

bill fontana  
sound sculpture



national gallery of victoria ..... 1 — 26 march

MUSICAL SCULPTURE  
LASTING  
SOUNDS LASTING FROM

DIFFERENT PLACES AND

FORMING  
SOUNDING  
A SCULPTURE WHICH LASTS

MARCEL DUCHAMP

. . . MUSIC GOES ON ALL THE TIME AROUND US AND  
IS MADE AUDIBLE BY A MUSICIAN . . .

HENRY COWELL

THE TERM *Sound Sculpture* MAY CREATE THE EXPECTATION OF VISUALLY INTERESTING OBJECTS THAT PRODUCE SOUNDS. THIS IS NOT MY INTENTION. THE USE OF THE TERM *Sound Sculpture* IS LITERAL. IT IS AN ENVIRONMENT OF PHYSICAL/SPATIAL DIMENSIONS CREATED BY SOUNDS. IT IS ALSO A TEMPORAL CONCEPT, WHICH UNLIKE A MUSICAL PERFORMANCE HAS NO BEGINNING, MIDDLE OR END, BUT IS A CONTINUUM IN THE SAME WAY ANY PHYSICAL OBJECT IS.

# space/time concepts in recent sound sculpture

THE WORK OF MANY CONTEMPORARY COMPOSERS EMBODIES A SERIOUS CONCERN FOR STRUCTURAL ISSUES RELATED TO THE FUNDAMENTAL NATURE OF SOUND AND OUR PERCEPTION OF IT.

A BASIC CONCERN OF MINE HAS BEEN THE USE OF PHYSICAL SPACE AS A STRUCTURAL CHARACTERISTIC OF SOUND IN ADDITION TO PITCH, TIMBRE, LOUDNESS AND DURATION. APART FROM SPACE AS A BASIC SOUND CHARACTERISTIC WE COULD AGREE WITH A STATEMENT MADE BY JOHN CAGE IN 1949:

*Sound has four characteristics: pitch, timbre, loudness and duration. The opposite and necessary coexistent of sound is silence. Of the four characteristics of sound, only duration involves both sound and silence. Therefore, a structure based on durations (rhythmic: phrase, time lengths) is correct (corresponds with the nature of the material)..*

THE HISTORICAL IMPACT OF THIS THINKING HAS CONTRIBUTED IMMENSELY TOWARDS LIBERATING WESTERN MUSIC FROM A STRUCTURABLE SOUND VOCABULARY BASED PRIMARILY ON THE CHROMATIC SCALE. TO EVEN CONCEIVE THAT MUSICAL STRUCTURE COULD BE BASED UPON WHAT WAS COMMON TO ALL SOUNDS-DURATION - MEANT THAT THE WHOLE FIELD OF SOUND COULD BE THOUGHT OF AS STRUCTURABLE.

HOW CONVENIENT THAT A MEDIUM CAPABLE OF STORING AND MAKING RE-USABLE ANY POSSIBLE SOUND (MAGNETIC TAPE) - CAME INTO USE AT THIS TIME.

THE REST IS MUSIC HISTORY. IT IS 30 YEARS LATER. I DON'T NEED TO FEEL EMBARRASSED OR THAT IT'S EVEN AN ISSUE TO MAKE SERIOUS MUSIC OUT OF SOME SOUNDS I FIND WALKING DOWN A STREET. IT SEEMS PERFECTLY NORMAL TO PERCEIVE ONE'S SONIC ENVIRONMENT AS BEING FULL OF STRUCTURED/STRUCTURABLE SOUND PROCESSES. WANDERING AROUND, I FIND MANY INTERESTING MUSICAL SYSTEMS FUNCTIONING IN REAL ENVIRONMENTS AND OFTEN I'LL NOTATE THESE WITH A PORTABLE TAPE RECORDER, OR IF I'M REALLY CARRIED AWAY I'LL MAKE A MULTI-CHANNEL RECORDING (8 CHANNELS) IN WHICH MANY MICROPHONES ARE PLACED IN CLOSE PROXIMITY TO THE CONSTITUENT SOUNDS. OFTEN THESE SOUNDS ARE IN A SPATIAL CONFIGURATION IN WHICH IT IS NOT POSSIBLE TO HEAR ALL THE RELATIONSHIPS BETWEEN ALL THE CONSTITUENT SOUNDS FROM ANY ONE PLACE. IT IS AT THIS POINT THAT SOME OF THE FORMAL AND AESTHETIC CONSEQUENCES OF SERIOUSLY CONSIDERING PHYSICAL SPACE AS A STRUCTURABLE SOUND CHARACTERISTIC COME INTO PLAY.

## (1) INDETERMINACY OF TIME

BY SETTING UP A SOUND PROCESS WHICH LISTENERS MUST MOVE THROUGH IN ORDER TO HEAR VARIOUS POSSIBLE SOUND RELATIONSHIPS, THE TIME STRUCTURE OF THAT SOUND PROCESS BECOMES INDETERMINATE IN THE SAME WAY ANY PHYSICAL SCULPTURE HAS AN INDETERMINATE TIME STRUCTURE, DUE TO IT'S MULTIPLICITY OF POSSIBLE PERSPECTIVES WHICH EACH VIEWER MUST WORK OUT IN HIS OWN REAL TIME. THE SIMULTANEOUS DISTRIBUTION OF SOUNDS IN PHYSICAL SPACE CREATES THIS SAME TEMPORAL INDETERMINACY. IN SETTING UP A SOUND SCULPTURE A SITUATION IS CREATED ON A FORMAL LEVEL IN WHICH THE LISTENER MUST CREATE HIS OWN TIME STRUCTURE. AS A WESTERN COMPOSER I AM RELINQUISHING A TRADITIONAL ROLE. I AM NOT COMPOSING TIME, I AM COMPOSING SPACE. THUS IN A VERY REAL WAY THE LISTENERS TO THE SOUND SCULPTURE ALSO BECOME THE COMPOSERS OF THE SOUND SCULPTURES.



