



Dr Brigid Burke

Coral Bells composition, acousmatic sound and video art by Dr Brigid Burke

<https://museumvictoria.com.au/discoverycentre/websites-mini/federation-handbells/coral-bells/>

Coral Bells - The Intersection of Computer Music and Acoustic Ecology (Paper)
Topic: Art and Music

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Abstract

Coral Bells - The Intersection of Computer Music and Acoustic Ecology

The significance of the work is the conversation of the Federation Handbells 1 x Standard set and 1 x Quarter-tone set provided by Museum Victoria Australia, notated score, acousmatic sound, video and Bass Clarinet. The dead coral is the focal point that accentuates the audio-visual composition reflecting both the translucent Federation Bell sounds, Bass clarinet, glass and dead coral.

This paper is about how the Federation Hand Bells vibrates with the coral and was recreated into visuals of moving glass objects, glass plates and two mosaic glass windows with translucent drawings under the glass creating a three-dimension effect. The sounds of the Federation Bells were then transformed into acousmatic sounds through filters. Acoustic resonators on the Federation Handbells vibrate with the coral and are recreated into visual images of moving glass objects. White/grey textures, sepia, hints of pastel colours, burnt reds, yellows and gold images are layered to create a thick timbral texture that forms the video voice. The sounds of subtle high pitched bells, gritty sand sounds and bass clarinet periodically join the drones with discordant multiphonics and monophonics which are modified with granulation and pitch shifters. Flourishes of notes dominate throughout. Subsequent acoustic and visual motifs capture and emerge sonically/visually creating timbre layers of the interpreted coral and glass reflections.

Granular synthesis of the Federation Bells was then again layered into multi channelled processing. The audio processing was processed live and pre recorded. The sounds of subtle high-pitched bells and gritty sounds electronically reproduced with the bass clarinet joining the drones with discordant multiphonics and flourishes of notes dominate throughout. The score is graphically notated (*The bass clarinet part produced is a graphic/notated score that can be adapted for other instrumentation for future performances*).

Coral Bells required a significant amount of research into changes of the overtones sounds of the Federation Hand Bells, using different mallets and sonic environments, the visuals went into the details of light interactions on the coral. The samples of sounds and images were collected from the Federation Hand Bells from Melbourne Museum and Coral beaches on and surrounding Fitzroy Island. The audio and granular manipulation focused on creating stimulation in the composition.

Finally artistic rationale was to explore the diverse overtone, microtone sounds of the Federation Handbells and Bass Clarinet with the discrete sounds of the ecosystems of coral from Fitzroy Island Northern Australia.

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Key words composition, acousmatic sound and video art, Australian Government through the Australia Council for the Arts, Museum Victoria on behalf of Creative Victoria

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Coral Bells - The Intersection of Computer Music and Acoustic Ecology

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Coral Bells: Museum Victoria

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Premise

In 2015, I was awarded an Australia Council grant to create a work for the Federation Handbells titled "Coral Bells". The composition uses the Federation Handbells to provide deepening connections with the Australian landscape. It was first performed by myself on (bass clarinet, live electronics and video) and Carmen Chan, Erica Rasmussen and Wendy Couch on (Federation Handbells) as part of the Tilde Festival in 2016. It is a thirty-minute, audio-visual composition for Federation Handbells, bass clarinet, acousmatic sound and video projection in four movements. It involves both pre-recorded material and live performance.

1. Introduction



Figure 9.1 Brigid Burke performing Coral Bells at Tilde Festival Melbourne Australia 24th January 2016 with processed video footage.

Coral Bells is a quartet for two sets of Federation Handbells (1 x Standard set and 1 x Quarter-tone set (see *Figure 1.2 Technical set up*) provided by Museum Victoria, bass clarinet (or other instrumentalist), acousmatic sound and video.

The artistic rationale is to explore the diverse overtone, microtone sounds of the Federation

Handbells and bass clarinet with the discrete sounds of the ecosystems of coral from Fitzroy Island Northern Australia.

