difficult to categorise. Perhaps, in both an aesthetic and practical sense, it was to remain an art exhibit until activated, and it is in this that its strengths and weaknesses are to be found. Documentation serves a useful purpose here. Considering that, over the two days in which the display was left open to the public about sixty people visited, Coathanger was a success: it was bringing the crowds. What is, on the other hand, almost impossible to quanitify is the amount of things people actually learned — about the behaviour of sounds — about themselves.

This then brings us back to the whole purpose behind the "exhibition". As an artist, Ros will not be drawn on the particular contribution she is, or believes to be, making to the art world, and by this I mean the complex though clearly defined world of our perceptions. If self-discovery was the aim of her and Martin Harris' work it's proof is to remain sadly inaccessible, or confined to the people who did or did not succeed in discovering something important. Without such information the mounting of any similar project in the future may seem of doubtful significance. The enthusiasm may be there AND the workmanship — but all shaped into a smile of unruffled good faith.

Robin Teese.

'enthusiastic explorations in sound and touch'

Music for Winds & TV Circuits
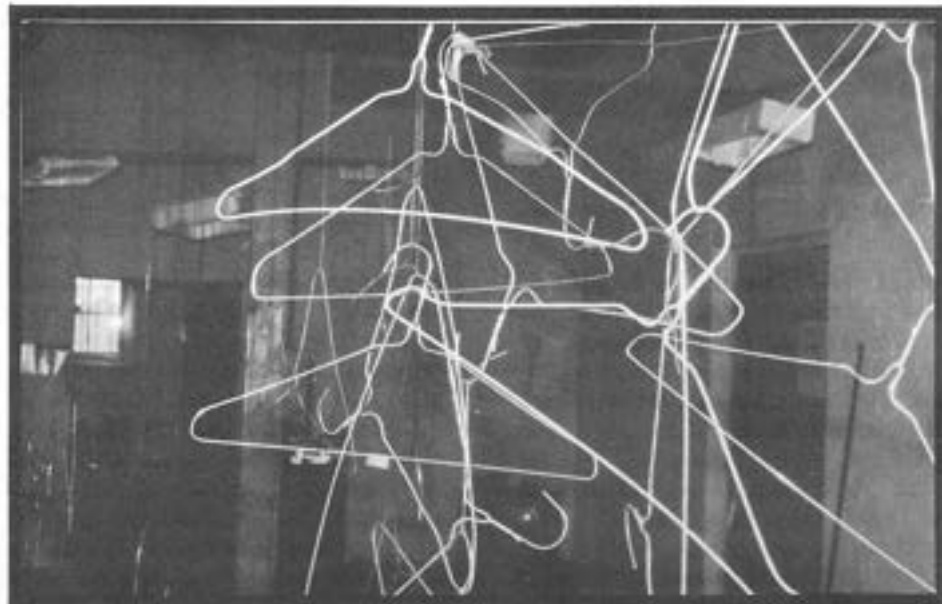
LOOK UP DOWN THROUGH
TOUCH
LISTEN
MOVE
ACTIVATE
STRIKE
RUSTLE
REACT
CHANGE
REPEAT
ARRANGE

An environmental sound-sculpture for air-currents, T.V. images and audience participation.

LISTEN
— listen to the room mobile as a whole
— listen to resonated sounds amplified by polystyrene resonators
— listen to electronically amplified sounds

FIND
— sound contingencies-coathanger —coathanger resonator — T.V — amplifier.
— sound/sight contingencies

MODIFY
— either contingency, walk through coathangers, strike them, strike resonators, set mobiles in motion, modify images on TVs by turning settings or striking contingent mobiles.
— delete, induce modifications to the sounds. Turn controls, colour or black and white.

RECONSIDER
— junk* as a viable source for creating visual and sonic art.

LISTEN   EXPERIMENT
CREATE
DO IT YOURSELF

* none of the TVs used function as normal. Martin says "add an extra deflector and you have kinetic art".

Surfaces and Cavities

A LISTENING PATHWAY
Work your way through the maze of 39 different surfaces, taking a coathanger attached with string held in your ears. Strike a surface with the coathanger. Listen. Focus. Listen again.
EVERY SOUND BORN HAS A BEGINNING A MIDDLE AND AN END.
TAKE TIME TO LISTEN, REALLY LISTEN . . . IT'S MAGIC.
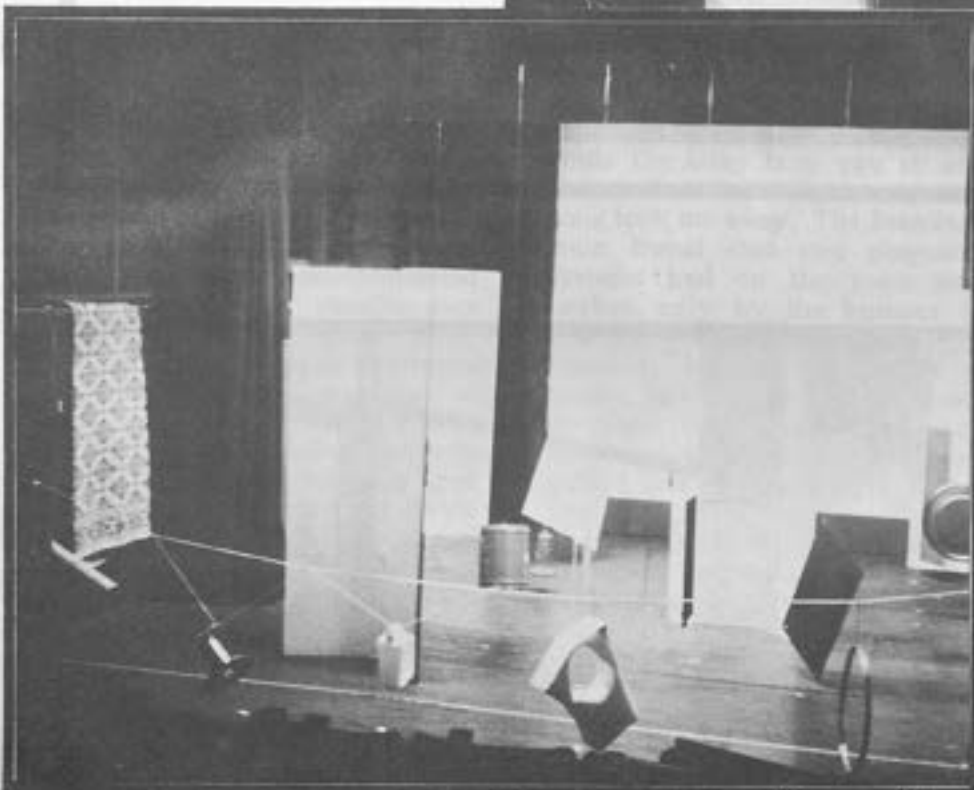
Listen to the inside of your body — it is unique, a resonating chamber for listening. How does your cavernous body relate to the different surfaces, textures, densities? Man is an extremely adaptable creature.

