Taming the wind: Aeolian sound practices in Australasia*

ROS BANDT

The Australia Centre, University of Melbourne, 137 Barry St, Carlton 3053, Victoria, Australia
E-mail: r.bandt@unimelb.edu.au

The movement of air is a powerful sound generator. Its presence has been perceived and encoded for over 40,000 years in Australia. It is present in natural and humanly organised environments. This paper traces various wind paths, from natural casuarinas to telegraph wires. Artists such as Peggy West-Moreland, Joan Brassil, Alan Lamb, Jon Rose, Chris Cree Brown, Jodi Rose, the present author and many others have devised their own Aeolian works that interpret, tame or represent the wind for acoustic purposes. Their attitudes to wind-powered sound installations are compared and contrasted against a variety of installation genres, found, permanent, semi-permanent, and ephemeral.

1. INTRODUCTION

The presence of the wind in Australia is a fundamental element shaping the land and its peoples. The wind has carved the landscape for thousands of years, actively changing its geomorphic composition on a daily basis. It erodes, moves layers of red dust through the Mallee, fans and directs the frequent bush fires, and controls the surf. It stirs the spindly casuarina, Australia's native pines, until they make wonderful tones of the harmonic series in just intonation, earning them their affectionate name, the whispering pines. Native grasses and swamp rushes rustle, as do the leaves of the poplar. Holes and crevices in the land itself can emit sound when the wind is from the right direction and strength. The energy of the wind has been used to drive windmills for water, and more recently, for the generation of electricity in the new wind propeller farms in Albany, W.A., and Portland, Victoria. Sound is often an undesirable by-product of such activity. So too the wind sonically activates man-made structures, albeit unintentionally. Telegraph wires and fences sing.

For thousands of years the wind has been listened to and interpreted for its sonic qualities, and utilised by man since the dreamtime. The indigenous *kalligooroo*, the bullroarer, is a simple aerial instrument swung about the head to activate air noise, (McLennan 2002). It is used in sacred ritual functions confined to men only. The tuning and twirling of swimming pool hoses above the head, instruments now known as whirlies, as used by Sarah Hopkins in her performances could be seen as a modern day echo of the quest for a spiritual evocation through harmonic sound.

Many artists in Australasia, including composers, musicians, sculptors and installation artists, have chosen to use the wind to power their works. These include large permanent object sound sculptures, environmental installations, semi-permanent sound sculptures, temporary exhibitions, and ephemeral performances. The extent of research into the aerodynamic qualities of the wind and the knowledge of Aeolian principles varies greatly in the works; some artists have spent years intuitively experimenting and others have done considerable scientific research. This knowledge may or may not be an important or conscious motivational factor in the creation of wind-generated sound art.

2. THE AEOLIAN PRINCIPLE, TERMINOLOGY

The word 'Aeolian' is derived from Aeolus, ancient Greek god of the winds. Hence its meaning, 'of, produced by or borne on the wind; aerial, as in Aeolian harp, a stringed instrument producing musical sounds under a current of air' (*The Shorter Oxford English Dictionary*, p. 29). The greater number of Aeolian art practices are Aeolian harps or wind harps, involving the activation of strings where the Aeolian principle, or the Strouhal's factor (see below), comes into play. Without the physical components of the wind being in the right relationship to the vibrating object, the work will not sound (speed, direction, pressure). Chris Cree Brown writes of this relationship:

> One of the fascinating formulas to predict an Aeolian tone is:
>
> $fo = cV/d,$
>
> where c = a constant (a dimensionless number known as the Strouhal number, which is usually around 0.2, but varies slightly with air pressure and other variables)
>
> V = the velocity of the wind
> d = the diameter of the string. (Cree Brown 2002: 2)

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The fundamental frequency of the string will sound at a certain ratio and, as the pressure increases, the string or pitch will overblow in the natural series of harmonics, the intervals of the octave, fifth, the fourth, and continuing in their whole number ratios. This emits the intervals of just intonation, of the natural harmonic series, often described as heavenly, harmonic and consonant in other musical practices. It is the tuning of the natural universe, untempered.

