

**MULTI-SENSORY SITES OF EXPERIENCE:
PUBLIC ART PRACTICE IN A SECULAR SOCIETY**

SUBMITTED IN FULL FULFILLMENT REQUIRED FOR
THE DEGREE OF DOCTOR OF PHILOSOPHY

FACULTY OF THE CONSTRUCTED ENVIRONMENT

SCHOOL OF ARCHITECTURE AND DESIGN

RMIT UNIVERSITY

Anton Glenn Hasell

B. Ec, Dip. Ed, B.F.A, P-G Dip F.A, M.F.A

September 2002

Abstract

Western secular societies have come to celebrate the individual within his or her community. Secular society has been shaped to fit the maximum freedoms and rights that are compatible within the compromise that communal life impose upon its members. Earlier communities in both Europe and Asia were bounded by religious practices that privileged the communal perspective over that of the individual. Rituals brought people together and the places in which these rituals were enacted, the temples and cathedrals so central to communal life, were places of complex and powerful multi-sensory experience. It is within such stimulating experience that people recognize themselves as vibrant parts to a greater whole.

Artists who work in public-space commissioned works, such as myself, are repeatedly invited to create works of art that signify and celebrate the forms and images that bring the community together. Such communal-building work attempts to countervail the drive to ever greater individual freedoms in secular society. Artists are placed in a difficult position.

The most recent developments in computer technology have been used to re-invent the bell. The reinvented bell has become a fundamental element in new bell-sculpture installation works. This thesis develops a context for the use of bells in contemporary public-space design. New bell designs and bell installation works enact similar community-building experiences for people in secular societies as they have done for religious bound communities. The experience of the bell within the overall sensory experience available in temples and churches can be just as powerful a communal experience for citizens of secular societies.

It is the contention of the author that such multi-sensory experiential sites of public-space art offer the community opportunities to participate and collaborate in community-building experiences. It is the mystery and wonder of everyday life that such gatherings celebrate. Rather than culture being understood, in the nineteenth-century Western tradition as activities and achievements that separate the cultured from the uncouth, culture can be felt as those acts of communication citizens make between themselves. This thesis advances the position for developing community-building 'sites of experience' as places in which the public can gather together and experience itself as a community. Places where people can recognise themselves as a community able to share emotional experiences with each other. A number of 'sites of experience' installation works are considered in detail. Those of the author have been designed to be sacred sites in which everyday ritual and feeling is shared and celebrated. They were inspired by the philosophy put forward in this thesis, and are examples of possible fruitful directions for public-space design.

The author believes that such sites of experience are fundamental to the evolution of an 'inclusive' secular society in Western Civilisation.

ACKNOWLEDGEMENTS

I wish to especially thank Dr Neil McLachlan and Dr Peter Downton of the Architecture and Design Department of RMIT University for their enthusiastic supervision and advice offered to me throughout my Ph.D research program. Their guidance has been invaluable to my research and I am much indebted for their generous and kind support. In particular, I would like to acknowledge and thank Dr Neil McLachlan who was a director of Australian Bell until 2008.

This research has been greatly assisted by the commissioning of the Federation Bells Installation by the Melbourne International Festival of the Arts. I am grateful to both its artistic director Jonathon Mills, without whom this project would not have come about, and the Festival manager Ian Roberts and staff for their support over the four years Neil and I undertook this bell installation commission.

Finally, I would like to acknowledge the support of my wife Georgina and children Samuel and Matilda. This research absorbed large tracts of time which otherwise would have been shared with them, and I thank them for their forbearance.

Declaration:

Except where due acknowledgment has been made, this work is that of the candidate alone.

Signed:

Dated

Dated

Anton Hasell

TABLE OF CONTENTS:

LIST OF ILLUSTRATIONS

- Figure 1 *Nau* Lehr 1983, p.60
Figure 2 *pian chung*, Lehr 1983, p.60
Figure 3 *Marquis Yi pian chung*, Lehr 1983, p.60
Figure 4 *The Yongle Bell*, Beijing, Postcard, p.61
Figure 5 *Ming Dragon bell*, Hasell, p.60
Figure 6 *Powerhouse bell*, museum, p.61
Figure 7 *Beijing museum bell spectrogram*, p.67
Figure 8 *Beijing Museum bell*, Hasell, p.61
Figure 9 *Hoko-ji bell spectrogram*, p.66
Figure 10 *Emile Bell Korea*, Hasell, p.61
Figure 11 *Emile spectrogram*, p.64
Figure 12 *Pulguk-sa temple*, korea,Hasell, p.62
Figure 13 *Pulguk-sa Bell*, Korea, Hasell, p.62
Figure 14 *Pulguk-sa spectrogram*, p.64
Figure 15 *Dotaku*, Lehr 1983, p.62
Figure 16 *Zhong bell*, Yang Bato 1982, p.62
Figure 17 *Hoko-ji bell*, Japan,Hasell, p.62
Figure 18 *Cowra World peace bell*, Hasell, p.63
Figure 19 *Cowra peace bell spectrogram*, p.66
Figure 20 *Wat phra That Doi Suthep bell*,Hasell, p.63
Figure 21 *Doi Suthep spectrogram*, p.65
Figure 22 *Thailand bells*, Hasell, p.63
Figure 23 *Small Thailand bell spectrogram*, p.65
Figure 24 *Powerhouse Museum bell spectrogram*, p.67
Figure 25 *Conical horse bells Iran*, Lehr 1983, p.85
Figure 26 *Sugar-loaf bell*, Lehr 1983, p.85
Figure 27 *Beehive bell*, Lehr 1983, p.85
Figure 28 *Optimised hemony strickle pattern*, p.86
Figure 29 *Hemony bell design*, Lehr 1983, p.86
Figure 30 *Australian Bell casting Hemony bell*,Hasell, p.86
Figure 31 *Lehr & Ausbell's Harmonic bells*, Hasell, p.87
Figure 32 *Hemony bell spectrogram*, p.87
Figure 33 *Whitechapel bell foundry*, Hasell, p.88
Figure 34 *Eijsbouts major third bell*, postcard, p.88
Figure 35 *Tilly Asten Bell*, Hasell, p.109
Figure 36 *Swan Bell Tower*, Hasell, p.109
Figure 37 *Helyer Korean bells*, Bandt 2001,p.109
Figure 38 *Handbells*, Hasell, p.127
Figure 39 *Armageddon bell*, Hasell, p.127
Figure 40 *Raincatcher*, Hasell, p.127
Figure 41 *Federation Bells*, Hasell, p.128
Figure 42 *Orchestral bells*, Hasell, p.128
Figure 43 *Federation Bells*, Hasell, p.129
Figure 44 *MSO Edwards*, Hasell, p.129

Figure 45 *Testing MSO bells*, Hasell, p.129
Figure 46 *Gates of Day*, Hasell, p.129
Figure 47 *Weary Dunlop*, Hasell, p.146
Figure 48 *Loughborough carillon*, Hasell p.146
Figure 49 *Wellington carillon*, Hasell, p,146
Figure 50 *Serra's Tilted Arc*, Gablik 1998, p.147
Figure 51 *Cherry's police model*, Hasell, p.147
Figure 52 *Robertson Swan, Vaults*, p.147
Figure 53 Table comparing Korean Bells, p.51

Audio CD Track Contents:

Track 1. Doi Suthep bell, Chiang Mai (Thailand)

Track 2. Hoko-ji bell (Japan)

Track 3. Beijing Bell Museum bell (China)

Track 4. Federation Bells playing (selection)

Track 5. Carillon playing by Tim Hurd, Wellington Carillon (New Zealand)

Track 6. Change-ringing bells Swan Bell Tower (Australia)

Track 7. Australian Bell's three tone bell. (Australia)

Track 8. Small Buddhist bells rung randomly Golden Mount temple (Thailand)

Track 9. The bells of Notre Dame in Paris (France)

Track10. Powerhouse Museum Ming dynasty bell (Australia)

Track 11. Pulguk-sa bell (Sth Korea) Emile bell (Sth Korea)

Track 12. Brenton Broadstock's 'Gates of Day' (selection)

Track 13. Emile bell, (South Korea)

Track 14. Eijsbouts Major third bell (Netherlands)

Track 15. Eijsbout's Harmonic bell (Netherlands)

Track 16. Australian Bell's 'Hemony' bell (Australia)

Track 17. Australian Bell's Harmonic bells (Australia)

Track 18. Marquis Yi pien chung replica, played by Neil McLachlan (China)

CHAPTER HEADINGS

Introduction

Chapter 1 The Experiential nature of cultural expression

Chapter 2 The codification of cultural experience

Chapter 3 The Asian Bell tradition

Chapter 4 The European bell tradition

Chapter 5 Bells and Multi-sensory Installation

Chapter 6 Centenary of Federation Bells projects.