Acoustic resonators on the Federation Handbells vibrate with the coral and are recreated into visual images of moving glass objects. White/grey textures, sepia, hints of pastel colours, burnt reds, yellows and gold images are layered to create a thick timbrel texture that forms the video voice.

The sounds of subtle high-pitched bells, gritty sand sounds and bass clarinet periodically joins the drones with discordant multiphonics. Flourishes of notes dominate throughout.

Subsequent acoustic and visual motifs capture and emerge sonically/visually creating timbre layers of the interpreted coral and glass reflections.



Figure 1.2 Technical set up for performance

2. History behind Coral Bells

2.1 The Federation Handbells

The Federation Handbells are cast in silicon bronze and exhibit a unique design and pitch. Each set of bells covers two chromatic piano octaves (from E to E). The bells are played by striking them with a rubber tipped mallet. They can be played in the style of a xylophone by a

single musician controlling a set of bells, (Coral Bells used this style) (see *Figure 2 Federation Bells set up*) or each musician can play one bell.

Each set consists of 24 bells contained in four travelling crates that will fit in the back of a station wagon. The largest crate weighs 28 kg and the two largest crates require two people to lift them. The Federation Handbells range in size from 120mm high to 180mm high and have an average weight of 1kg each.



Figure 2.1 Federation Bells set up

2.2 Background of the Federation Bells - Celebrating the Centenary of Federation

The Federation Handbells were created in 2001 to celebrate the Centenary of Australian Federation. There were three parts to the Federation Bell project:

The Federation Hand Bells, (*Coral Bells* used these) The Federation Bells, a large-scale sculptural installation at Birrarung Marr and a set of harmonic orchestral bells made for the Melbourne Symphony Orchestra.

2.3 Unique design and construction of Federation Bells

The handbells were designed and constructed by physicist and instrument maker, Dr Neil McLachlan and sculptor, Anton Hasell, co-directors of Australian Bell. It took almost three years to research and develop the world's first true harmonic bells.

Unlike church bells that usually produce a chord-like sound, the handbells produce a single clear musical tone. This many of new possibilities for bell music, since, as Neil McLachlan said, "for the first time, they can actually be scored for." McLachlan and Hasell worked with technology originally designed to analyse and fine-tune car parts to control vibration and reduce engine noise. This technology, developed by Dr Josef Tomas of RMIT, was perfect for predicting how various bell profiles would vibrate. Dr Tomas was delighted - "We'd only ever tried to get rid of noise, never make it," he said.

There is a sculptural display of the Federation Handbells located at Melbourne Museum and examples of their music can be heard on the hour (between 11am and 4pm). (*Figure 2.3 Federation Bells Museum Victoria*) The pieces are arranged and performed by master percussionist Peter Neville.



Figure 2.3 Federation Bells Museum Victoria

2.4 History of Coral on Fitzroy Island Northern Queensland Australia

Fitzroy Island is a tropical paradise of rainforest and beaches within the calm sheltered waters of the Great Barrier Reef and Marine Park Queensland.

The Island was converted into a military base during World War II to protect Australia's mainland from invasion. Most of the walking trails were formed during this time, hence their access to some of the best vantage points in the region, although these days Fitzroy Island's features rainforests, coral beaches, crystal clear springs, birds and wildlife; and a untouched coastline of Far North Queensland. The sheltered waters around Fitzroy Island abound with soft coral and marine life (see *Figure 5,6 & 7 Coral beach coast line Fitzroy Island*), 97 percent of the four square kilometre continental island is National Park, covered in tropical rainforest.

The island has a very colourful and interesting history, starting with its original separation from the mainland (about 8000 years ago), at the end of the last Ice Age, and from then on with its continuing Aboriginal cultural links, mainly for visiting hunting trips and recreation. There were also links with England's Captain Cook and (much later) use of the island for a considerable time as a significant Chinese Quarantine Station (for the Queensland goldfields). Subsequently it was used as a Mission School and then, during World War Two, as a Coast Watch Station. The island has also been important as a significant Lighthouse Base, with the last permanent lighthouse structures on the main island still being an important community attraction. Since its closure the marine community has been serviced with an automatic lighthouse based on the adjacent Little Fitzroy Island.