BECAUSE OF FORMAL DEFINITION OF A COMPOSER IS SOMEONE WHO MAKES TIME STRUCTURES OUT OF SOUNDS. AS AN AESTHETIC ASSUMPTION THIS UNDERLIES MY WORK IN ALL AREAS OF SOUND SCULPTURE IN WHICH THE ESSENTIAL CREATIVE ACTION IS THE PERCEPTION OF AN ABSTRACTABLE STRUCTURE IN A SOUND PROCESS. I THINK THAT THE SOCIAL IMPLICATIONS OF THIS ARE IMPORTANT. LAST YEAR I WROTE: SOMEDAY WE MAY LIVE IN A SOCIETY IN WHICH THE ARTIST AS SUCH IS UNNECESSARY. NOT BECAUSE A REPRESSIVE TOTALITARIAN STATE DID NOT ALLOW CREATIVITY BUT BECAUSE THE AVERAGE PERSON HAD LEARNED TO REGARD HIS OWN SENSIBILITY AS BEING SIGNIFICANT.

*The heights that are now reached by single individuals at special moments may soon be densely populated.*

JOHN CAGE

(2) MOTION THROUGH SPACE AS A WAY OF CHANGING PITCH.

TEMPORALLY REALIZED CHANGES OF PITCH-TIMBRE-PHASE RESULT FROM THE PHYSICAL MOTION OF A LISTENER OR MICROPHONE IN RELATION TO A CONTINUOUS DRONE WITH COMPLEX HARMONICS, ESPECIALLY WHEN THE SOUND PROPAGATION QUALITIES OF THE DRONE ARE SUCH THAT IT'S VARIOUS HARMONICS FORM INDIVIDUAL STANDING WAVES. IN THIS SOUND SCULPTURE EXHIBITION THE *Standing Wave Sculpture*, *Pipe Phase* AND *Moorabbin Airport* EACH EXPLORE DIFFERENT ASPECTS OF THIS PHENOMENON.

THE *Standing Wave Sculpture* IS BASED UPON THE ACOUSTICAL PROPERTIES OF LOW TO MIDRANGE FREQUENCY SINE WAVES. A SINE WAVE IS THE SIMPLEST OF ALL SOUNDS IN THAT IT IS A PURE FREQUENCY WITH NO HARMONICS. VISUALLY IT CAN BE REPRESENTED:



-WITH THE CRESTS REPRESENTING LOUD SPOTS AND THE TROUGHS THE SOFT SPOTS. WHEN A SINE WAVE FROM AROUND 30 CYCLES PER SECOND TO ABOUT 500 CYCLES PER SECOND IS PLAYED IN AN ENVIRONMENT HAVING SOUND REFLECTIONS SUCH AS A ROOM, THE REFLECTING SINE WAVE IS DISTRIBUTED THROUGHOUT THE ROOM ACCORDING TO A WHOLE SPECTRUM OF POSSIBLE PHASE RELATIONSHIPS (TWO EXTREME POSSIBILITIES BEING REINFORCEMENT WHEN THE CRESTS COINCIDE AND CANCELLATION WHEN THE CREST IS COMPLETELY OUT OF PHASE WITH THE TROUGH). WHEN WALKING THROUGH THIS SPACE THE SINE WAVE CHANGES - - GETTING LOUDER OR SOFTER - THESE CHANGES GIVE THE SOUND WHAT SEEM TO BE PHYSICAL DIMENSIONS. WHEN MORE THAN 1 SINE WAVE IS PLAYED SIMULTANEOUSLY EACH ONE WILL HAVE IT'S OWN SHAPE IN THE SPACE SO THAT BY MOVING AND LISTENING ONE CREATES CHANGING PITCH/PHASE COMBINATIONS.

NANETTE HASSAL'S INSTRUCTIONS FOR A *Standing Wave Dance* ARE AN EXCELLENT DESCRIPTION OF THE RELATIONSHIP BETWEEN CONTINUOUS STANDING WAVES AND MOBILE LISTENERS:

THE STANDING WAVES CARVE THE ROOM INTO MANY NEW SUB-DIVISIONS. THE FOLLOWING IS A SERIES OF SUGGESTIONS BY WHICH TO EXPLORE THE SPACE.

*.....Stand at the edge of the space.....Move slowly forward passing through the channels of sound.....can you find a silent space..... find a channel of low sound.*

.....Explore the dimensions of this channel-up and down as in a corridor.

.....Find the borders of a channel of higher pitch.....rock gently in and out of the channel of sound.

.....sometimes new channels exist below you.....close to the floor  
.....find one such area.....sit or lie there for a time listening  
.....softly sing to yourself with the sound.

.....you can change the spaces in the room by moving (and singing)  
.....run through the space carrying the note with you.....fall back gently into the floor in the same place you were lying.....  
continue running and falling until you have changed that space.

.....jumping will bring you into new spatial dimensions that lie above you.

SIGNIFICANT PHASE CHANGES CAN BE HEARD, EVEN IF ONE IS STATIONARY, WHEN SOME OF THE LOUDSPEAKERS ARE IN PHYSICAL MOTION. THIS MOTION HAS MORE OBVIOUS EFFECT ON THE PHASING OF THE HIGHER FREQUENCIES, WHICH IS A BIT OF A MYSTERY SINCE THESE HIGHER FREQUENCIES PRODUCE ALMOST IMPERCEPTIBLE STANDING WAVES. A POSSIBLE EXPLANATION OF THIS MAY LIE IN THE 360° SOUND ILLUSION ACHIEVED IN DUMMY HEAD RECORDINGS IN WHICH THE LISTENER WEARS SENSITIVE OMNIDIRECTIONAL MICROPHONES ON EACH OF HIS EARS, SO THAT WHEN THE RECORDING IS LISTENED TO THROUGH OPEN AIR HEADPHONES ONE HEARS THE RECORDING WITH THE SAME SENSE ONE WOULD HAVE HAD LISTENING TO THE ORIGINAL ENVIRONMENT. AN EXPLANATION MAY BE THAT THE DIFFERENCES IN PHASE INFORMATION BETWEEN THE TWO EARS IS GREATER WITH HIGHER FREQUENCIES, WITH WAVE LENGTHS THAT START TO BECOME SHORTER THAN THE DISTANCE BETWEEN THE TWO EARS. PERHAPS DIFFERENCES IN HEAD DIMENSIONS WILL GIVE PEOPLE SENSATIONS OF ACOUSTIC SPACE UNIQUE TO THEM.