Chapter 7 The Victoria Police Memorial Installation

Conclusion

Appendix 1 Glossary of terms

Reference Listing

INTRODUCTION

This thesis has been written over a period that has coincided with my working on two major public-space installations. Both installations were undertaken in collaboration with other artists. Whilst I began this research thesis prior to being commissioned for the Federation Bells projects and the Victoria Police Memorial, they have enabled the development of ideas concerning public-space artwork that I advocate in this thesis.

My practice as a sculptor over the past twenty years has in the last decade primarily focussed on public space commissioned sculptures and installations for local communities in Victoria. The issues that this research thesis will discuss have arisen from my experience as a sculptor. These issues arise from a fundamental contradiction of expectation I see facing the artist working in public space art in contemporary Western societies.

Artists like myself, who work in commissioned public space sculpture, are asked to create images and objects that clarify a community's sense of itself. Our work is hoped to be both a focal point for community sentiment and an icon around which it is intended that the community will unite. An example of this expectation is shown in a sculpture brief from Nillumbik Shire Council. The brief calls for "The construction of a public art work [that] will provide an enriching experience for the local community, and must be in keeping with the new vision for Eltham Town Centre as well as taking into account the artistic ethos of Eltham." (Eltham sculpture brief from Nillumbik Shire Council, 1997, attachment C) The artist is called upon to create a cultural experience and a symbol of their common identity. The brief calls for a site specific Installation that will provide an experience for the community that enhances the community's vision of itself.

However, people hold separate feelings for themselves as members of their community and for themselves as individuals within their community. The tension between these feelings can be both heightened and/or relieved at times of powerful social pressure, such as the recent World Trade Centre terror. Nevertheless, the development of the idea of the individual has marked the transition from the bound religious communities of the Middle Ages into the present secular social structures in the West.

Mass communication systems connect interest groups to each other and an individual to other individuals. Commercial marketing systems reach out to persuade individuals and interest groups with little regard to the coherence of important social units that aggregate to the larger community. To witness advertising on children's television programs, and to have one's children plead for this or that plastic 'gizmo' is to realise that the market views every one of us as an individual consumer to be informed and enticed independently of other social connections that may condition our personal identity. Western democracies are following the revolutionary call of the North American political philosophy that has made its social and legal systems divisible to the individual. The political voice that arose from the French and American revolutions is the cry for economic and political freedoms. Our market economic systems are fundamentally structured around the 'Utilitarian' idea of a free, choosing and selfish individual, who, in numbers, come together in the market place to trade the relative values of their individual desires.

In this context it is hardly surprising when artists are confused as to the purpose of their work. The market-place ideology has deeply infiltrated the social imagination of the place for artists. The cult of the individual is a profound adjunct to the marketing of cultural practices. Artists and their cultural production might simply constitute an artisan arm of the general model of economic production undertaken to satisfy social demand, except for the sense that cultural activity conditions the fundamental identity and imagination of the society in which it takes place. Cultural production can give great impetus to the directions in which a society might develop.

Artists who believe that cultural activity directly affects the evolution of society must invent their own 'map', or understanding of the history and issues central to the cultural history of the place where they work. This thesis outlines my perspective on the cultural history and the social context that my work responds to. As stated at the outset, I am confronted with a contradiction between developing a vision for my community through cultural practice, and the apparent fragmentary and fragmenting notion of the communal before the celebration of individualism. Indicative of this fragmentation was Margaret Thatcher's famous claim that 'there is no such thing as society there are only individuals'. How is it that Western society has come to so celebrate the individual or conversely, come to so doubt the feeling for the communal?

From the highly centralized and urban living arrangements we in the Western world are familiar with, it is difficult to comprehend the rural life of our forebears. Our history is one of living in small, mostly rural communities with usually a town not far away. The most significant area of the town or city was typically the site of the most important church or temple. This traditional agrarian communal structure is easily forgotten in the midst of the

incredible freedoms and privilege, comparatively, that our modern secular societies bestow upon us as individuals.