Learn how to use every environment in a personally meaningful way. Make your own piece. Find your own pathway. Choose. Discriminate. Utilise time, opportunity, space, people and make a positive contribution for yourself and for society.

YOUR BODY AND YOUR IRRATIONAL SUBJECTIVITY NEED NOT BE A PRISON.

Ros Bandt.

ANNONOMATIONS III
Carolyn Thompson

Keyboard / or piano strings

Solo or in communication with any number of keyboard instruments / may be played on non-keyboard instruments within arpeggionic expansion.

Instructions for performance:

(1) Sections 1 and 2 plus Coda are to be played with right hand only first time in given common time metre.

(2) The structure (1 + 2 + coda) is then to be played with both hands as many times as the performer pleases, using improvisation to make melodies from the given chordal structure. The patterns are to be used in all areas of the keyboard. Rhythm and space are at the will of the performer.

(3) Section 3 is to be improvised with expansion and contraction after (1 + 2 + coda) has been played to satisfaction. Continue section 3 to satisfaction.

(4) Finally play coda. The piece is then finished.

Carolyn Thompson
April 3, 1977.
Sydney.

SONGS WITHOUT FOUNDATION

Songs Without Foundation
November 20
Clifton Hill Community Music Centre
Composed and performed by Robin Teese.

For those born in the early 50's, Robin Teese's Sunday afternoon performance of "Songs without Foundation" provided a potpourri of adolescent memories. Pop songs, mainly from the early 60's were sung unaccompanied and overlaid by simultaneous cassette recording. The resulting collage had the social overtones its title suggests. Lyrics such as 'love is lovelier the second time around', 'don't throw bouquets at me', 'if it were mine to love you' were sung extremely sensitively conveying all the appeal originally intended by the song writers. Sixteen such songs were sung continuously, without a break, over and over, for two and a half hours and Robin's clear warm tone never faltered. It's a heart warming experience to hear all those mouldy oldies completely devoid of electronic media, devoid of the four bar introductions, echoing fragments and rhythmic accompaniment. The melodic phrases stood naked with solo voice its only foundation.

Forty-five minutes into the piece the cassette playbacks began. The innocence of the natural voice was gradually and increasingly desecrated by the build up of distortion. Juxtapositions. 'With both feet on the ground people will say we're in love I'll always be true the second time around it's more comfortable while I'm away from you all my loving what have they done to my song lock me away.' The Frankenstein threat that two playback systems had on the voice was broken only by the humour if not idiocy of two cassettes singing together. Maybe it'll be OK a quaver apart. Over a long period of time the process unfolded, becoming almost oppressively engulfing and the distortions of the final playback coupled with a black-caped dervish verged on the neurotic. The process seemed in itself to damage the initial fine points of the performance, the engaging socially relevant content and the high quality of talented vocal delivery.

We came away from the performance feeling dissatisfied; disappointed that a potentially good work was not as successfully realized as it might have been. A number of flaws can be singled out. The work was too long, measuring content against duration. The process as it unfolded was so obvious and predictable that it was hardly worth seeing it through to its conclusion. The various dramatic guises assumed seemed indulgent lip service to any dramatic ideal rather than an integral part of the whole.

Exotic influences and distortion pieces run the risk of being seen as fashion-conscious. We asked Robin about some of these things and his answers demonstrated a philosophical commitment to non-interference with the repercussions of his own actions: in this case passing responsibility onto the audience. However, under the circumstances such rationalization seems inadequate. In the performance situation, intense and constant attention was focused upon the composer/performer who made a strong social statement. It seemed rather as if insufficient consideration had been given to the work's physical realization. A more sensitive awareness and manipulation of the process of sound through time and the passive participant's experience could have made the work a much greater artistic achievement.

Ros Bandt
John Griffiths.

'a potpourri of adolescent memories ... manipulated and socially processed'

no:3 carols (1970)

no: 5 MARY MODER CUM AND SE

These three carols on early English texts are taken from a set of seven originally commissioned by the Vienna Boys Choir and first performed by them in Salzburg, Christmas 1970. All seven carols, which were written over a period of two or three years, retain both the form and spirit of the early English carol: Consequently the subject matter is by no means confined to Christmas, and we find texts for Lent, Easter, the Epiphany and individual saint's days in the several hundred extant examples available to us in the various C15 manuscripts. Thanks are due to my publisher — Hans Werwerka of *Edition Modern* in Munchen for allowing the carols to be printed in this newspaper.

AT MELBOURNE UNI THEY HOPE TO SOLVE COMPUTER QUERIES

co-ordinator: Barry Conyngham
chief researcher: Rex Harris
programmer: Jonathan Burns
hardware design: Jurijs Semkin, John Roe
technical: Les Craythorn
computer: Interdata 8/32
storage: 2 Ampex 40 megabyte diskdrives
terminal: Intercolour 2001
recorder: Sculley 4 track ½ inch
reproduction: 4 Philips motional feedback speakers.

This project is sponsored by The Department of Computer Science, the Faculty of Music, University of Melbourne Research Funds and a Grant under the Australian Research Grants Committee.

(a) Aims and significance of the Project

The aims of the project are to investigate (a) the direct synthesis of music by computer, (b) the replacement to some extent of the existing traditional music making ensembles, and (c) computer assistance of the process of organising and structuring a musical work.

The principles relating to producing music directly from a computer and enabling the power of a digital device to assist in the structuring of all types of sound were first enunciated at Bell Telephone Laboratories about 10 years ago.

Basically, a computer is used to generate samples at some supersonic frequency (typically 15 to 30 kHz) of an audio waveform. The samples in the form of numbers are subsequently used as input to a digital-to-analogue converter, the output of which, after amplification and filtering, is an audio frequency waveform. This may be played through a loudspeaker but, because the number of samples generated is too large to store permanently on a digital storage device, the waveform is usually recorded on an ordinary high quality tape recorder.