THE GREATER SUSCEPTIBILITY OF PHASE CHANGE IN THE HIGHER FREQUENCIES IS ALSO EVIDENT IN *Pipe Phase* AND *Moorabbin Airport*. IN *Pipe Phase* ONLY LARGE MICROPHONE MOTION WILL BRING ABOUT SIGNIFICANT PHASE CHANGES TO THE LOWER HARMONICS OF THE VIBRATING PIPE, WHILE SLIGHT MOTION OF THE MICROPHONE BRINGS ABOUT SIGNIFICANT CHANGES TO THE HIGHER FREQUENCIES AND DRASTIC PHASING WHEN THE MICROPHONE MOTION IS RAPID. IN *Moorabbin Airport* THE RAPID MOTION OF THE SMALL AIRCRAFT PAST THE MICROPHONES PRODUCES GREAT CHANGES IN THE PHASING OF THE MOTORS' HIGH HARMONICS, WHILE THE LONG AUDIBLE DISTANT LOW TONES ONLY GRADUALLY BECOME LOUDER OR SOFTER.

### (3) POLYRHYTHMIC SPACE

AN ABSTRACT DEFINITION OF A TYPICAL SOUND ENVIRONMENT IS THAT WHEN IT'S CONSTITUENT SOUND PROCESSES ARE CONCEIVED SIMULTANEOUSLY (WHICH IS HOW THEY ACTUALLY HAPPEN) IT BECOMES POLYRHYTHMIC SOUND SPACE. THIS IS A LISTENING EXERCISE REQUIRING CONSIDERABLE IMAGINATION. USUALLY IT IS ONLY IN ONE'S IMAGINATION THAT THESE RELATIONSHIPS BETWEEN DISTANT SIMULTANEOUS SOUNDS CAN TAKE PLACE.

THE MULTI-CHANNEL FIELD RECORDINGS AND THE LIVE ENVIRONMENTAL MONITORING INSTALLATION, *Sound Sculpture with Resonators* ATTEMPT TO REALIZE THIS POLYRHYTHMIC SIMULTANEITY. THE GENERAL AESTHETIC

PRINCIPLE ON WHICH THESE WORKS ARE BASED IS FOUND IN AN EARLY CONCEPTUAL SCORE OF MINE CALLED *Listening Centres*.

.....*Find a continuous sound process in your environment to use as a listening centre.....*

.....*Listen to all the sound events of that place in relation to the centering process.....*

.....*Repeat this listening process at different times with different centres.....*

THERE ARE A NUMBER OF SPATIALLY DISTRIBUTED POINTS AT WHICH RHYTHMICALLY OR HARMONICALLY HOMOGENEOUS SOUND PROCESSES HAPPENING IN DIFFERENT PLACES ARE EITHER RECORDED OR MONITORED SIMULTANEOUSLY IN A MULTI-CHANNEL FORMAT. IN THE MULTI-CHANNEL RECORDINGS *Kirribilli Wharf, Prince Alfred Bridge, Moorabbin Airport* AND *Nepean Highway* THE SOUND PROCESSES HAPPENING AT THE VARIOUS LOCATIONS ARE INTEGRAL TO EACH OTHER IN THAT THEY ARE REALLY DIFFERENT AREAS OF THE SAME SPATIALLY IMMENSE SOUND PROCESS.

IN THE LIVE INSTALLATION *Sound Sculpture with Resonators* THE INITIAL SOUND LOCATIONS MAY ONLY HAVE DISINCTNESS AND ACTUAL SIMULTANEITY IN COMMON. IN MONITORING, A COMMON TRANSFORMATION PROCESS IS USED AT EACH SOUND LOCATION SO THAT THESE SOUND LOCATIONS ARE HEARD FILTERED THROUGH THE ACOUSTICS OF A RESONATOR (A RESONATOR IS ANY HOLLOW PHYSICAL SPACE WITH IT'S CAPACITY TO GENERATE A SPECTRUM OF HARMONICALLY RELATED FREQUENCES IN RESPONSE TO A SOUND SOURCE). IN THIS CONTEXT THE RESONATOR IS A MUSICAL INSTRUMENT WITH A SPECIAL FUNCTIONAL DEFINITION--IT MAKES MUSIC BY LISTENING TO SOUNDS WHICH ARE ALREADY THERE...

BILL FONTANA

# description of works in murdoch court

THERE ARE 12 WORKS WHICH WILL BE PLAYED AT SCHEDULED TIMES THROUGHOUT THIS EXHIBITION. THEY FALL INTO 4 CATEGORIES:

(A) MULTI-CHANNEL FIELD RECORDINGS-

- (1) *Kirribilli Wharf*
- (2) *Prince Alfred Bridge: Gundagai*
- (3) *Moorabbin Airport*
- (4) *Resonant Columns: Murdoch Court*
- (5) *Pipe Phase*

(B) ENVIRONMENTAL MONITORING-

*Sound Sculpture with Resonators*

(C) *Standing Wave Sculpture and Standing Wave Sculpture with Mobile Loudspeakers.*

(D) COMPOSED/PERFORMED SOUND SCULPTURE -

- (1) *Piano Sculpture*
- (2) *Wave Spiral*
- (3) *Handbell Sculpture Number 2*
- (4) *QUINTET FROM Sound Sculpture for Brass Band*
- (5) *Phantom Clarinets*

*Kirribilli Wharf* - 8 CHANNEL TAPE - DURATION 30 MINUTES SYDNEY 1976.