Public space is whatever place a community gathers together to recognize itself, and until relatively recently, public space was primarily a religious place. For much of the history of civilizations in both the 'East' and the 'West' it is difficult to think of purely secular aspects of daily life. It is the primacy of these religious communal perspectives; given the pervasive, sometimes oppressive, power they exercised which held political sway and philosophic imagination in check.

In the communities of the past these places of gathering and worship provided a multi-sensory experience to those who visited them. Much of this multi-sensory experience can still be accessed today. The temples in Japan, particularly those of Kyoto which were spared from allied bombing in the Second World War, can date from 1000 AD. The medieval cathedrals that have survived to the present transport all of their architectural magnificence and powerful beauty across long periods of time. I have handled the marble columns of the Parthenon on the Acropolis and stood in the centre of the Pantheon in Rome to measure its spherical architecture against my body. As I will explain further in this thesis, as a sculptor I am driven to 'feel', both as touch and empathy, this brilliance radiating from long dead peoples through the tactile objects and buildings they have bequeathed us.

I have marveled at the dim huge interior of Chartres Cathedral and its brilliantly lit and coloured South Rose stained glass window. I have been moved by the one thousand and one statues of Kannon-Bosatsu in the temple hall called Sanjusangendo, rebuilt in 1266 A.D. in Kyoto. To experience sacred sites around the world is to discover some kind of archetypal memory, or at least intuit the perfect and complete religious conviction impelling the creation of such significant 'sites of experience'.

My experience of these places is informed by the multi-sensory design that important temples and shrines, churches and holy sites incorporate. They are designed, I believe, with a careful aim of exciting every sense-receptor of the person entering them. This includes the use of emotive olfactory sensations such as incense fragrances, the scent of flower arrangement and perhaps, the delicate and fresh aromas of harvest produce. Visual stimuli used to excite the eye might include luxuriant furnishing, colourful decorations, coloured glass and candle flames. One's spatial sensibility is challenged with elaborate architecture and gilded statuary of masterful proportion. An acoustic sense of space is typically developed through the use of bells and the drum, as well as with other musical instruments. Importantly and almost universally, the reverberation of the human voice in choral singing and chants are important sensory experiences made available within these sacred sites. The architecture blends together these sensory experiences into a complex sensory experience

that many of us find moving and exciting. What I experience in sacred sites is the certain and wonderful confidence with which the site and/or artifact was created. It is this experience of another's conviction, found in both the grand visions and exquisite detail of these works, that I find just so profoundly satisfying.

This kind of sensational experience is holistic to the point of dissolving any important distinction between sight, sound, touch, taste, smell and intuition within the moment of the experience. The purpose of every temple and church is to manifest the spirit of its god, and to make convincing this experience for the congregation. The visitor transforms from a spectator into a participant. In places of experience such as these, the idea of the community and the idea of the individual are understood to be profoundly inter-dependant.

The West has largely passed beyond its religious communal forms. The secular societies in Western and other communities, arose from a long series of philosophical and technological changes; such as the agrarian, the mercantile and the industrial revolutions. The question of what constitutes a secular community has found numerous possible answers from philosophers and utopian authors as well as the more recent contributions made by economists, sociologists and political theorists of our 'modern age'. For artists like myself, with a conviction that their cultural work celebrates all that is vital and alive in their community, it is important that their work makes its contribution toward encouraging a sharing of feelings, passions and imagination between community members.

In post-religious Western societies, members identify essentially as separate individuals. How then, can artists create cultural expressions that make emotional connections between people? Arguably the last great flourish of cultural expression in the West was the Renaissance, in which the fundamental Christian faith of Europe was celebrated, excitedly, against the measure of man. The passing of the agrarian religious communities in both the Eastern and Western worlds has left a void where, in the absence of universal faith and a shared communal vision, fragments of individualism jostle with fragments of interest groupings.

This is well illustrated by an article from Victoria Combe in 'The Age' newspaper. "Christianity is close to being vanquished in Britain and no longer influences the government or people's lives, the leader of the Roman Catholic Church in England and Wales said on Wednesday." She reports, " ..Cardinal Murphy-O'Connor said that Christians and particularly the 4.1 million Catholics, had to adapt to "an alien culture". People turned to consumerism, to New Age practices, or to the transient pleasures of alcohol, drugs and recreational sex rather than to God. There is indifference to Christian values and to the church among many young people. We see quite a demoralised society, one where the only good is what I want, the only rights

are my own and the only life with any meaning or value is the life I want for myself." (Combe, The Age 7/9/2001)

Our secular societies are very clearly still under construction.