Many factors come into play which influence whether there is a sound at all, and if so what is heard. Since the aerodynamic flow of the wind is constantly changing, these elements are in a constant dynamic relationship. So is the sound. The slightest change in temperature and humidity can alter the sound considerably within moments. Site orientation, the wind path and the nature of the acoustic soundscape in which the harp is situated influence the sound formation and its perception. The number and length of strings will affect the loudness and range of harmonics between the strings. The tuning of a number of strings at the same pitch will determine the density and richness of the sound and the degree of sympathetic vibration possible. The degree of tension on the string in relation to the wind's pressure is the most critical feature. The materials and acoustic design of the body and the type of soundboards will influence the timbre of the sound produced. The way the strings are attached to the bridges will affect the sound transfer from string to resonator.

3. AEOLIAN FOUND OBJECTS, BRIDGES AND WIRES

The sound artist Jodi Rose has recorded the singing of bridges in various locations around the world, including Sydney, San Francisco and Helsinki. She has been inspired to some extent by the ability of bridges to function as Aeolian instruments, but this is really just one element in the total sound she is chasing, which includes the entire surrounding soundscape, the traffic over the bridges, the interior sounds bridges emit, and the sounds produced by playing them. The Aeolian features of wires have inspired several artists, reaching as far back as the nineteenth century: from Percy Grainger to Leigh Hobba's interpretation of the rabbit-proof fence in 1979, to the recent work of Jon Rose (McLennan 2002). Jon Rose has entered into a long-term project recording the fences of the outback in Australia. Using location recordings, photographs and documentation, he recently improvised and performed on a reconstructed fence-wire installation in the George Adams Gallery, Victorian Arts Centre for a Melbourne Festival, doing several daily performances over many weeks with the American violinist Hollis Taylor. This musical practice is 'inspired by the natural sounds created by the wind 'playing' upon the omnipresent fences of outback Australia' (programme note, Rose). In these cases, bridges and fences can be considered found objects containing Aeolian characteristics, which the artists have used and interpreted in their individual practices.

4. WIRES AS LARGE OUTDOOR INSTALLATIONS

One artist who was quick to seize on the vibrating qualities of telegraph wires was the scientist Alan Lamb. He has developed his own wire music over a twenty-year period and built several large-scale wire installations for the purpose (see Discography and http://www.sounddesign.unimelb.edu.au/web/biogs/P000277b.htm). He has installed both new and abandoned telegraph wires, on several sites in Western Australia and Japan. Lamb has written extensively about the behaviour of sound in relation to the string:

> In very long wires such as telephone wire which are also very thick (three millimetres), the fundamental is well below one hertz. Thus only the higher frequencies fall into the auditory range. The very high harmonics (for example 250 Hertz and above) become so crowded they cease to have discrete frequencies but rather tend to beat together, creating second-order frequencies of lower pitch . . . the choir-like quality of wire music is made up of numerous voices, each competing for harmonic dominance. (Lamb, in Bandt 2001: 32)

In 2001 I accompanied him to Wogarno Outback station, a day's drive northeast of Perth, where he had installed a pair of tensile wire strings over a vast section of the landscape, bolted between rocks and reaching a kilometre up a large hill. Lamb describes this work in detail:

> This work represents one extreme of the range of structures covered by the term 'Wire Installation'. It is a sound sculpture. It is not an instrument to be played with or modulated. Its design is minimalist, consisting of a pair



Figure 1. Alan Lamb, *Wogarno Wire Installation*, 2001, Wogarno, Western Australia (photo: Ros Bandt).

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of galvanised steel wires separated 25 cm, 3.15 mm diameter and 300 metres long. The wires are drawn taut between the top and bottom of Wogarno Hill, a solitary red granite landmark three by one kilometres rising about 50 metres above the semi-desert plains of the mid west outback of Western Australia. The wires are tied independently at each end to massive boulders using the minimum fixtures possible. There is a single 2 cm thick steel bolt wedged into a crack in the bottom boulder around which both wires are tied. At the top of the hill each wire is tied to its own loop of fine steel rope wrapped around the one boulder. From their tie points the wires are guided up from the back of each boulder and over the top where they are kept from scraping on the rock by the primitive means of using short lengths of broken sticks and corks held in place simply by the tension of the wires to act as 'bridges'.