A SOUND SCULPTURE IS SECRETLY GOING ON ALL THE TIME ON THE KIRRIBILLI FERRY WHARF IN SYDNEY. ON THAT WHARF THERE ARE MANY CYLINDRICAL RESONATORS THAT ARE DRILLED INTO THE CONCRETE WHARF THAT GO FROM THE SURFACE YOU STAND ON TO THE SURFACE OF THE WATER UNDERNEATH. THE LAPPING AND MOVEMENT OF THE WATER SOMETIMES CLOSES THE BOTTOM END OF THESE CYLINDERS WHICH MOMENTARILY SETS OFF THEIR RESONANCE IN THE FORM OF A COMPRESSION WAVE. SINCE THE VARIOUS CYLINDRICAL BLOW HOLES ON THE WHARF ARE CLOSED OFF AT DIFFERENT TIMES A HIGHLY COMPLEX RHYTHMIC SITUATION IS POSSIBLE BUT TO HEAR THIS ONE WOULD NEED TO BE IN MANY PLACES AT ONCE, WHICH IS PERHAPS THE REASON THAT THIS SOUND SCULPTURE HAS UNTIL NOW REMAINED A SECRET. RECENTLY ON A CALM NIGHT IN SYDNEY, I MADE A RECORDING OF HALF AN HOUR IN THE LIFE-TIME OF THE SECRET SOUND SCULPTURE. THE RECORDING WAS MADE WITH AN 8 CHANNEL TAPE RECORDER THAT WAS PLACED IN A TRUCK NEAR THE WHARF WITH 8 MICROPHONES LOOKING INTO THE OPENINGS OF THE 8 CYLINDRICAL BLOW HOLES. AS A NATURAL PHENOMENA THE SECRET SOUND SCULPTURE IS EFFECTED BY ENVIRONMENTAL CONDITIONS SUCH AS WEATHER AND BOAT TRAFFIC. THIS PRESENT RECORDING WAS MADE ON A CALM NIGHT AFTER A LOT OF RAIN, THE ONLY BOAT TRAFFIC BEING THE OCCASIONAL FERRY. THE EFFECT THIS HAS ON THE RECORDING IS TO GIVE IT A SYMMETRY OF GRADUATIONS IN RHYTHMIC COMPLEXITY, FOR THERE ARE TIMES WHEN THE WATER IS CALM AND THE COMPRESSION WAVES ARE SPARSE AND THERE IS THE CONTINUOUS SOUND OF WATER GURGLING IN THE VARIOUS BLOW HOLES. THEN A FERRY COMES AND MAKES THE WATER TURBULENT, SETTING OFF AMAZING RHYTHMIC EVENTS IN THE SOUND SCULPTURE.

(THIS RECORDING WAS ORIGINALLY COMMISSIONED BY ANDREW MCLENNAN FOR HIS 360° SHIFT PROGRAM ON ABC FM)

*Prince Alfred Bridge: Gundagai* - 8 CHANNEL TAPE-DURATION 30 MINUTES - GUNDAGAI 1978.

THIS 100 YEAR OLD WOODEN BRIDGE CROSSES THE MURRUMBIDGEE



RIVER AND ASSOCIATED RIVER FLATS BETWEEN GUNDAGAI AND SOUTH GUNDAGAI IN NEW SOUTH WALES. ANYONE WHO HAS EVER DRIVEN OVER THIS BRIDGE WOULD BE AWARE THAT IT RATTLES AS TRAFFIC MOVES ACROSS ITS HORIZONTAL WOODEN PLANKS. SINCE THIS RATTLING BRIDGE IS 922 METRES LONG, IT WOULD MAKE A POLYRHYTHMIC SOUND SCULPTURE IF ONE COULD HEAR ITS DIFFERENT RATTLING SECTIONS SIMULTANEOUSLY. THIS RECORDING IS AN ATTEMPT TO DO THIS. 8 MICROPHONES WERE PLACED ALONG APPROXIMATELY HALF THE LENGTH OF THE BRIDGE SO THAT THE PHYSICAL MOTION OF TRAFFIC RATTLING THE PLANKS FORMS THE BASIS OF THIS SOUND SCULPTURE. TWO UNUSUAL EVENTS HAPPEN DURING THIS RECORDING: IT IS RAINING DURING A SUMMER DROUGHT, AND THE AFTERNOON TRAIN TO TUMUT GOES THROUGH A LEVEL CROSSING AND RUNS ALONG THE PARALLEL WOODEN TRAIN BRIDGE.

NOTE: THIS BRIDGE IS IN IMMINENT DANGER OF BEING DEMOLISHED BY THE DEPARTMENT OF MAIN ROADS, N.S.W. IT IS HOPED THAT THIS RECORDING WILL BE ONE STEP TOWARDS PRESERVING THIS BRIDGE AS PART OF AUSTRALIA'S HERITAGE.

*Moorabbin Airport* - 8 CHANNEL TAPE-DURATION 30 MINUTES - MELBOURNE 1978.

THE SOUND OF AN AIRCRAFT MOTOR IS FULL OF HARMONICS AND IN ABSTRACT TERMS MAY BE THOUGHT OF AS A *mobile drone*. AT 8 LOCATIONS CLOSE TO RUNWAYS AROUND THIS AIRPORT (WHICH HANDLES LIGHT AIRCRAFT) 8 MICROPHONES ARE CONNECTED TO AN 8 CHANNEL TAPE RECORDER BY MEANS OF WIRELESS COMMUNICATION EQUIPMENT (WHICH IS OPERATED BY MEMBERS OF THE AUSTRALIAN ARMY SIGNAL CORPS). THE RELATIVELY LOUD SOUND OF A GIVEN AIRCRAFT MOTOR WILL BE AUDIBLE TO MORE THAN ONE MICROPHONE SIMULTANEOUSLY, WHICH MEANS THAT AT A GIVEN MOMENT DIFFERENT MICROPHONES WILL *hear* DIFFERENT PHASE (OR PITCH) INFORMATION ABOUT THE AIRCRAFT MOTOR. SINCE THE SOUND SOURCE MOVES QUICKLY, THE PHASE INFORMATION WILL CHANGE QUICKLY BETWEEN THE MICROPHONES. I THINK OF THE SOUND ENVIRONMENT OF THIS AIRPORT AS A NATURAL PHASE SCULPTURE.