The program that causes the generation of the samples consists of a series of modules (unit generators) linked to form "instruments" which are "played" from a "score" written by the user. In addition, facilities are available to enable the user to specify in a simplified form patterns which are subsequently expanded and monitored in detail by established programming techniques.

Today there are still only a few centres in the world harnessing the computer to further the investigation of music and sound. One of the Principal Investigators, Barry Conyngham, acquired the technique while a Visiting Fellow at Princeton University, and researcher with post-doctoral status at the University of California at San Diego. He carried out further research at the University of Luminy, Institut de Recherche Musicale, France, where he worked with J.C. Risset, now at Institute for Research and Co-ordination Acoustics/Music (I.R.C.A.M.); he also collaborated briefly with John Chowning from the Stanford Artificial Intelligence Laboratory.

Recently, the power of direct synthesis was increased by Chowning's adaptation of the principle of frequency modulation in an attempt to recreate instrumental timbre accurately, and Conyngham has been involved in further experiments in this direction, synthesizing string, percussion and vocal sounds. Investigations have also been made into manipulation of the spatial domain by the use of multichannel reproduction, artificial reverberation and other sound location procedures. These elements were found to influence in a significant manner the success of recreating existing sounds.

Harris, who has a background in mathematics, numerical analysis and computer systems programming, became associated with this project shortly after Conyngham's arrival in Melbourne. In addition to assisting with local implementation of the program, he has commenced a study of the mathematics involved, as this aspect of the project is virtually untouched and has considerable potential for increasing the efficiency of analysis and generation of sounds.

It is the general aim of this project to further these investigations already begun by the two Principals.

In the view of the Principal Researchers, the significance of this project is far reaching. In the years ahead the creation of music will be more and more affected by technology. Already most of the music heard today is recorded and reproduced by electronic means, and the use of digital devices will further accelerate this trend. While traditional synthesizer techniques are able to produce unique sounds, the process of duplicating existing instru-

mental sounds is not well understood; however, significant progress towards this goal has been made by using the accuracy attainable with direct digital synthesis . Much basic research is still necessary into the ways of using the computer to assist in the reproduction, storage, and extension of music. What is the most efficient way of creating sound by computer? What are the minimum cues in the perception of a musical tone? How significant are reverberation, phase, Doppler shift, and transient amplitudes in the perceived reality of sound? What are the creative processes, and can they be sufficiently documented to be assisted by program? Perhaps the most important question of all, can the humanity and emotional spirit of man's musical expression be preserved as well as aided by his use of machines? We feel this project and other projects like it overseas may answer these questions. At this point it may be stated that this project is being carried out in close co-operation and communication with Risset and his research group at I.R.C.A.M., a government funded music research institute in Paris, and Chowning and his associates in the music research programme sponsored by the National Science Foundation at the Stanford Artificial Intelligence Laboratory, USA.

(b) Methods and techniques

In June 1976 Melbourne University became one of the few centres in the world to have such a project when a program for producing music was implemented by the Principal Researchers on an Interdata 8/32 computer in the Department of Computer Science. This system operated in two channels with a bandwidth of 7 kHz per channel. Since its implementation the program has been used by staff and students to synthesize compositions by traditional composers such as J.S. Bach, Mozart, and Richard Strauss.

Various real timbres such as brass, woodwind and percussion have been recreated and experiments made into the spectral content of these types of sounds. Compositional subroutines have been written and some preliminary work has been carried out to enable musician/users to create music in a language more accessible to them. Recently

a new version of the program based on developments started at I.R.C.A.M. was installed. The new program with more unit generators and the use of dynamic storage allocation allows a greater range of experimentation. In 1977 the fidelity of sound was increased to a maximum 20 kHz bandwidth and the full manipulation of space will be possible through the implementation of four channels.

The existing installation is moving towards a teaching and experimental aid that will allow composers and music researchers to create new, or recreate existing, musical works duplicating a full range of traditional instrumental timbres, thus to some extent replacing the expensive and complex operation of an orchestra. Extending this concept, instrumental sounds can be replaced or mutated easily and quickly into new and interesting forms while remaining connected to past acceptable sound sources, so that we can for example create trumpet-like violins, bell-like clarinets, and gong-like pianos.

The next two years (1978/9) will see further investigation with and of the system. Harris will examine at first hand latest developments in the field; (a) by applying standard software engineering techniques to the program, investigate ways of creating the strings of samples more efficiently; (b) incorporate Fast Fourier Transform techniques into the program, to enable display and analysis of the generated information; (c) design in conjunction with Conyngham an effective source language and oversee its implementation using current compiling techniques; and (d) investigate the mathematics initially through Bessel function spectral analysis, of some of the more complex sounds capable of generation by the program.

Conyngham will (a) continue his research into the use of F.M. techniques to have interactive prediction and verification of the creation of instrumental timbre via a graphic input device; (b) develop a program that will enable a composer to create compositions incorporating his own style and personality while being assisted in the construction and realisation by the machine; and (c) continue to investigate the accurate manipulation of sound in the spatial domain, as outlined above.

EXCITING POSSIBILITIES FOR REAL-TIME COMPOSITION USING YOUR OLD AND TINNY CASSETTE RECORDER

When a sound is recorded and then played back, many things have changed. 'High fidelity' is an extremely relative term — virtually every characteristic of the sound will be altered in some way. But even more important, the *context* of the sound will be changed. This distorted, just-like-being-there, better-than-the-real-thing musical world has changed our ears.

The very essence of electronic media is distortion. Futurism has become our constant sound condition.

The best electronic music to date has explored the distortive possibilities of the media: juxtaposition of the previously significant with the previously insignificant; delay and overlay systems; loops — the defiance of time and change — playing the same record twice; new sounds previously existing only in theory; spatial possibilities; and all the rest.

This is nice, but it is also expensive and tends to be elitist. Also the distortion/manipulation which occurs through mass dissemination by electronic means is alienating — people are being more and more removed from active participation in the PROCESS of music.

In light of the above, I find it impossible to separate socio-political responsibility from musical responsibility. The cultural processes music, electronics, and politics, would seem to me to be inseparable.