The famous vista over the whit-coral beach surrounded by granite boulders lapped by warm tropical waters is the inspiration behind *Coral Bells*.



Figure 2.4, 2.5 & 2.6 Coral beach coastline Fitzroy Island

2.5 Acousmatic Music

The acousmatic music technique used in "Coral Bells" stems from a compositional tradition that dates back to the introduction of *musique concrète* in the late 1940s. It is a form of electroacoustic recorded music that is specifically composed for presentation using speakers and often uses recordings taken from the world around us as a significant source of sound material. "Coral Bells" uses recordings of both the ecosystems of coral from Fitzroy Island in Northern Australia and the complex sounds of the bass clarinet and the Federation Handbells. These are explored through the spatialisation of sounds heard via multiple speakers.

3. DESCRIPTION

Coral Bells required a significant amount of research into changes of the overtones sounds of the Federation Hand Bells, using different mallets and sonic environments. The visuals went into the details of light interactions on the coral. The samples of sounds and images were collected from the Federation Hand Bells from Melbourne Museum and Coral/beaches on and surrounding Fitzroy Island. The audio and granular manipulation focused on creating stimulation in the composition.

The First stage was to compile sounds from the Federation Hand Bells and images of coral from Fitzroy Island. *Federation Hand Bells - Standard and Quartertone sets donated by Museum Victoria*). These were documented with audio, line drawings, photos and video footage. The samples were then transformed/replicated with intricate processing and Multi-tracking. The visuals: were processed in a similar manner. The samples were combined for live performance into a notated score for Federation Hand Bells (3 performers), Bass clarinet, real-time electronic processing with video. This followed with a performance on 21st January 2016 at The Tilde Festival Melbourne Australia.

The recorded performance and video was then screened in Melbourne Australia on the Big Screen for International Women's Day on the 8th March 2016.

3.1 Movement 1

Coral Bells Movement 1 explores a palette of Federation Bells samples treated to form the acousmatic sound, focusing particularly on movement water and timbre and acoustic notated Federation Bells performed by 3 percussionists. The pitch organization is drawn from a Non-western tonality influenced by the Javanese Gamelan but with a converging and diverging Western microtone scale. The Federation Bells part is scored in traditional Western notation and electronics in graphic notation (See *Figure 3. Page 3 Figure 3.1 Page 7*), that indicates the contour and duration for use of the scale effect and sample throughout the piece. The

visual elements consist of delicate lines, gold leaf, coral, water and bubbles crossing between greys, blues, pinks and vibrant processed gradations. These intersect with the timbres of the ringing electronic percussive rhythms.

A pulse was generated through the overtone rings of the Federation Bells creating movement s both visually and audibly. This, along with the use of different mallets to create different overtones and quartertones in the rhythmic passages, aims to create a holistic first movement depicting coral life, color and movement.

When repeating the conductor will not of which will be triggered by the electronics

Bells 1
Bells 2
Bells 3
Elec

41 \downarrow 40 \downarrow 120

Bells 1
Bells 2
Bells 3
Elec

ff

Figure 3.1 Page 3 Movement 1score

Bells 1
Bells 2
Bells 3
Elec

61
67

Bells 1
Bells 2
Bells 3
Elec

Figure 3.2 Page 7 Movement 1score

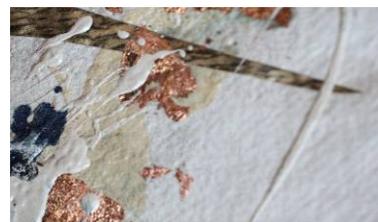


Figure 3.3 coral & glass Figure 3.4 coral & water colour Figure 3.5 gold leaf, paint