*Resonant Columns: Murdoch Court* - 8 CHANNEL TAPE - DURATION 30 MINUTES - MELBOURNE 1978.

THE MURDOCH COURT HAS HOLLOW STEEL COLUMNS THAT SUPPORT IT'S 3 LEVELS OF BALCONY. THESE COLUMNS ARE ALSO VERY INTERESTING RESONATORS THAT NOT ONLY GENERATE A CONTINUOUS DEEP PITCHED DRONE BUT ALSO RESPOND TO NOISES PRODUCED BY THE BUILDING AND BY OVERHEAD AIRCRAFT. WHEN THIS PRESENT RECORDING WAS MADE IT WAS A RAINY AFTERNOON WITH MURDOCH COURT CLOSED TO THE PUBLIC. 8 COLUMNS WERE MIKED SIMULTANEOUSLY AND RECORDED IN 8 CHANNELS.

AS THIS TAPE IS BEING PLAYED, YOU CAN HEAR THE COLUMNS VIBRATING SYMPATHETICALLY WITH THEIR RESONANT FREQUENCIES COMING FROM THE LOUDSPEAKERS.

*Pipe Phase* - 8 CHANNEL TAPE-DURATION 30 MINUTES - MELBOURNE 1978.

ALTHOUGH THE ORIGINAL RECORDING SESSION FOR THIS INVOLVED LIVE MUSICIANS, I REGARD THIS AS AN 8 CHANNEL FIELD RECORDING. THIS WORK IS RELATED TO *Moorabbin Airport* SINCE IT ALSO EXPLORES PHASE DIFFERENCES BETWEEN MICROPHONES PLACED AT DIFFERENT AND CHANGING DISTANCES TO A COMMON SOURCE OF COMPLEX HARMONICS. IN



THIS CASE, THE SOUND SOURCE IS A 4.5 METRE LONG ALUMINIUM PIPE FREELY SUSPENDED FROM TWO OF ITS NODES (NON-VIBRATION POINTS) AND PLAYED WITH A REPETITIVE RHYTHMIC PULSE. EIGHT VERY SENSITIVE B & K INSTRUMENTATION MICROPHONES (WHICH ARE OMNIDIRECTIONAL) ARE IN CONTINUOUS MOTION AROUND THE SOUND FIELD OF THE PIPE SO THAT EACH MICROPHONE *hears* DIFFERENT AND CHANGING PHASE INFORMATION ABOUT THE PIPE.

NOTE: THE PIPE USED IN THIS RECORDING IS ON DISPLAY IN THE EDUCATION DEPARTMENT ON THE 3RD FLOOR. A PHENOMENON TO EXPLORE WITH THIS IS THAT AFTER STRIKING, MOVE YOUR HEAD AT CHANGING SPEEDS/ANGLES/DISTANCES THROUGH THE SOUND FIELD OF THE VIBRATING PIPE SO AS TO HEAR THE DISTINCT STANDING WAVE PATTERNS GENERATED BY THE PIPES VARIOUS HARMONICS.

*Sound Sculpture with Resonators* - 8 CHANNEL ENVIRONMENTAL MONITORING SYSTEM, LIVE WITH THIS EXHIBITION - DURATION INDETERMINATE.

THE LARGE BOTTLE IN WHICH SOMEONE MAKES WINE ALSO MAKES MUSIC. IF YOU PUT AN AIR MICROPHONE INTO THIS BOTTLE AND LISTEN THROUGH A SET OF HEADPHONES, ALL OF THE SOUNDS GOING ON AROUND YOU AT THAT MOMENT SEEM TO HAVE BECOME MAGICALLY TRANSFORMED INTO *the most perfect music*. THIS TRANSFORMING EFFECT OF THE RESONANCE/ACOUSTICS OF A CAVITY WHICH IS SMALL IN RELATION TO A LARGE SOUND ENVIRONMENT IS TRUE OF COUNTLESS OTHER THINGS, SOME EXAMPLES BEING MUCH BETTER THAN OTHERS. I SUPPOSE A WHOLE NEW ART OF MUSICAL INSTRUMENT MAKING COULD BE BORN HERE IF ONE COULD CONCEIVE OF A MUSICAL INSTRUMENT AS A WAY OF LISTENING TO SOUNDS WHICH ARE ALREADY THERE. IN THIS CONTEXT, THE ULTIMATE MUSICAL INSTRUMENT BECOMES THE PERSON WHO IS LISTENING.

EIGHT DIFFERENT LOCATIONS WITHIN A 1/4 MILE RADIUS OF THE NATIONAL GALLERY OF VICTORIA HAVE BEEN SELECTED FOR SOUND AND ARE RELAYED SIMULTANEOUSLY TO MURDOCH COURT VIA LONG MICROPHONE CABLES. SOME OF THESE LOCATIONS WERE CHOSEN BECAUSE THEY ARE RESONATORS THAT ARE ACTUALLY PART OF A REAL ENVIRONMENT. THESE INCLUDE:

- A HOLLOW STEEL PILLAR ON A PLATFORM IN FLINDERS STREET STATION.
- A STORM DRAIN ON THE YARRA RIVER NEAR PRINCES BRIDGE.
- BACK STAIRWELL IN NATIONAL GALLERY.
- DRAIN PIPE IN BOILER ROOM OF NATIONAL GALLERY.

LOCATIONS AT WHICH RESONATORS WILL BE PLACED INCLUDE

- CYLINDER LISTENING TO FOOTSTEPS ON ST. KILDA ROAD.
- SEA SHELL PLACED IN ENTRANCE TO FLINDERS STREET AT CORNER OF FLINDERS STREET.
- CERAMIC RESONATORS DESIGNED AND CONSTRUCTED BY JUDY LORRAINE PLACED AT ARTS CENTRE CONSTRUCTION SITE.

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- LARGE SHELL PLACED NEAR POND IN QUEEN VICTORIA GARDENS.