So I am interested in cassettes for many reasons:

1. They can be used to produce most of the musical effects of previous electronic systems. (See Warren Burt's article in this issue.)
2. They are cheap and readily available to everybody.
3. They make the distortion process obvious and accessible.
4. They are easy to operate.
5. They provide possibilities of record, rewind, fast-forward playback functions, and possibilities of complex spatial arrangement and rearrangement during live performance. Electronic music more easily becomes a theatrical process rather than a studio process.
6. There are great possibilities here for the assertion of involvement in process as a cultural value and this can be of enormous value to any music education program.

None of these things are possible to the same extent with any previous electronic equipment.

Ron Nagorcka.

AtomBomb & Son & Godzilla

Atom Bomb: An Opera in Three Parts. 1: Atom Bomb, 2: Son of Atom Bomb, 3: Atom Bomb Meets Godzilla.
Nov. 28, 29 & 30.
Clifton Hill Community Music Centre.
Composed by Ron Nagorcka.

Afterwards somebody commented that they would have preferreds to have simply heard rather than watched (as well) the performance of the first part of Atom Bomb. An interesting comment: what did it mean if an awareness of the processes, their *unavoidable presence*, subtracted from the work? For me it was the opposite: seeing the thing built made it accessible. Perhaps because I'm unfamiliar with 'new music'? Yet it did seem a work of unveiled processes (at least in performance), that it was a work *made* of unveiled, unveiling processes. That each person present was given a score was more than polite: it was to *make known* as much as possible. When at the end of each part the performers had gone and the cassettes played on they were *reiterating* the activity (as Walter Billeter said later, producing their own 'histories'), it was time, accompanied by the cassettes notation, to think back on the activity just witnessed. The comment? A desire for mystification? — ah pure sound, 'pure' work. Unencumbered by the 'worry' (anxiety in awareness?) of its method. i.e.: its 'easiness' or 'clumsiness' or 'chanceness' or 'skillfulness' of technique. Or the more revealed personalities of the performers? This all relates, of course, to Nagorcka's article in *New Music Newspaper 1* and the mini-debate in *New Music Newspaper 2*. And one presumes the first part of the work to be a practical manifestation of the thoughts briefly outlined in Nagorcka's article. (And the last and maybe 2nd part to be *of* the debates since some of the text seems to be quotes from the debate.) The instruments used (toy organs, toy xylophones, bells, wood blocks etcetera, and four cassette recorders) were simple and accessable. And the composition was essentially made of simple elements: the bomb chant itself, epigrammatic fragments, simple percussive sounds, and the 'folding back' of the performance by the recorders. Yet it was extremely intense work, demanding. (Yes, I have to admit, that if I had heard this work on the radio without seeing it I might not have been interested. That is a hypothesis: having seen it I am interested an and a purely audible performance *now* could not be). What happened to the epigrammatic fragments once introduced into the fabric of the work was indeed surprising (I'm reminded of Chris Mann's 'th funny thing about tautologies is that they are surprising'): some others seemed to sink beneath the activity, 'dieing out' as in a process of natural selection (question: how does this relate to Mao's 'Good ideas grow out of social practice'). And given the simpleness and accessibility of instruments and elements this is most likely happening: without the props of 'sophisticated' and mystifying structures, each thing introduced must sink or swim in the texture of the piece. It is useful to compare in this context the three parts of the opera, 'opera'. More complex elements were operating in both the 2nd and 3rd parts — or at least large structural elements were in operation. The second part I found the least compelling. It was the most improvisational in the sense that more decisions on the nature of the elements introduced were left to the performers. Five in all, I'm not sure how the purely 'musical' side of it behaved (it used more 'conventional' instruments, violin, guitar, flute, clavichord, accordian) but the verbal excursions proved almost banal. The performers seemed to be trying for 'jokes'. One of these was a reading of reports of the 'Lynch affair' — nowhere near as pertinent, or, surprisingly, as *particular*, as some of epigrams of the first part. Here I could have been tempted to ask for the light to be out and merely listen, but I could have just as easily asked for the thing to stop. Was it the work or the performers? I should imagine that within the aims and desires of Nagorcka's stance such separating would be beside the point. It would appear that the 'composition' exists only in relation to the 'performance' and although Son of Atom Bomb might fare better marginally with different performers, perhaps performers more adept or simply more thoughtful of verbal effectiveness, it is the base of the work itself that's to blame. Though to more fully articulate that I'd need more familiarity with music and its method than I have. The third part was an odd mixture of 'sophisticated structures'and simple elements. The actual score on paper made less sense to me than the other two. It was a much 'clearer' work. Maybe because it had only one performer. It was interesting to contrast this piece with the first: the 1st uses a multitude of simple small elements to build an intensity of activity, a very intricate going on, while the 3rd has a solid superstructure of three motives, prelude, Love Me Tender, and a prepared tape. Supplemented by simpler, 'little' motives, epigrammatic 'statements' and percussive sounds. The prelude was played on the clavichord. Yet while the 3rd was less 'intricate' than the first it was nonetheless still 'intense'. It occurs to me that the *restraint* of the elements, both verbal and musical, in 1 & 3 meant the activity was forced to take note and deal with them. Work towards some resolution of their energies. And in the 2nd part the unrestrained, the 'freedom' meant the performance is led to try and make *out side* itself, to 'improvise' by addition rather than (as in 1st & 3rd) into itself. :in the 1st and 3rd parts the elements filled the spaces between themselves with their consequences while in the 2nd the consequences were not and hence the need for addition. But then 'son of' movies aren't meant to be as good as the originals are they? Art & politics, politics and art? Not sure (of course!) : certainly I'd agree that the demystifying of processes is in the importance, in anything, and in that sense the 1st parts makes sense, but the third (which I found equally 'attractive' even though more mystified — but then information takes two and if mystified then perhaps in this case ignorance is to blame?) leaves me with the questions.

Robert Kenney

Cassettes: Warren lists a few of the advantages

As Ron says in his statement, the cassette recorder makes real-time performance involving tape music techniques practical. By cassette recorder, we here mean the basic $30—40 monophonic machine with built-in condenser microphone, internal loudspeaker and earphone jack, which can be either mains or battery powered. Nearly all the pieces described here use this sort of equipment. These cheap machines do have limitations, but we find both the challenge and unique attributes of these limitations incredibly exciting. Funk can be a positive value.

The most immediate advantages of the cassette recorder are its portability, cheapness and ease of operation. For example, the realization of multichannel sound sculpture was formerly realizable only in terms of the use of thousands of dollars of special purpose equipment. Now, in addition to that option, we can also make them with a couple of hundred dollars worth of easily obtained ("everybody" owns one) general purpose technology. Bill Fontana's *Vending Machine Sculpture*, for example, used 12 cassette players dispersed through the RMIT Union lounge, each softly playing a variant of the drone created by the soft-drink machines. The slight thickening of the environment that resulted was quite magical.