In this thesis I shall refer to a number of writers on cultural life who have grappled with this contradiction between the 'inalienable' rights of the individual and the responsibilities and feelings expected by the community. I shall show that in this writing there is a call for cultural practices and cultural visions that countervail the further disintegration of the 'community' into the 'society' and the society into the 'Leviathan' anarchy of rampant individualism.

I shall argue that there are possible answers to these calls for cultural expression that affirm communal living and public participation. I shall argue that public space multi-sensory Installation works offer 'sites of experience' which serve this function. As temples, cathedrals and other sacred sites serve religious communalism, our secular societies might be served by such experiential Installation.

Most artists who practice their calling in their studios need to reformulate the received history of art and culture if they hope to find a place in it for their own practice. In 'my' history of art I hold that 'progressive' artist-movements across the 20th century promoted a shared vision, a vision of culture being made accessible to all. This vision countervails the dominant 19th century notion of culture as an elite expression of excellence, excellence in homage to god, and excellence which may be used, by example, in the education of the rude masses.

From perhaps Impressionism onwards, artists have made works, gathered in small groups and written passionate manifestos proclaiming the inevitable unity of cultural experience with the real, every-day experience of the community. Cultural movements throughout the 20th century have attempted to ameliorate the growing division between the individual and the community that binds that person to others within it.

Artists took two quite different approaches to this task of affirming these emotional and felt connections between people. These can be identified as separate strategies for making contemporary art accessible to its audience.

Kasimir Malevich and his 'Suprematist' comrades, arguably, discovered the first strategy. This was the re-invention of pure form (abstraction) as a stream of consciousness. What was within a person, any person, could be let out and expressed. What was manifested would be a natural language, or connection, between human beings. This unconscious expression was a natural and universal language of the archetypal communal human spirit. Anyone could look inwardly, and release the brake of rationalism and access passion and feeling. Art was a

medium of 'feeling' exchanged between individuals who were prepared to trust their own instinct for expression and reception of one another's expressiveness through cultural activity.

In the case of the Malevich 'Suprematists' and those that followed this lead, the task lay in finding universal symbols, the code if you like, which gave art its intuitive and innate power to convince an audience. Here pure form sought its own weighting, its own relativity, that is, its own natural language. Colour 'red' for 'anger' perhaps, and 'zigzag' lines for 'fury' or 'wavy lines' for 'peace', and 'blue' for, say, 'the spiritual'. But more importantly, these forms were thought to come from the unconscious, archetypal, universal essences of human experience, and could be accessed by those who just allowed them to flow. A 'universal language' seemed to be on offer. At one base level this developed into graphics, and the understanding and codification of imagery into a quite definite visual language, and at another level, abstract painting made linkages to music and mathematics in an effort to map the 'aesthetics' of form itself. An example of this mode of cultural practice, amongst many, might be the work of Vasily Kandinsky, whose paintings remain a powerful body of research in the poetics of pure form and colour.

The second strategy, in contrast to the abstractionists, included those artists who believed that culture was an apt expression of the everyday activities of social life. For them, differentiation between culture and ordinary life harked back to the old imperial and aristocratic values and divisions. Artists of this ilk identified with the energy and functionalism of industrialization, technology and modernisation. Art and everyday life were thought inseparable, and art and craft indistinguishable from one another. Culture was weighted for its usefulness, in the 'form followed function' and 'truth = beauty' equations and efficiency became the new secular social utopian goal.

Marcel Duchamp was one artist who championed this cause, and whose work was a celebration of dynamism over convention. Jay writes "Taking to an extreme the incorporation of materials from everyday life in cubist collages, Duchamp's "readymades" questioned the difference between representation and presentation, while at the same time mocking the traditional auratic notion of a "work of art" from the hand of an individual genius". (Jay, 1994. P 162) An artist like Vladimir Tatlin make it possible to imagine a world where every ordinary object had an aesthetic quality; where mass produced items retained something of the eccentric human touch that marks the expression of human passion. Tatlin designed and constructed his own stove, printed his own images on the material with which he then sewed his own clothes. He made patterns of this work so that these designs and objects for every day life could be mass-produced. In short, every part of his life had an equal aesthetic value, and was entirely to be shared in the ideal society which he, at first, believed he had found in Soviet Bolshevism. (Unfortunately, Soviet Bolshevism reverted back to a 19th century cultural

didacticism with its 'Socialist Realism' which is not an unexpected revision given its adoption of a classic 19th century economic model in Marxism!). Tatlin's vision of cultural experience is a common theme underwriting artist-movements as diverse as Constructivism, the Bauhaus, the 'Happenings' of the 1960's and later performance works. It could be taken to extend to contemporary installation art and interactive multimedia artworks.