NOTE: SINCE THIS CATALOGUE WAS WRITTEN BEFORE THE ACTUAL INSTALLATION WAS SET-UP IT IS POSSIBLE THAT SOME LAST MINUTE CHANGES OF EITHER LOCATION OR RESONATOR MAY BE MADE.

*Standing Wave Sculpture* - 8 SINE WAVE OSCILLATORS - DURATION: INDETERMINATE - MELBOURNE 1977.

IN ORDER TO LISTEN TO THIS, PLEASE MOVE THROUGH THE SPACE TO HEAR THE PHYSICAL DIMENSIONS OF THE SOUND.

THIS SOUND SCULPTURE IS BASED UPON THE ACOUSTICAL PROPERTIES OF LOW TO MIDRANGE FREQUENCY SINE WAVES. A SINE WAVE IS THE SIMPLEST OF ALL SOUNDS IN THAT IT IS A PURE FREQUENCY WITH NO HARMONICS. VISUALLY IT CAN BE REPRESENTED:



WITH THE CRESTS REPRESENTING *loud* SPOTS AND THE TROUGH REPRESENTING *soft* SPOTS. WHEN A SINE WAVE FROM AROUND 30 CYCLES PER SECOND TO ABOUT 500 CYCLES PER SECOND IS PLAYED IN AN ENVIRONMENT HAVING SOUND REFLECTIONS (SUCH AS A ROOM) THE REFLECTING SINE WAVE IS DISTRIBUTED THROUGHOUT THE ROOM ACCORDING TO A WHOLE SPECTRUM OF POSSIBLE PHASE RELATIONSHIPS (TWO EXTREME POSSIBILITIES BEING REINFORCEMENT WHEN THE CRESTS ARE IN PHASE AND CANCELLATION WHEN THE CRESTS AND TROUGHS ARE OUT OF PHASE). WHEN WALKING THROUGH THIS SPACE THE SINE WAVE CHANGES - GETTING LOUDER OR SOFTER - THESE CHANGES GIVE THE SOUND WHAT SEEM TO BE PHYSICAL DIMENSIONS. WHEN MORE THAN 1 SINE WAVE IS PLAYED SIMULTANEOUSLY EACH ONE WILL HAVE IT'S OWN SHAPE IN THE SPACE, SO THAT BY MOVING AND LISTENING ONE CREATES CHANGING PITCH/PHASE COMBINATIONS.

NANETTE HASSALL'S INSTRUCTIONS FOR A *Standing Wave Dance* ARE AN EXCELLENT DESCRIPTION OF THE RELATIONSHIP BETWEEN CONTINUOUS STANDING WAVES AND MOBILE LISTENERS. (SEE P. 10)

*Standing Wave Sculpture with Mobile Loudspeakers* - 8 SINE WAVE OSCILLATORS - ELECTRO/MECHANICAL SYSTEM FOR SPINNING AND MOVING LOUDSPEAKERS THROUGH SPACE-DURATION INDETERMINATE - MELBOURNE 1977 - 78.

THIS IS A VARIATION OF STANDING WAVE SCULPTURE THAT GREW OUT OF MY INTEREST IN THE EFFECT OF PHYSICAL MOTION OF A SOUND SOURCE ON THE PHASE PERCEPTION OF THAT SOUND. THUS A NUMBER OF HIGHER PITCHED SINE WAVES WILL BE PLAYED OUT OF 2 OR MORE LOUDSPEAKERS MOVING AT VARIOUS RATES OF SPEED.

*Piano Sculpture* - 4 PIANOS - DURATION INDETERMINATE-MELBOURNE 1978.

THIS WORK DEVELOPS A SYSTEM OF SPATIAL RELATIONSHIPS FROM A GROUP OF IDENTICAL INSTRUMENTS SO THAT THE HOMOGENEITY OF TIMBRE BECOMES A SPATIAL REFERENCE POINT. IN ADDITION TO THIS, THE PIANOS ALL PLAY A BASIC 84 NOTE 4 OCTAVE MELODY WHICH IS REPEATED AT CHANGING TEMPOS AND IN 4 DIFFERENT OCTAVE TRANSPOSITIONS WITH CHANGING DURATIONS OF SILENCE. THUS THE COMPOSITIONAL PROCEDURE BUILDS A SYSTEM OF CHANGING SPATIAL PATTERNS ROTATING AROUND A BASIC MELODIC SYMMETRY.

FOR A MORE DETAILED DESCRIPTION AND ANALYSIS REFER TO RICHARD HAMES ARTICLE IN THIS CATALOGUE.

PERFORMED BY THE VICTORIAN TIME MACHINE.

*Wave Spiral* FOR 5, 9 OR 12 JAPANESE RIN GONGS - DURATION INDETERMINATE - MELBOURNE. 1977

THIS WORK IS BASED ON THE UNUSUAL SOUND PROPAGATION QUALITIES OF THESE TRADITIONAL BUDDHIST TEMPLE GONGS WHEN THEY ARE PLAYED IN A MANNER SIMILAR TO A WINE GLASS THAT IS RUBBED WITH A CONTINUOUS CIRCULAR MOTION AROUND ITS RIM. THE CIRCULAR RUBBING OF THE BOWL SHAPED GONGS IS DONE WITH A LEATHER COVERED STICK. THE SOUND PRODUCED IS CONTINUOUSLY OUT OF PHASE WITH ITSELF. WHAT THIS MEANS IN PRACTICAL TERMS IS THAT THE LISTENER'S SPATIAL PERCEPTION WILL BECOME DISORIENTED BECAUSE IT IS NOT POSSIBLE TO TELL WHERE THE SOUND IS COMING FROM. IN PERFORMANCE, AN ENSEMBLE OF EITHER 5, 9 OR 12 GONGS IS DISTRIBUTED IN A LARGE CIRCULAR FASHION AND THEY SUSTAIN TOGETHER IN VARIOUS COMBINATIONS ACCORDING TO A SYSTEM OF SLOWLY INCREASING OR DIMINISHING DENSITY. THE SCORE FOR 5 IS AS FOLLOWS:

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      11 11   111 111  1  111 111   11  11
    22 22   222 222 222 222 222   22  22
  333     33  333   33333   333  33   333
    4   44   444 444 4444444444 444 444   44  4
      55   555  555 55555555 555   555   55
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THE NUMBERS REFER TO THE DIFFERENT PLAYERS, THE VERTICAL COLUMNS ARE SIMULTANEOUS AND THE HORIZONTAL REPEATS OF A NUMBER (SUCH AS 444) ARE THE EQUIVALENT OF TIED WHOLE NOTES. THE DURATION OF EACH VERTICAL COLUMN IS APPROXIMATELY 30 SECONDS, WITH DURATIONS INCREASING AS THE DENSITY INCREASES SO THAT

- 1
- 2
- 3
- 4
- 5 IS ABOUT 1 MINUTE LONG.