Feedback processes, such as that outlined in Alvin Lucier's *I am sitting in a room* (where a recording is made of a voice, that recording played back in the room and recorded, *that* recording played back in the room and recorded, etc, until the original voice disappears and only a complex of resonant frequencies remain) are greatly facilitated by the use of the cassette player. This sort of feedback process, as well as the use of simple resonators such as milk bottles placed over microphones, or the small cassette machine placed entirely inside a resonating chamber form the basis for many recent pieces by myself and other composers.

An interesting use of this technique can be seen in the recent work of Ron Nagorcka's *Atom Bomb*. In this piece, the performers are constantly fast forwarding or rewinding their tapes a certain number of seconds, recording small musical fragments. These tapes are later played back while a similar recording process occurs on other machines. Through the use of extremely clever time schemes and careful choice of materials, when all the tapes are played back in consort, a surprisingly coherent form emerges. This form involves not only the premonition and recall of various motives, but also many generations of recording each with its own characteristic sound.

Other useful techniques: the external microphone input is usually insensitive enough to accept any microphone, including the lowly contact mic. The uses of *that* device for magnifying and uncovering hidden small sounds have been so thoroughly explored that no further explanation seems necessary. If you haven't played with one yet, your $2 investment will repay itself many times over. And if your external mic has a "remote" switch on it (to turn the recorder on and off from the microphone during recording), this can produce delightful glissandi and disguised attacks/decays if operated *during* a sound's duration. This is especially effective with sounds with a long steady-state components, such as bells.

The earphone output can be used to power a small loudspeaker directly, without an intermediary amplifier. This is used in my piece, *Tasmanian "D"*, one section of which has five tapes, made during the course of the piece) playing into a hand operated switch which switches outputs between 7 loudspeakers. This multichannel switching routine uses only the cassette's own battery power. Fitzroy Gardens, watch out.

Doppler effects can be obtained quite easily by spinning a small loudspeaker on the end of a long speaker cable. In my *Hebraic Variations*, this is combined with the use of 2 battery powered cassettes to created a portable texture of whizzing microtonal viola sounds.

One of the most useful devices has been the endless loop cassette. Marketed by TDK, it has 30, 60, 90 or 180 seconds of tape in an endless loop configuration inside a normal cassette shell. This means that continuous sounds of any duration are easily possible. Loop music comes to the cassette.

So far I've described techniques easily available to everyone. A few techniques now for those not afraid of taking things apart and experimenting. The first is disconnecting the erase head of your machine so it will record over information previously recorded without erasing it. A crude, but effective, form of mixing. For about $1 and 20 minutes of labour, you can install a switch on your machine to switch the erase head on or off. This is not only useful in performance, but makes your machine not-just-useful-for-electronic-music-only.

Variable speed of a limited, but effective range is possible by flicking the drive belt or flywheel lightly while recording, or by changing the size of the drive wheel. This technique is used with great effectiveness in David Lloyd's *Clock Accidents*, among others.

For those interested in electronic sounds — a wide variety of these can be generated by operating a cheap calculator next to a transistor radio. Generally, the cheaper the calculator and trannie, the better, but very elaborate results have been obtained with some of the more expensive scientific programmable models.

Finally, for those not afraid of getting their fingers dirty (shocked?) many other electronic sounds are available by simply placing your fingers on the circuit board of the machine, using your body as a stray capacitance. It should be noted that if you do intend trying this last item you should keep your fingers well away from the power supply. 240 volts can fry you. Dead. 6 volts can't. If you can't tell what is a power supply, *don't* try this one. One of the things we try to avoid in this magazine is the roasting of musicians, both in print and in the flesh.

Warren Burt.

VOCAL ADDITIONS no. 1. JULIA ANDERSON

DIRECTIONS

Add one sound onto another in the following manner: 1, 12, 123, 1234 and so on up to 42. Proceed as rapidly as possible, immediately attacking one sound after another.

Pitches are not specified. Vary the pitches, trying not to use the same pitch too often.

Performance layout: sit in a circle on the floor, sitting comfortably to facilitate good breathing and voice projection.

NOTES ON NOTATION

Relatively higher and lower pitches are represented by up and down within a particular stave.

Dynamics are indicated by the relative thickness of lines or the size of the pitchheads — larger for louder, smaller for softer.
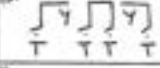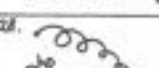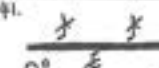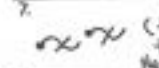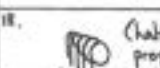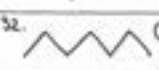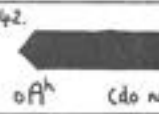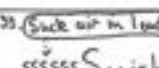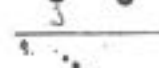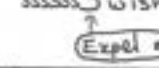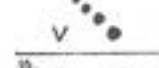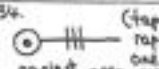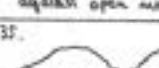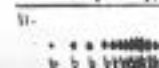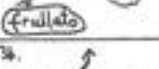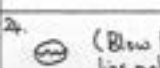
Raised, smaller letters, as in b⁰ indicate the sound after the attack letter.

Julia Anderson.

VOCAL ADDITIONS #1

DIRECTIONS:

Add one sound onto another in the following manner: 1, 12, 123, 1234, and so on up to 42.

Proceed as rapidly as possible, immediately attacking one sound after another.

Pitches are not specified, but vary the pitches, trying not to use the same pitch too often.

Performance Layout: Sit in a circle on the floor, sitting comfortably to facilitate good breathing and voice projection.

NOTATION NOTES:

Relatively higher and lower pitches (•), are represented by up and down within a particular stave.

Dynamics are indicated by the relative thickness of lines or, the size of pitch-heads - larger for louder (●), smaller for softer (•).

Raised, smaller letters, as in b⁰ indicate the sound after the attack letter.