The bridges lie on large, found, naturally occurring plates of granite which transmit the vibrations of the wires into the boulders and cause them to sing softly. When the winds are favourable and flowing smoothly so high above the plain they excite the most beautiful harmonic and ever changing hymning. It is the perfect sound to represent all that is so mysterious and wonderful in this vast landscape. It is soft enough to be inaudible more than a few metres from the boulders, and loud enough to hear every infinite detail when the ear is held to crevices in the boulders. The ground can be felt to vibrate subtly underfoot. Lying upon the boulders fills the entire body with the vibration, every cell. It is healing. (Lamb 2002, Australian Sound Design website)

The sound of this installation was digitally recorded by the present author and can be heard at http://www.sounddesign.unimelb.edu.au/web/biogs/gallery/lamb/wogarno.mp3

Although the location of this installation is privately owned, the wire music has been heard by the many tourists visiting Wogarno Station. It was installed for the *totally huge new music festival* in 2001, and visited by several thousand people despite its remote location.

The distance and the length of a string in controlling the durational elements of the sounds heard, is obvious in Lamb's large-scale works. It takes time for sound to travel over long distances before reaching the listener. Lamb has done extensive research into auditory perception and the human brain and has developed a number of theories in relation to the wire music and its behaviour. His use of piezo contact recording devices and the extensive multi-channel mixes of his work at the post-production stage have given rise to an idiosyncratic wire music with two complete CDs being dedicated to it (Discography, Lamb 1990, 1995).

5. PERMANENT PUBLIC INSTALLATIONS

As early as 1970, Peggy West-Moreland collaborated with Steve Kele, George Cain and David Thomas to create *The Singing Ship*, a twelve-metre concrete sculpture at Emu Point south of Rockhampton, Queensland. Situated high on a cliff overlooking the Pacific Ocean at the Tropic of Capricorn, it marks the place where Captain Cook first sighted Australia in 1770. This Aeolian sound sculpture has slotted pipes activated by the wind installed in a white concrete boat-like form which acts as a resonator. Chord-like drones sing when the wind direction and velocity are suitable. A time capsule containing unknown objects and documents is buried in the ground to be opened at its centenary in 2070, a poetic gesture which looks forward to the changing technologies of the future. This is one of the first works to use sound and sculpture for a public landmark in Australia.



Figure 2. Alan Lamb, *Wogarno Wire Installation*, 2001, bridge detail (photo: Ros Bandt).

Thirty years later, Joan Brassil's *A Tether of Time*, 2001, was also commissioned as a major landmark, but for the industrial satellite town of Campbelltown, forty kilometres west of Sydney. It is situated on a corner adjoining a noisy main intersection with seven sets of traffic lights leading to seven streams of traffic. The artist accepted the challenge of working in sound at this noisy site and has utilised a number of poetic elements to engage the listener-perceiver into the act of listening in such an environment. Eight-metre masts

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Figure 3. Peggy West-Moreland, Steve Kele, George Cain and David Thomas, *The Singing Ship*, 1970, Emu Point, Rockhampton, Queensland (photo: Ros Bandt).

in the shape of tuning forks, fold back as if embracing the art gallery, reminiscent of giant windswept grasses. A large reflective pool and the inscribed concrete supports for the ground harp are important components which establish the work visually as a major sculpture in its own right. The materials and elements chosen reflect the history of the site. Brassil created text fragments which refer to the massacre, and the totem of the imitative lyrebird, of the Dharawal people.

Casuarinas sigh
Shush . . . um . . . swish
As breezes slither needle combs
Whilst
Dharawal Lyre-birds sigh
Mimicking breezes of shush
Um . . . swish
Um . . . swish

The movement of wind, seen in the rippling water and heard in the three harps, informs one of the importance of nature and the passing of time in this urban precinct. The motive behind this design is to bring the ethereal sound in the air to the ground by tethering one