THIS WORK WAS COMMISSIONED BY THE VICTORIAN TIME MACHINE, WHICH PERFORMS IT.

*Handbell Sculpture Number 2* - FOR A LARGE SET OF TRADITIONAL ENGLISH HANDBELLS WITH ONE PERFORMER FOR EACH BELL - DURATION INDETERMINATE - SYDNEY 1976.

THIS WORK WAS ORIGINALLY COMPOSED FOR *Sanctuary* CHOREOGRAPHED BY NANETTE HASSALL FOR THE DANCE COMPANY OF NEW SOUTH WALES.

EACH PLAYER HAS A DIFFERENT RANDOM NUMBER SEQUENCE THAT GIVES HIM DURATIONS OF SILENCE IN BETWEEN WHICH HE RINGS HIS BELL ONCE UNTIL IT BECOMES FULLY SILENT. HE THEN ADDS THE NEXT DURATION OF SILENCE AFTER WHICH HE RINGS HIS BELL AGAIN AND SO ON.

THIS SIMPLE SYSTEM PRODUCES COMPLEX AND CHANGING SPATIAL PATTERNS.

THE ENDING OF THIS WORK IS SPECIAL IN THAT AN AMBIGUITY IS



CREATED AS TO WHETHER IT HAS ENDED. THIS IS ACCOMPLISHED BY THE ACTUAL BELL RESONANCES WHICH IN PART DETERMINE THE OVERALL DURATION - THE LARGER BELLS WILL ALWAYS FINISH LAST. THUS AT THE END ONE BELL MAY STILL BE COUNTING SILENCES AND OCCASIONALLY RINGING, AND THERE IS NO WAY FOR THE OTHER PLAYERS TO TELL WHETHER IT IS FINISHED EXCEPT BY WAITING AND LISTENING.

PERFORMED BY THE VICTORIAN TIME MACHINE.

QUINTET FROM *Sound Sculpture for Brass Band* - DURATION INDETERMINATE - MELBOURNE 1977.

THE FULL VERSION OF THIS IS TO BE PLAYED BY 5 SIMULTANEOUS BRASS QUINTETS IN A LARGE OPEN SPACE. THESE QUINTETS ARE SPREAD OUT FROM EACH OTHER AND MAKE NO ATTEMPT TO SYNCHRONIZE. EACH QUINTET IS WRITTEN AROUND A DIFFERENT TONAL CENTRE SO THAT A WANDERING LISTENER WOULD ASSOCIATE THE TONAL CENTRES WITH LOCATIONS IN SPACE. THE PITCH SEQUENCES THAT MAKE UP EACH TONAL CENTRE ARE DERIVED FROM THE OVERTONE SERIES FOR A BRASS INSTRUMENT. THESE PITCH SEQUENCES ARE EXPRESSED IN PERMUTATIONS OF A RHYTHMIC SERIES SO THAT ALL KINDS OF HARMONIC TEXTURES SPATIALLY CASCADE AT VARYING RATES OF SPEED.

PERFORMED BY THE VICTORIAN TIME MACHINE.

*Phantom Clarinets* - FOR TWO IDENTICAL CLARINETS - DURATION INDETERMINATE - NEW YORK 1975.

INSTEAD OF WRITING A DESCRIPTION, I HAVE INCLUDED THE INSTRUCTIONS FOR PERFORMANCE.

#### INSTRUCTIONS FOR PERFORMANCE

THIS DUET CAN BE PLAYED ON IDENTICAL PAIRS OF ANY SIZE CLARINET.

AN 8 NOTE MICROTONAL SCALE IS DISTRIBUTED BETWEEN THE INSTRUMENTS. IT IS NOTATED WITH A TABLATURE:

○	○	○	●	●	●	○	●
○	○	●	○	○	●	●	●
○	●	○	○	●	○	●	●

THESE SIGNIFY THE BOTTOM THREE FINGER HOLES OF A CLARINET (RIGHT HAND) IN VARIOUS OPEN/CLOSED POSITIONS. THESE ARE THE ONLY FINGERING CHANGES IN THIS WORK. THE UPPER FINGER HOLES (LEFT HAND) ARE IN A CONSTANT POSITION THROUGHOUT CONSISTING OF:

○

●

●

WITH THE THUMB HOLE CLOSED.

THE PLAYERS MUST BECOME PROFICIENT AT SUSTAINING THESE POSITIONS SO THAT THE QUALITY OF SOUND WHICH IS ACHIEVED IS THAT OF A NEARLY PERFECT SUB-AUDIBLE SINE WAVE.

A PERFORMANCE WOULD CONSIST OF THE PLAYERS SUSTAINING TOGETHER

VARIOUS COMBINATIONS OF MICROTONES AS INDICATED IN THE TABLATORES. THESE COMBINATIONS WILL GENERATE VARIOUS BEAT FREQUENCIES THAT AT TIMES WILL SEEM LOUDER THAN THE ACTUAL SOUNDS OF THE CLARINETS - CREATING AN ILLUSION TO BOTH THE AUDIENCE AND THE PLAYERS THAT THE CLARINETS ARE NOT MAKING A SOUND. THIS ILLUSION IS INITIALLY DISCONCERTING FOR THE PLAYERS WHO IN ORDER TO CREATE THE ILLUSION MUST EXERCISE EXTRAORDINARY EMBOUCHURE/BREATH CONTROL WHILE HAVING LITTLE KINESTHETIC SENSE OF MAKING A SOUND.