A Singing (Bell-like) Clear enunciation. Do not prolong the sounds.	B Speaking. Short, accented sounds.	C Indefinite pitches ie. neither speaking nor singing, but in between.	D Sing. Prolong the sounds, gliding a little or better, a lot.
1. b⁰	13. Hᵖ (close lips hard on p)	25. K k k k k	37. Wah
2. gᴸ	14. eʸʰ scrzzzzzds	26. Vah Vah Vah	38. F E ing
3. Oⁿ	15. T T T T	27. d~~~(A slow vibrato)	39. M ah
4. Ø (lip pop)	16. D Dᵇ D Dᵇ (Cup hands in front of mouth)	28. dᵇ⁰	40. N e
5. (•) (rattle tongue, like a single)		29. pᵗ........ w	
6. E E E E	17. (tongue clicks)	30. WA	41. R⁰
7. ⌒ ⌒ (trill the tongue against the roof)	18. P (half-note progression using P)	31. (Whistle)	42. oAʰ (do not shout).
8. (Use j for every pitch)	19. Qᵃᵏ	32. (regular glissando)	
9. V	20. P̶i̶P̶ (a sound that cracks)	33. (Suck air in loudly) sssssS wish (Expel air)	
10. e (Highest pitch possible) i (lowest pitch possible)	21. (Suck lips together then open loudly)	34. (tap very rapidly with one hand against open mouth sound)	
11. k k k kkkkkkkk k k	22. n...CH n...CH n...CH	35. (frullato)	
12. Cⁱ (as short as possible)	23. Bᶻᶻᶻᶻᶻᶻᶻ	36. Whoop	
	24. (Blow through lips making them vibrate)		

Julia Anderson Sept. 1977.

Prelude to a Project in Computer-Assisted Musical Composition

The purpose of this article is to give a general and informal overview of the reasons for and the *modus operandi* involved in the implementation of some projects in computer-assisted composition recently initiated on the DEC-10 computer system at the La Trobe University computer centre and a PDP11—10 minicomputer in the university's music department.

Firstly, may I make it quite clear that I am not referring here to the use of computers to control synthesizer systems or of the generation of sound by computer by means of such by-now well-known programs as MUSIC4BF, MUSIC360 and so on (questions appropriate to another occasion perhaps) but to the use of computers to build up and test computer-language models of processes of musical composition or rather — to avoid overstating the current state of play — of models of particular aspects of particular processes in (mostly) rather short segments of particular hypothetical compositions.

Before attempting to give a description of the general form of such compositional algorithms, may I disavow two or three propositions which the mere reading of the title and statement of purpose of this article may arouse, and which are frequently suggested to me.

The first is the proposition that what is involved here is the production of "mathematical music". It is not so much that I am opposed to such an idea as that, in my view, there is not, and indeed cannot be any such thing as "mathematical music", in any useful meaning of the term. It is true, of course, that numerical algorithms can be devised to generate musical compositions, given appropriate principles of interpretation of the output. For instance, algorithms can be devised to produce each of the following number sequences,

all of which can generate certain aspects of existing or hypothetical compositions: (a) 2, 65, 7.5, 7, 1, 64, 5, 7, . . . (b) 0, 11, 7, 4, 2, 9, 3, 8, . . . (c) 98, 7, 4, 6, 56, 8.5, 7.1, 1, . . . (d) 1, 2, 3, 5, 7, 11, 13, 17, . . . and it would certainly be possible to develop an algorithm to generate any existing composition, from Aquitanian chant, to Chinese opera, to a Stockhausen Klavierstuck. I leave it as an exercise for the reader to determine which of the above sequences generates the Beethoven sonata, which the Morton Feldman piece and which the hypothetical composition that is a sonic analogue of an extract from personal statistics on the La Trobe University music-student population; in any event, there are surely no grounds for distinguishing between them on the grounds that any one is "more mathematical" than any of the others — certainly not on the grounds that some algorithms would be shorter and less complicated than others [for instance, example (d)] or that some [again for instance, example (d)] would be liable to be encountered also in circumstances not concerned with music.

The only sense in which any of the instanced pieces is "mathematical music" is that evidenced by the mere fact that it can be expressed as a numerical algorithm — a somewhat trivial and useless sense, since all pieces, without exception, can be expressed in such a manner. Thus, for example, a comparison of Boulez's *Structures* and *Roll out the Barrel* would have to conclude that neither can be characterized as more (or less) "mathematical" than the other. I suggest this comparison in order to deny another supposed criterion of "mathematical" music which might be raised, namely not the extent to which the piece can or cannot be represented as a numerical algorithm (that extent being 100% for all pieces) but the extent

to which the algorithm might reasonably be supposed to have existed prior to the piece rather than to have been derived from it. Thus, pieces whose composers have explicitly admitted to have been generated with the aid of computed algorithms (say, for example, certain works by Iannis Xenakis) are neither more nor less "mathematical" than (say) a Miles Davis improvisation.

I raise this latter comparison in order to come to its converse, which is the second proposition I want to disavow: that, in computable compositional algorithms one should see biographical or autobiographical intent — the implication that a particular algorithm is necessarily a model of some mental process of the composer. In seeking to establish the most coherent way of hearing an existing piece (which I take to be one of the aims of musical theory) the composer speaks from no special position of privilege My own conceptions of my own pieces can have no *a priori* precedence over anyone else's. (This is not to say that I would not want to assert their precedence *a posteriori*).

A basic scenario for compositional algorithms of my own devising, described in terms broad enough to remain more or less constant from work to work, contains three basic components in the generating process: (a) the smallest indivisible units of the musical "language" with which one is working; every structural event in the work which is regarded as a discrete unit (compositionally not physically) is relatable to this basic vocabulary of units, which is stored as data throughout the running of the program; (b) a small number of transformation processes which are called upon in every run of the program — a set of "reserved" routines which act upon the basic vocabulary, within constraints defined by grammatical rules;

these processes and rules remain unchanged during the course of a work's progress from beginning to end; (c) a large, interconnectable library of "rhetorical procedures" — routines which direct the way in which the "reserved" routines are handled; these procedures undergo radical modification during the course of the work's progress, modification which is itself controlled by means of very large arrays of binary switches keeping track of the current state of accrual of events.