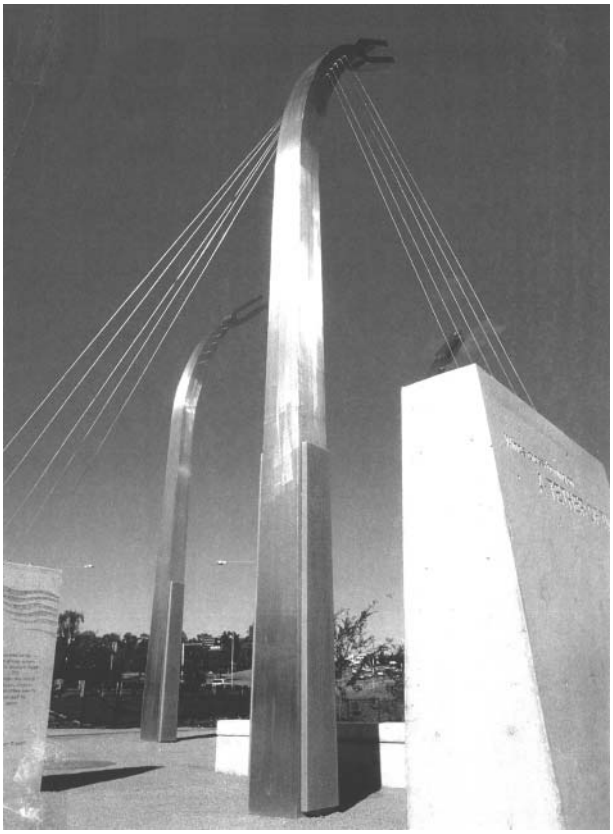


Figure 4. Joan Brassil, *A Tether of Time*, 2001, Campbelltown Landmark Installation 2002, NSW (photo: Bob Hughes).

of the harps to the ground with large blocks of sand-blasted concrete. The sculpture is a trio of harps: the ground harp is intended to be played; the remaining two harps are aerial. The strings, grouped in sets of five like musical notation, are of different thicknesses, with the tethered harp, intended for plucking, having more solid and durable ones. These are made of twisted stainless steel. Brassil engaged Alan Lamb to tune the two aerial harps, and a musician, Ewan Kidd to tune the tethered harp.

The artist invites the listener to engage in the intimate act of listening by turning away from the traffic and placing the ear to the mast in this busy precinct, an extraordinary juxtaposition of opposites. They can also pluck with a coin or bow with a stick. The text suggests:

Placing the ear
Against the masts
Currents of air
May be heard throbbing
Through wires as a sonic harmonic
Searching for a song.

Sensual contact is made with the elements; aerial sounds float to the ear, the wires can be touched and the transferred vibrations can be felt as well as heard, throbbing in the hollow steel masts themselves, just as

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Figure 5. Joan Brassil, *A Tether of Time*, tuning the strings at the moment of installation (photo: Joan Brassil).

the windswept ripples come and go in the waters of the reflective pool. The wind is in a state of theatrical play, the artist uses it as a jester.

6. SEMI-PERMANENT INSTALLATIONS

The present author's Aeolian harps were first constructed in Red Cliffs, near Mildura for the last Mildura Sculpture Triennial, held in 1988 on the banks of the Murray River. Following the exhibition they were installed in the Red Cliffs High School where Steve Naylor, head of the construction team, was teaching. Here they remained amid casuarina trees, for three years, tuned and played by the students before they were recommissioned to be recorded by the ABC at Lake Mungo, in New South Wales for the Sound Art Australia Prize organised by the ABC and the WDR. The presence of the wind is everywhere in this remote desert environment. It has eroded fossil-like forms, carved into human-sized shapes standing erect like spectres, and the layers of the ancient earth are revealed beneath the feet in a map of geomorphic history, complete with pre-ice-age fossil fish and shell middens, signs of the first human habitation. Each day the wind cleanses the marks of daily activity on the



Figure 6. Joan Brassil, *A Tether of Time*, 2001, detail of five strings (photo: Anita Beuthien).

high sand dunes of the lunette surrounding this ancient dried salt lake. It is a wind-driven soundscape.

Here in this interior wilderness, the harps could find the sensitive quiet needed to record them. Larger soundboards were made to enhance resonance, and the tuning pegs, originally wood, were turned in stainless steel to be more stable in the extreme temperature conditions of the desert environment. The best time for the sound was at dawn or approaching nightfall when the harsh desert temperatures of the day abated and soft breezes cooled the earth. The heavenly music of slowly changing polyphonic voices in just intonation went on for hours. In the hot winds, they screamed their overblown upper harmonics, activated by the wind's force and the over-dried strings. At dawn they whispered new awakenings in soft cool breezes.

The harps were inspired by the form of a cobweb, made to stand up vertically. Every second section was removed, so that a person could enter into its centre in order to play them. They were designed with four ground harps oriented north, south, east and west to maximise the possibility of the wind playing them,



Figure 7. Ros Bandt, *Aeolian Harps*, 1987, Murray River Mildura (photo: Ros Bandt).