What these two 'strands' or 'visions' of culture shared was a desire to undermine the 19th century separation of art between those who owned culture and the uncouth. Each vision of cultural experience reacted to 'Culture' being understood as the epitome of civilisation's evolution and pertaining exclusively to the privileged 'cultured' few. In this thesis I quote Herbert Read whose position on culture exemplifies this conviction that a great natural division exists between high and low (or popular) forms of cultural expression and appreciation.

While both strands of progressive cultural expression threatened one another, they shared the drive to make art both accessible and fundamental to the existence of everyone in the wider community. These forms of cultural expression attempted to make people aware that culture was an expression of life, and that they participated in art and cultural experience every day of their lives. The whole century might be understood to be a period of the popularisation of art and culture. This popularisation was accelerated by new technologies such as photography, film, mass media, video and acoustic materials. These became increasingly affordable and so available to a wider selection of people toward the end of the century. Their impressive technologies made them even more persuasive mediums of cultural expression.

At their extremes, however, both these strands of cultural philosophy risked collapsing into those absurd expressions of themselves that can, and do, plague contemporary life.

Abstractionists risked developing a rarefied language that only a cultural elite could decode and translate or, at a mass level, a graphic language which, I suggest in this thesis, has become the advertising hieroglyphic of our time. The 'industrial functionalists' risked the kitsch and banal results that come when energy is worshiped for its own sake, as it is in the popular and fashionable arts-entertainment. That is, Tatlin's dream of the beautiful utilitarian object turns into Philippe Stark's fashionable trinkets.

Exponential technological development in the second half of the 20th century has opened up opportunities for the artist. It is now possible to accelerate the transition of the spectator into the informed audience through the new, and becoming more widely available, technology of multimedia, inter-activity and installations. This technology encourages our participation in every facet of social life. Technology in the field of cultural communication, like technological

advances elsewhere in our societies, invites an increasing degree of audience participation. The power of film lies exactly in this quality. It so absorbs the viewer that time/space coordinates of the viewer align with the film, and to 'fall' out of the experience, to see yourself watching the film, is to have the film fail for you.

Technology has also advanced into areas we usually regard as immune to it. I will show how it has been applied to practices from our ancient and mystical past, and led to the rejuvenation of these practices.

New technology has opened up new design possibilities in the field of bell design that previously might have been considered to have reached an apex. Bell founders in Europe have a history of using technical developments, as they became available, to improve the tuning of the musical bell. From mystical and sacred origins, the bell in Europe slowly had its geometry changed to increase the musical uses it could be put to. New computer aided design technology has generated a distinct leap in recent times, especially in the hands of the author and his collaborator, such that a revitalization of this ancient art is in prospect.

This new computer-aided technology was first used for designing bells in the Netherlands in the 1980s. The work of Australian Bell, recounted in this thesis, has developed this technology to re-position campanology within contemporary design practices in public-spaces.

In the history of both the East and the West, the bell has played its rich aural part. This role included the clear note of the priest's handbell during service and ritual, and the larger tower or temple bell that encircled the congregation with sound. The bell has been an enduring, one might suggest, archetypal object profoundly embedded in our feelings of community.

In the following chapters I will describe the changing role of the bell. In the West the bell is first found as small bells, often 'crotal' ('pea in a sphere' style of bell) in design, and was attached to clothing and horse harness to keep away evil spirits. From this magical beginning it became a powerful object in the ritual of the Christian faith that spread across Roman Europe from the 2nd century AD. During the Middle Ages an interest developed in the musical possibilities of the bell and bell sets. Change-ringing and the invention of the carillon in Europe encouraged bell-founders to learn how to control the vibrations of the bell and tune it to a more sonorous ring. As music, its peal could unite the community in both the fellowship of religious faith through ritual, and also entertain the community with more popular melodies and change-ringing methods. In times of social stress, the bell could connect the community through alarm ringing, or ringing out against storms and lightening. The Liberty bell has become a symbol of American 'Freedom, just as 'Big Ben' has become the voice of a defiant Britain. In Paris, the call to the barricades in 1848, 1871 and 1968 was accompanied by the

ringing of the bells of Notre-Dame Cathedral. The bell has accompanied our early steps toward a more secular and democratic society.