THIS ILLUSION IS NOT THE OBJECT OF THIS WORK AS MUCH AS IT'S STARTING POINT. FOR THE PLAYERS THIS MAY LEAD TO AN EXPLORATION OF PSYCHOLOGICAL PROCESSES THAT ARE TRIGGERED BY CONTROLLED BREATHING (ANALOGOUS TO YOGA). FOR AN AUDIENCE IT SHOULD PROVIDE A SOUND ENVIRONMENT IN WHICH TO EXPLORE A VARIETY OF PSYCHO/ACOUSTIC SOUND PROCESSES.

ALTHOUGH THIS WORK CAN BE PERFORMED IN A FORMAL CONCERT SITUATION IT IS MORE APPROPRIATE TO PLAY IT IN SITUATIONS THAT ENABLE IT TO BE A SOUND SCULPTURE (THAT IS WITHOUT APPARENT BEGINNING, MIDDLE OR END), SUCH AS A GALLERY.

IN PERFORMANCE THE FINGERING POSITIONS INDICATED ON THE TABLATURE SHEETS ARE SYNCHRONOUSLY SUSTAINED FOR A DURATION OF ONE BREATH FOLLOWED BY A PAUSE OF INDETERMINATE LENGTH. THIS PAUSE IS A NECESSARY REST PERIOD FOR THE PLAYERS SO THAT THE INEVITABLE FATIGUE CAN BE MINIMIZED. AS A RECURRING SILENCE IT IS AN IMPORTANT PART OF THE MUSIC.

THERE IS NO NECESSARY LIMIT TO THE TOTAL DURATION OF A PERFORMANCE EXCEPT THE REQUIREMENTS OF THE SITUATION. AS A SOUND SCULPTURE A TEAM OF PLAYERS COULD DO A VERY LONG VERSION. AN AVERAGE DURATION FOR MY PERFORMANCES HAS BEEN ABOUT 40 MINUTES, WHICH IS THE TIME IT NORMALLY HAS TAKEN TO PLAY THROUGH THE TABLATURE SHEETS TWICE.

NOTE: *At scheduled times this work will be performed in the Modern European Gallery, on second floor.*

# description of works in education department third floor

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(1) VIDEO BY WARREN BURT CONSISTING OF:

- (A) *Prince Alfred Bridge: Gundagai*
- (B) *Nepean Highway Interiors\**

(BOTH OF THE ABOVE ARE VIDEO DOCUMENTATIONS OF  
MULTI CHANNEL FIELD RECORDINGS BY BILL FONTANA)

- (C) *Phantom Clarinets* - DOCUMENTS PERFORMANCE BY BILL FONTANA  
AT LA TROBE UNIVERSITY.

- (2) SCORES OF ALL THE WORKS BEING PERFORMED DURING THIS EXHIBITION.
- (3) TAPE LIBRARY ON STEREO CASSETTE AVAILABLE FOR HEADPHONE LISTENING. THESE TAPES CONTAIN VARIOUS FIELD RECORDINGS, EXPERIMENTS AND PERFORMANCES OF THE PAST FEW YEARS.
- (4) EXAMPLES OF DIFFERENT TYPES OF RESONATORS USED IN *Sound Sculpture with Resonators* AND THE ALUMINIUM PIPE USED IN *Pipe Phase*. ON REQUEST, THESE INSTRUMENTS CAN BE EXPERIMENTED WITH BY VISITORS.

*\*Nepean Highway* - PART OF THE ORIGINAL PLAN FOR THIS EXHIBITION WAS TO MAKE A NUMBER OF MULTI-CHANNEL FIELD RECORDINGS. ONE OF THE LOCATIONS USED WAS A SELECTION OF THE NEPEAN HIGHWAY BETWEEN MORDIALLOC AND SEAFORD WHERE AT INTERVALS OF APPROXIMATELY EVERY HALF MILE THERE IS A LEVEL CROSSING WITH A BELL. I WANTED TO MAKE AN 8 CHANNEL RECORDING IN WHICH A MICROPHONE WAS PLACED AT EACH LEVEL CROSSING SO THAT THE MOTION OF THE SUBURBAN TRAIN PAST A SEQUENCE OF LEVEL CROSSINGS (IN ADDITION TO THE BELLS RINGING THE TRAINS BLOW THEIR WHISTLES) PRODUCED A SPATIAL SCULPTURE IN THE 8 CHANNEL FORMAT. BECAUSE OF THE CONSIDERABLE DISTANCE INVOLVED IT WAS NOT PRACTICAL TO CONCEIVE OF MAKING THE RECORDING USING MICROPHONES ON LONG CABLES, AND BECAUSE COMMERCIALY AVAILABLE FM WIRELESS COMMUNICATION EQUIPMENT DOES NOT WORK OVER A DISTANCE GREATER THAN 2,000 FEET. IT SEEMED THAT THE ONLY WAY OF DOING IT WAS WITH MILITARY WIRELESS COMMUNICATIONS EQUIPMENT. THUS THE NATIONAL GALLERY MADE A REQUEST FOR MILITARY ASSISTANCE TO THE AUSTRALIAN ARMY SCHOOL OF SIGNALS WHICH WAS APPROVED. UNFORTUNATELY THE RECORDING WAS ONLY A PARTIAL SUCCESS BECAUSE OF THE HIGH SUSCEPTABILITY TO INTERFERENCE FROM CAR IGNITIONS THAT THE FM RADIO EQUIPMENT WAS SUBJECT TO. STILL THE BASIC CONCEPT OF THIS SOUND SCULPTURE IS PRESENT AT MOMENTS WHILE MOST OF THE TIME IT IS AN EXPLORATION OF THE ELECTRO-MAGNETIC CONTENT OF A FIVE MILE SECTION OF THE NEPEAN HIGHWAY.

OCCASIONALLY THIS TAPE WILL BE PLAYED IN THE MURDOCH COURT.