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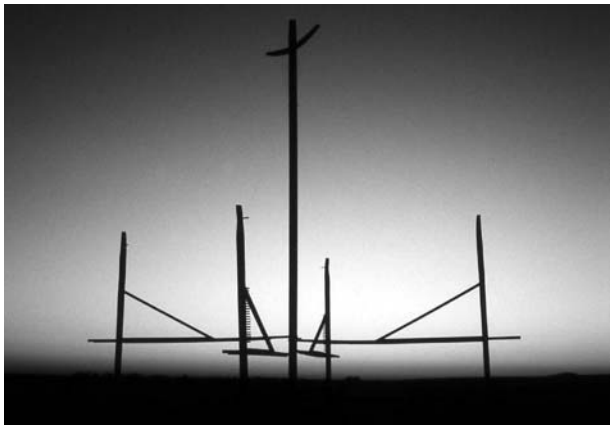


Figure 8. Ros Bandt, *Aeolian Harps*, 1992, second site, Lake Mungo at night (photo: Ros Bandt).



Figure 9. Ros Bandt, *Aeolian Harps*, 1992, Lake Mungo, detail of tuneable pegs and stringing (photo: Ros Bandt).

given that the wind has to be at a right angle to the strings at the right pressure to produce a sound. Each of the four harps interlocks around the central pole with Japanese joints so that it can be moved from site to site and taken and played indoors.

Strung in fifty-pound nylon filament, each ground harp has twenty-two strings, individually tuned like a lute in courses to encourage sympathetic vibration. Various scales were tried around the dorian or pentatonic scales, around G and D below middle C, the latter being chosen as the most suitable and stable. Given the number of strings and their delicacy, the sound design mirrors the cobweb; fine silk strands of intricate complexity weave a delicately fine but strong polyphonic musical fabric. The harps and their music seem almost invisible and suspended in time, like a cobweb. The desire to blend in with what was there was an essential factor in designing the installation. It was not to dominate in any way but to be a medium to elicit what was already present. As the Mutti Mutti elder, Alice Kelly said, the harps seemed to be reaching right back to the dreamtime, drawing us all together in what has been and what is (McLennan 2002). The great beauty of the just intonation was making this relationship for her, as she had often heard very similar sounds in the casuarinas as a child. The harps became integrated with the natural environment. When the week-long recording session was over, they returned to the city without leaving a trace.

The harps may be played by many people at once. Each harp is of human height for ease of playing. There are fourteen aerial strings in the overhead centrepiece and four bass rider strings which connect from the upper strings to each of the four surrounding harps. This means more bass tones can be plucked. The sound skates through the harp's entire oregon structure radiating through the central pole, a wonderful place to listen to the spatial sound, played by wind or human.

Ear to the mast to listen,
Fingers to the strings to sound

For the commissioned electro-acoustic radio work entitled *Mungo*, recordings of the Aeolian harps had to be made. This was tricky, as the nature of the wind, while essential to sourcing the sound, can interfere with the recording process. A variety of microphone techniques were set up including transducer contact strips, attached to the mast in an attempt to trap the internal amplified resonance heard through the wood, an omnidirectional *kunstkopf* to capture the changing spatial configuration of the sound around the four harps on the ground and in the air, and stereo figure of eights for the general soundfield of the location. In the studio of acoustic art, WDR, Cologne, these were multi-tracked seamlessly over the entire length of the piece. The voice of Alice Kelly drifts in, together with flying PVC drones, pardelotes feeding their young in rocky crevices, the crusty rhythms of dried leaves caught in parched bushes, the Aeolian sands changing place, and the crunching of sand under foot. The electro-acoustic work *Mungo* has been adapted for theatrical, interactive dance and concert situations including a surround-sound theatrical performance installation in the studios of the WDR in 1992. An excerpt of this can be heard at http://www.sounddesign.unimelb.edu.au/web/biogs/gallery/bandt/mungo.mp3

Since being installed at Lake Mungo, the Aeolian harps have had a varied life. They were exhibited in an urban outdoor exhibition at the Gasworks sculpture park in Melbourne and will become the centrepiece of the artist's Aeolian garden in her acoustic sanctuary in north central Victoria.