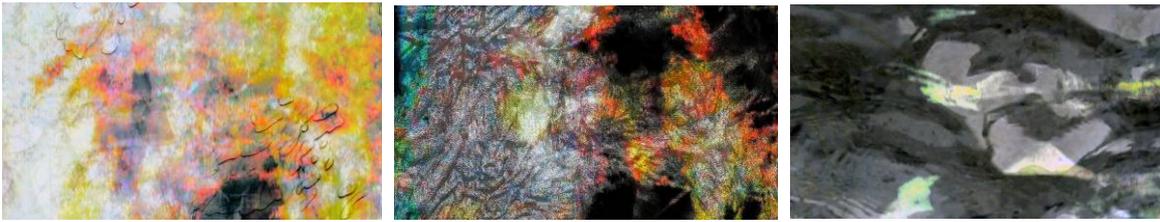


Figure 3.6, Figure 3.7 & Figure 3.8 Processed water, bubbles crossing between greys, blues, pinks and vibrant gradations.



Figure 3.9 Performance at Tilde Movt.1

Figure 3.10 Performance at Tilde Movt.1

3.2 Movement 2

Movement 2 is an improvised quartet for Federation Bells, Bass clarinet, acousmatic sound and prerecorded video. It has an intrinsic glistening quality the Federation Bells focal point for this shining and resplendent movement. The Bass clarinet flourishes. The Federation Bells part is scored in graphic notation (See *Figure 3.11 page 1* *Figure 3.12 page 2*), that indicates the contour and duration of the images. The acousmatic part is processed Federation Bells, percussive cymbal and metallic strings are hit from inside the piano, produce metallic sounds that mimic the sounds of a storm. This is then visualized in the artwork of *Coral Bells* using 2 glass infused plates (See *Figure 3.13 Glass plate 1* *Figure 3.14 Glass plate 2*) and two surreal stained coloured glass replicates with translucent line colored drawings (See *Figure 3.16 & Figure 3.17*), which were moved through water (See *Figure 3.15*). These images were dead coral collected from Fitzroy Island to create a deep water effect as if floating to the outside world, then photographed, processed and filmed. (See figures 19 to 24 Finally projected in performance (See figures 25)

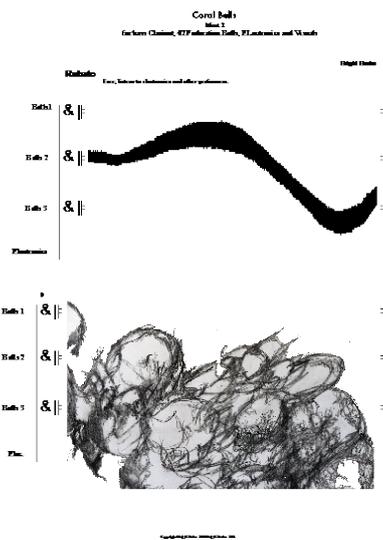


Figure 3.11 Page 1 Movt. 2

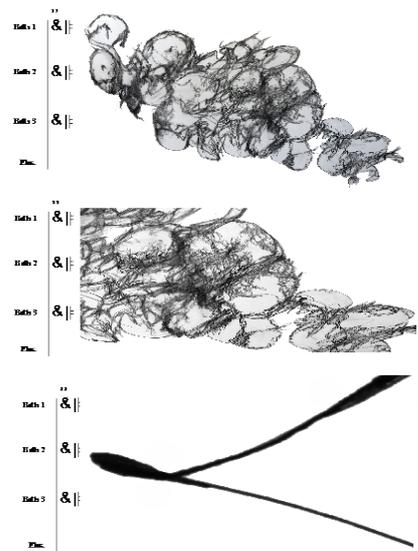


Figure 3.12 page 2 Movt. 2



Figure 3.13 Glass plate 1

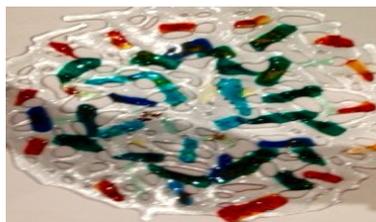


Figure 3.14 Glass plate 2



Figure 3.15 coral & gold leaf



Figure 3.16 water



Figure 3.17 coloured glass 1



Figure 3.18 pen & gold leaf



Figure 3.19, Figure 20 & Figure 3.21 coral, glass, ink & gold leaf



Figure 3.22, Figure 23 & Figure 3.24 Processed coral, plate, glass, ink & water



Figure 3.24, Figure 25 & Figure 3.26 Processed coral, plate, glass, ink & water



Figure 3.25, Figure 3.23 & Figure 3.24 Processed coral, plate, glass, ink, gold & water