With the rise of the market at the end of the late medieval period, came industrialization, increasing population in urban concentrations, democracy and the celebration of individualism. The secular economic model of society developed at first across Europe beginning perhaps in the 1700's with the 'Age of Reason' and 'The Enlightenment'. More recently this privileging of the individual is taking hold in Asia, with Japan, Taiwan and Hong Kong mimicking the political, economic and social tendency of the West. China, North Korea and Vietnam have embraced Marxist models of social organization antagonistic to their previous religious and feudal forms.

In Europe the uses of bells, and hence their design, changed in step with changes in the political and philosophical order. The magical bell cast by monks for ecumenical service slowly became extolled for its musical properties.

The bell finds its secular expression as a musical instrument. That is, the bell played for musical expression and listening pleasure, beyond liturgical functions and ritual. Pythagoras demonstrated the mathematical base of musical relationships that link musical form to the internally consistent structures of number and number relationships. In so far as musical scales and intervals conform to their own internal logic and aesthetic use can be made of the natural coherence and consistency of consonant sound, music can have a meaning beyond the religious perspective.

The religious perspective is based in a reverence for the accidental, mystical sounds, such as those made by church bells, which could be understood as particular voices of God. With the diminished power of the established church over contemporary society the bell has lost its former significance as a sacred 'voice' connecting a community together.

In this thesis I wish to show how it is possible to re-invent the sculptural and musical expressions for bell design. A re-invigorated bell experience can be an exciting and relevant element in contemporary public-space art. I am suggesting that the bell should be used, in multi-sensory installations, to again collect together the larger community. In this post-religious age the bell can still retain its special power for forging a communal experience through the act of transforming a spectator into a participant and a participant into a collaborator.

The promise of a contemporary experience of 'communalism', which I am suggesting is offered by the bell sculpture installations (and other installation designed from this philosophic position) on which I have worked over the past seven years, countervails the loss

of communal spirit apparent in our secular society. Indeed, the bell sculpture installations and the Victoria Police Memorial offer our contemporary secular society the experience of temples and shrines without a religious context. They share with the religious community the importance of a multi-sensory experience to build community connections between people. They also share a faith in the 'holistic' nature of experience itself.

The collaborative installation works commissioned by the Melbourne International Festival and the City of Melbourne has given me a wonderful opportunity to research bells and traditional bell installations in local communities, the church and bell towers in Europe, and the temple and single Buddhist bell in Asia. This thesis will present an historical context for bells in Asia and Europe, and include some data collected from bells in various places within those two main traditions of bell design and bell use. My research has examined new contemporary bell installations, such as the Swan Bell Tower in Perth as well as the 'sound-sculpture' work of contemporary artists such as Ros Bandt and Nigel Helyer. Naturally, this thesis will propose a context for the collaborative works I have participated in, the Federation Bells at Birrarung Marr Park and the Victoria Police Memorial in St Kilda Road, Melbourne.

Over this period of research I have experienced bells in an extraordinary array of situations. From the intensely religious and sacred, to the semi-secular experience offered by the Swan Bells in Western Australia, and the perfectly secular Federation Bells in Victoria. These experiences, which this thesis will relate, have strengthened my perception of the significant and exciting possibilities that bell sculpture installations promise for the creation of participatory public space works of art.

I am excited to be working within 'Australian Bell' to create innovative public space installation through the invention of new bells. The opportunity to design and cast bells that reference the long separated bell traditions of Europe and Asia is unique. The invention of entirely new bells, in both sound and form will open up a new space for the bell in contemporary public-space sculpture, and more generally in contemporary arts practice. Only the development of recent technology has allowed the modeling and close tolerance casting of new bell forms and new bell sounds. My contribution to this work on actual bells has been multi-disciplinary; it brings sculptural form and musical sound inseparably together and, thus, opens up a new range of cultural possibilities.