Chris Cree Brown has been investigating and designing Aeolian harps since 1983. His recent concrete form is the first he has actually built. This was commissioned for the Botanical Gardens in Christchurch New Zealand in 2002:

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> Information on the design and construction of Aeolian Harps is scanty at best, and often misleading or erroneous. However, through a series of (unsystematic) trial and error experiments over the last twenty-five years, I have made incremental improvements in the efficiency of sound production. The more recent constructions embody several unique innovations such as bridges that allow the strings to lie perpendicular to the soundboard as opposed to strings that are parallel to the soundboard. (Cree Brown 2002)

In the design for Christchurch, Cree Brown had three very clear design considerations. He wanted to make:

(i) a design that would collect the wind and send a laminated flow of air onto the strings,
(ii) a design that would reflect the sound to a central point where the public could hear and enjoy the sounds,
(iii) a design should preferably limit the amount of extraneous sound (traffic, leaves rustling, other voices). (Cree Brown 2002)

His resolution of these questions can be seen in the plans for the harp model, scaled to forty per cent of its actual size (figure 10).

Cree Brown's use of a concrete shell form not only directs and funnels the wind into the opening over the strings, but it also contains and amplifies the sound, making it more directly perceptible to the listener. The use of an elevated platform helps this as well. 'The shape of the sculpture is symmetrical about its latitudinal and longitudinal axis and incorporates three different elliptical curves creating a resonant chamber that is as efficient as possible (with all the sound being directed or redirected to the centre of the chamber). The material of the structure is concrete since this material works well as a reflector of sound. The central wall creates a bottle-neck effect where the wind is forced through the gap which contains the harp. As long as the pressure on one of the openings is different from the other, and the area of the openings is substantially greater than the gap in the wall, air will be forced through the gap and thus activate the strings (Cree Brown 2002).

After several tuning experiments, the artist settled for a ten-stringed instrument with six strings tuned to the same pitch (around an F), two strings tuned to a major third higher and two strings tuned to a perfect fifth higher. A forty per cent scale working model was built and tested on a hill at a farm near Darfield. The results, in the artist's own words, were as follows: 'I was elated by the beauty of the first few sounds, but over the course of a year, I was able to significantly improve the sound. The resonant chamber(s) seemed to substantially amplify the sound (although in reality, it is more a matter of containing the sound)' (Cree Brown 2002, unpaginated). From September through to November of 2002, the harp was exhibited in the Christchurch Botanical Gardens as part of the Art and Industry Biennale. The artist chose to mount the model on a plinth for the following reasons:

(1) The plinth conveys the idea of the sculpture as a model.
(2) The plinth adds to the volume of the structure and means that there is a bigger object for the wind to find a path through. (Also, in sheltered places such as the Christchurch Botanical Gardens, there is substantially more wind a few feet above the ground than at ground level.)
(3) The plinth means it is more difficult for the public to reach the delicate parts of the harp itself.
(4) Without the plinth, the public would have to bend down to hear the harp speak.

Cree Brown's positive reaction to the sound is recorded with a slight tone of relief and surprise at the wind's involvement: 'I have been elated with the

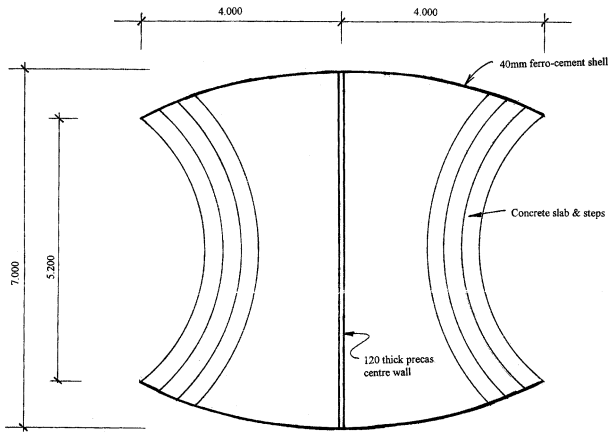


Figure 10. Chris Cree Brown, *Plans for Aeolian Harps*, 2002, Christchurch, New Zealand (Chris Cree Brown, catalogue, p. 14).



Figure 11. Chris Cree Brown, *Aeolian Harps*, 2002, loading the harp, detail of resonator containing strings (Chris Cree Brown, catalogue, p. 44).