Figure 3.26 Performance at Tilde Movt.2

3.3 Movement 3

Movement 3 was inspired by the soft environmental soundscapes of water, coral coast lines, diffusions of light and processed Federation Bells. The overtones produced from the Federation Bells are high-pitched wind sounds.

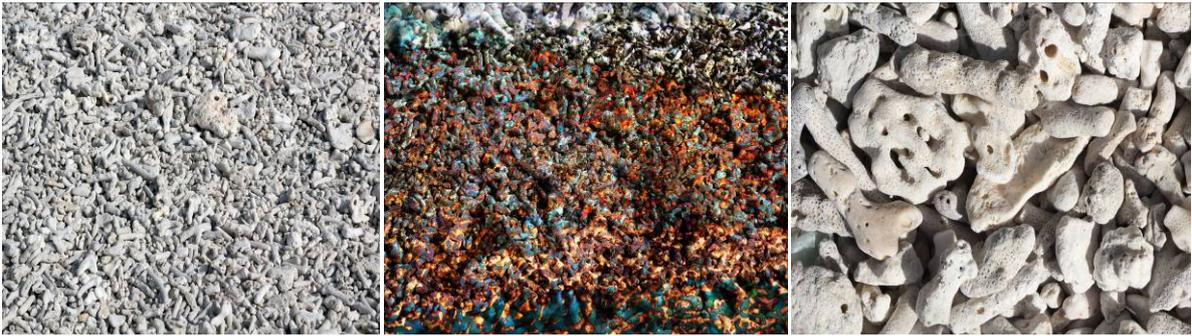


Figure 3.27, Figure 3.28 & Figure 3.29 Coral & Processed coral

3.4 Movement 4

Movement 4 is a fully notated and graphic score (See Figure 3.30 Page 3 Movt.4 and Figure 3.31 page 5 Movt. 4) for Federation Bells, Instrumentalist and acousmatic sound. The electronic part is transformed Federation Bells that has been treated through filters, fragmentation, rhythmic manipulations and layering elements. The visual colours and texture are bold and simple with a beautiful sunset (See Figure 3.34) and layered treated coral photographs (See Figure 3.32 and 3.33) and graphics taken from the second Movement score. The graphic, sunset images and white coral beaches depict a rich environmental landscape. (See Figure 3.35, Figure 3.36 & Figure 3.37) of processed coral, sunset, drawings & water. This over all effect creates the relentless pulse, forever voicing a dynamic intention, creating at times anguish and stimulation. This is shown in the performance picture (Figure 3.38) at Tilde Festival 24th January 2016 and (Figure 3.39) Screening at Federation Square Melbourne Australia International Women's Day 13th March 2016.