It is, of course, possible to regard tonal music in these kinds of terms, and would no doubt be possible to construct computer programs of this general form to generate examples of tonal music. Couching the three basic components of such a generating process for tonal music in language borrowed from Schenkerian and post–Schenkerian theory might give a picture something like this: (a) basic vocabulary: the implicit assumptions of the *ursatz*, the triad and the scale; (b) transformation processes: arpeggiation (including such things as octave coupling), neighbour motion, passing motion (zuge of a 3rd, 4th, 5th, 6th, 7th) etc., acting under the constraints of the rules of counterpoint; (c) rhetorical procedures such as "interruption" and subsequent "completion of the line" (generating structures such as the period and sentence and so on) and those to establish different kinds of patterns of recourse to the transformation processes in order to bring about structural differentiation between thematic, transitional, and developmental entities (and so on). It is not my purpose here to argue the extent to which it is reasonble to relate the general form of this computer program to Schekker's conception of tonal musical structure in any very precise way. At least one Schenkerian scholar has warned against attempts to make the theory "scientific" or to couch it in such terms as to render it synthetic as well as analytic. It may well be that it is best regarded as the embodiment of a way of thinking which is quite dependent but nourished by some acquaintance with Schenker's writings and graphs, especially in as much as the program was devised to generate non-tonal

music, in which there tends to be very little which remains constant from work to work, let alone from composer to composer.

Obviously, within this broad general procedure, two extreme approaches are possible: on the one hand, that in which the computer is used as a kind of work-saving device for the composer, performing, rapidly and efficiently, tasks which would be laborious and error-prone if done "by hand", and, on the other hand, that in which the relationship between initial input and final output is unforseen and unforseeable.

On the general subject of the relation of this form of algorithm to other forms which have been used, one interesting question is the extent, if any, to which algorithms structured in the above way yield results which are comparable to those yielded by algorithms which start from a "worm's-eye" view of a piece ("the probability of event x being followed by event y is Z, until time t_1, changing to Z_2 until time t_2, changing to Z_3 until time t_3 etc etc) and work up, or those which approach the problem as some sort of order/disorder problem ("variety-within-unity" or was it "unity-within-variety"?)

Finally, may I assert that what we are looking at in computer "composing routines" is a question of the possible, not of the necessary or the inevitable. It is surely clear that our age is not an age of a single musical practice, but an age of a great number of alternative musical practices, many of which can easily continue to exist and evolve without the aid of new technology, high or low, but solely with those oldest and most well-established of manually-operated machines, musical instruments and voices. To the assertion, whether laudatory or perjorative, that the future of music depends in some way on electronics, computers, synthesizers, technology etc, one can only counter-assert that, on the contrary, it depends as firmly as ever on the perceptual capabilities of human ears and on the conceptual capabilities of the minds to which those ears are interfaced.

Graham Hair.

'mathematical' music?

....AND CORRESPONDENCE WILL BE ENTERED INTO

HAIKU FOR CHRIS & WARREN

Create a context
A/void if you will
The expert as oppressor

Footnotes bugger, the
Context are of course
Not a relevant excuse

"Dialectics is dead"
Is disproved simply
By me saying that its not

The nineteenth century
Is it musically
So delightful to look at?

See how personal
Confusion is not
In the energy business

The world is but
A system of loops
Forget to flip the record

We were in heaven
A vocal background
And love I'll time all I me

How to change the world:
Switch to remove erase,
Things will be more interesting.

Replace artist as hero
By artist as anti —
Tautology as bastard

O God our help in
Ages past our hope for
Lord thou hast been our refuge

Cybernetics
Radiation sickness
Hitlers problems now past tense

A QUOTE FROM MYSELF

"The alienation of people from musical creative processes perpetuated by bourgeois mentality and culminated through technology has produced a popular music which is increasingly trite . . .

So it cannot be overemphasized that critical music appreciation begins in the act of musical creativity; in a demystification of musical processes; in a sense of powersover musical material; in a critical reflection on the processes of artistic creation and on the profound variation and significance inherent in musical language . . .

As the ancient Greeks perceived, music is the unitary psycho-drama, mind and body, sense and non-sense, the immediate and the mediate, emotion and abstraction, are combined in communal experience. We should never under-estimate the power of our discipline . . . "

IN REPLY TO DR. RICHARD DAVID HAMES (M.A., Ph.D.) (BOURGEOIS COMPOSER)

It does not interest me, and I hope it does not interest readers, to take seriously the typically paranoid unacademic polemic which spews forth on occasion from academic pens.

I am particularly concerned however, that somebody responsible for the Melbourne staging of Cage's *Musicircus* could claim that "all worthwhile art is inevitably elitist". Does this mean that *Musicircus* is not worthwhile, that it is elitist, or that it was staged merely for the purposes of polemic? If it was staged for polemical purposes, is dialogue desirable, or are the disaffected of the audience merely to be treated as dunder-heads?

Or is, as I suspect, Dr. Hames' (M.A. Ph.D.) letter simply an attempt to stir shit? If so, I fear he will require a sturdier stick. As Kurt Vonnegut so succinctly put it: "We are what we pretend to be, therefore we must be careful about what we pretend to be."

Ron Nagorcka.

In Vancouver, on top of the downtown BC HYDRO building is a set of horns which everyday at noon exactly do the first four notes of O CANADA at a moderate tempo. This event is loud and can be heard clearly for five, or more, miles. We suggest several outdoor event-extensions.

ONE. Using the O CANADA horns as a mold. That is, everyday for many days, many people gather at noon at a place near the HYDRO building and move/sound in perfect unison with the four notes of the horns. (Something to be noticed.)

TWO. Recording the O CANADA horns and playing the recording at a nearby location, loudly/clearly, at a time very close to, but not exactly at, noon. (Something to enhance the tone of what is done.)

Chris Dahl, Don Druick.
Vancouver 1977

For those interested in current developments in film, video, music and related areas, *Cantrill's Film Notes*, published by Arthur & Corinne Cantrill of Brunswick is a goldmine of information. The most recent issue, No. 25/26 contained an interview with Michael Lee on his film *The Mystical Rose*, a report on some environmental music doings in New Zealand by composer Phillip Dadson, and a report on Dragon Ilic's various pencil sculptures, videos, performances, among others. The cost of the magazine is $6/4 issues and it's available from Arthur & Corinne Cantrill, P.O. Box 1295L, G.P.O., Melbourne, Vic. 3001. An excellent investment in information on the current scene.

6/11/77

My Dear Bill Fontana,

Today we heard a piece of yours side-named by Felix Werder "Pentagong" using five rim-gongs and five players. It was performed at the ABC Waverly Recording Studio. The form of the piece was: middle pitches to extreme pitches through combinations of assorted pitches, coming to a conclusion with all five pitches together. This presented to the amassed public at the studio a fine, sometimes even harsh acoustic phenomena — subtle sound shifts, natural phasing (limited), modulations and in general a wavering aural shape.