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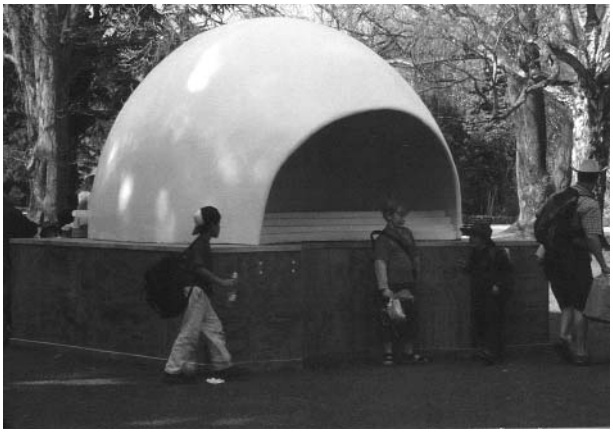


Figure 12. Chris Cree Brown, *Aeolian Harps*, 2002, Christchurch Botanical Gardens, note plinth (photo: Chris Cree Brown, catalogue, p. 47).

success of the project and the response from the public. The site has proved to be near perfect. My fear that the surrounding foliage might inhibit the wind flow was unfounded; indeed the foliage acts to ameliorate the stronger gusts of wind (particularly from the North West quarter)' (Cree Brown 2002 unpaginated). Every artist involved in Aeolian harp construction has had to wait to experience the delicate interplay of all features of the design that are ultimately tested by the wind's fickleness.

7. EPHEMERAL INSTALLATIONS AND EXHIBITIONS

To some extent all sound works are ephemeral as each sounding moment is unique and can never be repeated. Some works build this into the ideology for the piece more than others. The collaborative sound garden installed over the sea and on the sand at Lillies Beach, Flinders Island, a remote island wilderness in the middle of Bass Strait, between mainland Australia and Tasmania, was one such installation and event. It was part of the Flinders Island Wind Festival. Situated at the latitude of the roaring forties, the islanders experience extraordinary wind paths. They celebrate it and integrate it into their daily lives and activities. Some twenty people organised by Jon Hizzard, Phil Kelly and the author as commissioned artist, constructed an Aeolian garden and singing bows made from tea-tree and bird-scaring tape installed on the old pier supports. The bird-scaring tape hums in the wind and was attached in several strands like a bow harp. A large wind-chime hammock sculpture was suspended from a woven canoe-like roof structure lashed to the pier's end. A large bell was anchored to a buoy, so the tide played a part in activating the sound as well as the wind. It was left to the mercy of the wind over the next weeks and months, a floating celebration of the wind and its behaviour.

A local chora maker adapted piers and old tanks into Aeolian installations and playable instruments by lashing his instruments to them as resonators. He turned a single chora into an electronic portable sound sculpture and erected it on the beach at Lillies with other portable sound sculptures which were created and brought to the beach for the opening weekend. Another local artist installed plastic bottles with cut fipples, whistling bottle sticks, whining tones. The wind conducted this spatial Aeolian orchestra on sea and land (Bandt 2003). The spirits of the land seemed to be evoked. The beach adjoined the graveyard where some of the last aboriginal Tasmanians were buried. The haunting beauty of the sound matched the pristine visual splendour of the natural environment.

8. COMPARISONS AND CONTRASTS OF AUSTRALASIAN AEOLIAN SOUND INSTALLATIONS

This study is by no means definitive. There have been other installations involving Aeolian characteristics in Australasia by other artists such as Ernie Althoff, Herbert Jercher, and Graeme Davis (Bandt 2001). In the work of Les Gilbert and Garth Paine, wind data have been used as an environmental controller of sound synthesis in installations. The responsive sound installation *Reeds* by Garth Paine is a particularly sophisticated example of this and can be experienced at the websites http://www.activatedspace.com.au and http://www.sounddesign.unimelb.edu.au/web/biogs/P000258b.htm

The works included here, however, have established themselves in distinct ways to articulate the diversity of Aeolian practices, usually developed in comparative isolation. There are, however, some common features. An interest in spatial polyphony is common in the design of some installations (Brassil, Bandt, Lillies Beach, Paine) and many artists have taken Aeolian sound fully into the realm of musical



Figure 13. *Collaborative Sound Garden*, Wind Festival, Lillies Beach, Flinders Island, 2000 (photo: Ros Bandt).