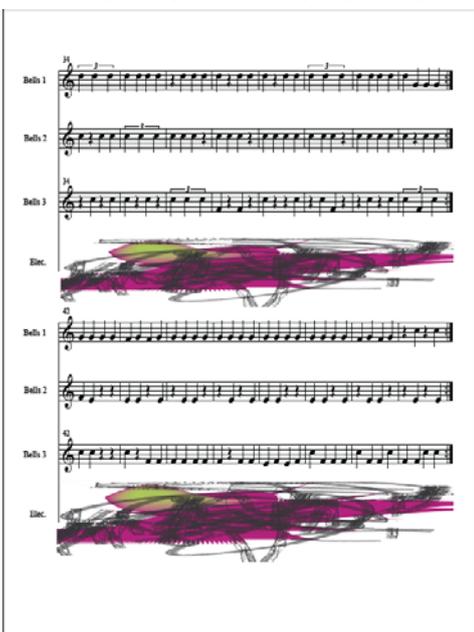


Figure 3.30 Page 3 Movt. 4

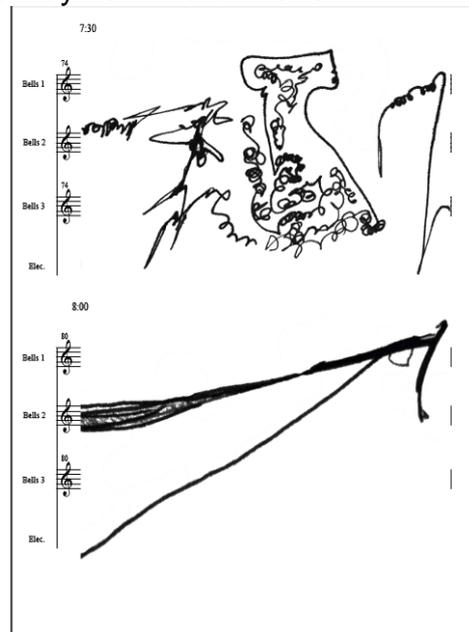


Figure 3.31 page 5 Movt. 4



Figure 3.32, Figure 3.33 & Figure 3.34 Processed coral, Fitzroy Island



Figure 3.35, Figure 3.36 & Figure 3.37 Processed coral, sunset, drawings & water



Figure 3.38 Performance at Tilde Movt.4



Figure 3.39 Screening at Federation Square Melbourne Australia International Women's Day 13th March 2016

3.7 The resources available from Museum Victoria

Coral Bells is now accessible through the Federation Hand Bells website on Museum Victoria to students and artists of multi-indisciplinary art forms. The score of *Coral Bells* and images are now made accessible and will enhance richly the Federation Hand Bells resources and provoke artistic exchange.

Museum Victoria are excited to include "Coral Bells" as a freely available resource through the Federation Handbells website.

On the website the public will find:

"Coral Bells" score in four movements for Federation Handbells, bass clarinet, acousmatic sound and video (please note there is no written score for movement three as this is acousmatic and video work only)

"Coral Bells" acousmatic and video parts in four movements Composer's notes

Video excerpts of the premiere performance of "Coral Bells" at the Tilde Festival in 2016.

"Coral Bells" focus on the identity of progress, music as a true evolving identity and the complexity of contemporary objects and spaces, and in doing so building a national awareness Australia's identity and landscape as it is today.

The context of the project aims to push and refine my aesthetics and techniques as an established performer, creator and educator on the International circuit in evolving innovative performances practices, instruments and collaborations that engage people in the creation of work (via the online resource and creative workshops). This project aims for Visual Music real time communication tools combining music, visual, acoustic, analog, and digital simulation.

4. Conclusion

The level of experimentation involved in Coral Bells was to research into the possibilities of controlling modulating parameters and the amount of the coalition between the live performers playing the Federation Bells, Live processing Pre-recorded electronics and visual dynamics during performance. The aim in Coral Bells is to make sound and image structurally integrated.

My goal at the onset of creating Coral Bells was to bring together my background and experience as a composer, clarinettist and visual artist with my compositional work which, was mainly intuitive as a multimedia performing artist working in four fields: a composer of acoustic, live electronic and acousmatic sound works; clarinettist and a filmmaker working with still images and original film clips. With the skills accumulated throughout the research process in working with the Federation Bells and investigating the eco system of the coral on Fitzroy Island I can now create highly refined moving images that are competitive in the international market of innovative art in this field. The infinite possibilities I thought I would be offered when creating a work for the Federation Bells in both Standard and Microtone has had shortcoming's with the sharp metallic sound and trying to create an ambient world. Choosing the correct mallets for the performers and then transmuting these sounds into an acousmatic world at times was quite limiting, when taking into account a sound world in the application of processing both the recorded and live sound.

Coral Bells has created a greater immediacy and fluency in my compositional, visual and performance practice, and has provided a unique uniformity to my work as a composer of sound and image.

5. References

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