It was a pity that the players did not move distances between themselves. This produces change in modulation and phasing in fairly large degrees and of course, when controlled, adds the spice to the flavour of the composition.

Unfortunately with your composition — you did present it as a composition, not as an exercise — it lacked contrast and development. I missed hearing certain complementary sounds that these gongs are capable of producing. One in particular was the striking of the gong. A question of taste naturally, but this would have had wonderful contrast effects upon the ethereal Tangerinian Dream — like hypnotic haze you surrounded us with (not unlike a marsh mist).

In the discussion following the performance a member of the audience came to your defence by saying that the use of this obvious effect — sound would sound too "oriental". Disregarding the intended joke, would this be the fault of the composer in his misuse of the sound or would the public be at fault for associating that particular sound with a particular culture? If the latter, then I must say that your initial composition sounds as oriental as Ghengis Khan observing the pretty little Yonis treading in the paddy-fields. Why then didn't you refuse to use them?

Surely a gong can be struck in more than one way: quick succession of say, muted strokes could have a total unoriental sound.

What happens if one fills the gong with water and strikes? — please don't say it rusts — and what happens if one places sand, marbles, confetti, clocks, vacuum cleaner hoses or whatever?

What occurs when two gongs strike each other? muted? filled with water, sand, jelly, etc?

Place a small gong inside a larger one and rub one or the other or both. Rub one, strike the second.

What occurs if one sings into these marvellous musical breakfast cereal bowls — (what, pardon me, happens if we pour in milk and Kellog's Rice Bubbles — does the snap, crackle and pop complement the rubbing?)

Roll a steel ball around inside — something wonderful should happen. Then sing into it.

These may be obvious ways of changing sound shapes but they all possess qualities equal to those of rubbing the rim.

Please inform me when we can expect to hear a composition with rim gong including not just one exciting sound but a few more? And if never, why?

Thank you for bringing these wonderful instruments to my attention.

Yours,

Mindaugas.

Dec. 16, 1977

Mindaugas:

The problems you express in your letter regarding my composition for Japanese Rin Gongs called "Wave-Spiral" are aesthetic problems. These problems arise from a system of aesthetic idea-values you have developed. As far as I can tell, the assumptions you make about the nature or essence (to use the mideival term) of musical composition are the following . . . .

1) a musical composition should in most cases display most of the possible sounds for which the instrument(s) being composed for are capable of producing.

2) the essence of musical time (or form) is to express all of these possible sounds with a sequential cycle of change so that an interesting "contrast & development" (your words) would take place.

I wish to point out to you that the system of aesthetic-values that underlies my work as a composer is very different to yours and since your letter indicates that you have no concept of it I will briefly list some of my major aesthetic assumptions.

I would summarise my main aesthetic assumptions (also refer to my article — Listener as Composer — in *New Music Newspaper* No. 2) as any single sound process that is continuous acquires its real-time structure when it becomes part of a listener's real-time consciousness. By assuming this intense listener involvement the whole nature of the compositional process is changed. As a composer, walking around and often stopping to listen to the passing sound, a transformation takes place when I stop. The sound which had been peripheral before I stopped now becomes the centre of my focus. Whatever structure or form this sound now has depends on my changing perception of it. Thus for me the essence of composition is the creative power of listening.

I would like to conclude my reply to you with a well-known story from John Cage's *Silence.*

"At the New School once I was substituting for Henry Cowell teaching a class in oriental music. I had told him I didn't know anything about the subject. He said, 'That's all right. Just go to where the records are. Take one out. Play it and then discuss it with the class.' Well, I took out the first record. It was an LP of a Buddhist service. It began with a short microtonal chant with sliding tones then soon settled into a single loud re-interated percussive beat. This noise continued relentlessly for about 15 minutes with no perceptible variation. A lady got up and screamed and yelled, 'Take it off! I can't bear it any longer.' I took it off. A man in the class then said angrily, 'Why did you take it off? I was just getting interested.' "

Bill Fontana.

THE BIG EVENT FOR FEBRUARY: COMPOSERS'& PERFORMERS' SEMINAR

An Australian Composers' and Performers' Seminar will be held at La Trobe University in Melbourne, from 15—23 February. Participants will come from all over the country.

There have been national conferences of Australian composers before, most recently in Canberra in 1973, where the "status and roles of the Australian composer" was discussed at considerable length. How will the forthcoming conference differ from past ones? Principally in the way which the third and fifth words of the title suggest: many performers interested in the presentation of contemporary music will also be coming. Strenuous efforts are being made to ensure that such talking about music as takes place occurs in the context of a great deal of actual music-making and listening to music.

Well-known groups in attendance will include ACME (The Australia Contemporary Music Ensemble); the full list of composers and performers numbers about 80 at the moment (mid-December). Registration has been encouraged from all sections of the community — from musicians both within and without institutions, students both post- and under-graduate, composers of every conceivable focus of interest.

Since it is hoped to organize an informal performance or open rehearsal of a work by just about every composer present, entries closed officially on November 30, but every effort will be made to accommodate late entries, and we would be delighted to welcome registration by anyone who just wants to come along to look and listen ($10).

The tentative schedule for each day is:

10 am — 1 pm
ACME open rehearsals

Petra Quartet open rehearsal
Students & other ad-hoc groups

2 pm — 5 pm
Ad-hoc groups open rehearsals
Papers by visitors and participants.

8 pm — 10 pm
Informal concerts.

10 pm —
Tape playing, video, discussion.

Anyone interested should write to me immediately (Music Dept., La Trobe University, Bundoora, Victoria 3083) for a registration form, which should be completed and forwarded with $10 to the Australia Music Centre, P.O. Box N9, Grosvenor St, Sydney 2000. Accommodation on the campus (9 days/9 nights) will be available for interstate participants and for locals unable or unwilling to return home nightly, at a cost of $150 ($100 for students).

Graham Hair.

QUESTIONS AS ANSWERS

Literacy (historical objectivism) as distortion.
Musical literacy/media distortion
Musical opinion as marxist/Political opinion as composer
Intellectual Ludditism valid?
Process within tautology (loops) as possible.
Progress (towards dialectic increase) as possible?
Avoidance of fetish (Is all commodity?)
Sounds are cultural (worth preserving?)
Unit sound (like instance) foolish (like serialism).

Ron Nagorcka.