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composition through recording their Aeolian installation (see Discography, Lamb, Bandt). Other artists have tuned into the Aeolian features heard in both natural and man-made environments, using them to very different ends, such as indoor installations to improvise and perform upon (Rose, Flinders Island Sound Garden).

Certain style characteristics can be observed from the works discussed that can identify Aeolian sound practices as Australasian. The first is the very large scale of the installations (West-Moreland, Lamb, Brassil, Bandt) compared with historical Aeolian harps usually scaled for domestic windows and doors. Strings are sometimes kilometres in length, in the case of Lamb, and the permanent object sculptures of Brassil and West Moreland have been of a size intended to be a major landmark in relation to the surrounding area. Large-scale works are not always permanent, however, as the Flinders Island installation covered the entire beach front and the water over the distance of the old pier, some 200 metres. Jodi Rose's bridges project includes locations all over the world, including San Francisco, Brooklyn, London, Helsinki and Sydney.

The second common trait is the inspiration from Aeolian features already found in the environment. The casuarina pines have influenced Brassil, Bandt and Hopkins, while man-made structures such as fences, bridges and telegraph wires have motivated Jon Rose, Leigh Hobba, Alan Lamb and Jodi Rose. A third characteristic is the flexible form of many of these harps, in some cases losing the box resonator entirely or organising innovative resonating forms such as hollow masts or funnelling domes or shells. In the cases of Brassil and Bandt, this flexibility has shaped their designs to include the multi functions of human interaction as well as environmental aerial sound. Flexibility may include site adaptability; Jon Rose and Bandt have moved their installations indoors for exhibition and performance. Many artists working in Aeolian practice seek a poetic or spiritual revelation which is revealed in the romantic or heavenly music they are searching for (Lamb, Hopkins, Brassil), and this is not uncommon throughout the history, especially in the nineteenth century (Cree Brown 2002). Sometimes this is explicitly presented as part of the work, such as in Joan Brassil's text inscriptions.

There are, however, important differences between the works and the artists' approaches. Some artists are constructing elaborate sound sculptural instruments designed to extract and modify the sound, wanting to amplify or contain it (West-Moreland, Bandt, Cree Brown, Brassil), while others are happily embracing found objects and the more random elements associated with their soundings (Jon Rose, Jodi Rose). The use of visual forms as object sculptures in their own right is particularly evident in Brassil, West Moreland and Cree Brown, while in other works the form is predominantly shaped by function (Bandt, Jon Rose, Jodi Rose, Cree Brown). The siting and placing of the works varies a great deal, from private to public, urban to desert, coastal to wilderness. In each case, this brings with it completely different site orientation for the listener (desert quiet, dense traffic, park, gallery) and an individual spatial listening orientation (remote, urban, comfortable, private, shared).

The acoustic communication of the Aeolian sound practices does not always stay within the installation itself but may extend through elaborate recordings and mixing to become electroacoustic composition (Rose, Bandt, Lamb), improvised works (Jon Rose, Bandt, Brassil), gallery installations (Jon Rose, Jodi Rose, Bandt), or interactive collaborative dance performances (Hopkins, Bandt, in Bandt 1990). Jon Rose rebuilds indoor fence installations which mimic the original, while Jodi Rose's exhibited illuminated globe serves a different function – to map the multiple locations of the bridges she recorded for the audio.

All these artists have embraced the wind as a powerful element in their work. The unpredictability of its appearance and the instability of flow have to be built in to the works. The wind is capricious and ephemeral. Artists have wrestled to tame the wind, bridling it through physical forms with the intention of hearing it sing the natural harmonic series of just intonation, the charming music the wind plays when it intercepts a form. When it occurs, it is the artist's reward for inventive and courageous handling of discrete environmental conditions. Aeolian practices are site specific, difficult to control and take much time to understand. The refinement in the practices described above is a testament to the time and ingenuity spent by those artists who have chosen to 'tame the wind'.

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<www.sounddesign.unimelb.edu.au> Search and browse for Jodi Rose, Jon Rose, Alan Lamb, Joan Brassil, Ros Bandt. Be sure to check the audio visual gallery at the end of each entry for images, video and sound.

<www.abc.net.au/arts/adlib> See Jon Rose, Percy Granger, Alan Lamb, Ros Bandt.

<http://www.activatedspace.com.au/> See Garth Paine.

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