Still, the historical context of the bell cannot be entirely removed from even the newest of the invented bells. Their history reverberates through them. They echo the power of the bell to forge and protect communities within their acoustic domain. A vibrating field sets the people within it into sympathetic oscillation. The struck bell resonates in those people who gather around it. Such an experience is a shared physical, palpable experience.

Organisation of this thesis

I have divided this thesis into a number of chapters in which various areas of my research can be laid out separately. The first and second chapters will examine the difficulties I believe the 'arts' find themselves in at the beginning of the 21st century trying to fulfil their early promise of making culture fully accessible to its community.

At the beginning of the 20th century there was an excitement toward making culture accessible to the population as a whole, and to make it central to the experience of everyday life. Rather, Western culture has largely become obsessed with its own appearance, and with the idea of itself. Thus, the cult of the individual artist genius and the divide between high and low arts has prevailed. Graphics has largely overcome the idea of a shared universal and innate understanding between all people. In important ways, discussed in chapter 1, artists seem to have abandoned a trust in the physicality in their art. The sensual, the intuitive and the kinaesthetic aspects of their expression have diminished as they have celebrated the prestige of the image. The familiarity of the 'look' has supplanted the intuitive and emotional 'feel' in cultural expression. The agreed 'known' is trusted above the shared 'knowing' and intuition. Practices, such as the plastic arts, which are fundamentally 'felt' experience, have either been marginalised, or have had their 'graphic' (as visually read) aspects celebrated. 'Passion' has too often fallen beneath 'fashion' in the arts. I suggest in this chapter that the plastic arts, in their full multi-sensual expressions, can again find a place in contemporary cultural design. I suggest that this will be found in actual 'sites of cultural experience' in the spirit of the Federation Bells Installation or the Victoria Police Memorial.

In the second chapter I will consider the cause of this turning away from the sensual and experiential core of cultural expression due to our obsession with visual and textual cues. This coding of object experience (translation of an object into an image of an object or text explanation) and the other replications of the object has greatly affected the way our cultural practices are received in the community.

This codification of experience has, in the investigations of science, undeniably made our lives very much more comfortable and predictable. However, the drive to codify (decode) cultural experience; to attack mystery and magic and to differentiate sensation into separate senses, and sense expression into separate expressions of visual arts, physical arts, verbal arts, written arts and musical arts and so on, has weakened our confidence in our innate creativity. Specialization works well in the manufacture of motor cars, but serves to separate culture from its community when applied in the field of cultural experience. Division of parts can alienate cultural creativity within our selves. This categorization and rationalization of cultural expression has served to make us consumers of the refined cultural products of others.

The third and fourth chapters will examine the history of the bell in Asia and Europe and the holistic experience offered by the sacred public space of the temple and the cathedral. A context for the bell's place in the religious practices of Europe and Asia is necessary for an appreciation of the very different context of our newly invented bells and bell sculpture installations. This context relates directly to the secular functioning of the bell sculpture installations.

The final chapters of my thesis will examine generally 'sound-sculpture' in the Australian context, as well as the history of Installation practices. I will also consider other contemporary bell sculpture installations as well as report on the two projects on which I have collaborated with other artists.

My concluding chapter will make clear the context that is fundamental to understanding the projects on which I have worked, and will show that it is possible to design public space works of art that can successfully engage the community as participant and collaborator.

Chapter 1 THE EXPERIENTIAL NATURE OF CULTURAL EXPRESSION.

“Jones, who has been in Venice for the past two weeks, is delighted with the finished effect of her site-specific installation, which includes a single video screen on the upper level of the Australian pavilion and five, large synchronised video projections below. The Melbourne artist has blended English and Italian voices with footage of both Venice and Sydney Harbour to explore such themes as the tension of anticipation and waiting, sexual desire and danger. She wants viewers to be involved – “implicated” – in the installation and says they will ultimately find themselves with the “very physical sensation of being in deep water”. (Backhouse. M. 6th June 2001, on the Venice Biennale and Australia’s 2001 representing artist Lyndal Jones.)

1. Culture as every-day living
2. Multi-sensory experience
3. Participation
4. Collaboration

1. Culture as every-day living

Every 'progressive' movement amongst artists in the 20th century, I am suggesting, has sought to re-assemble cultural practice and cultural experience to make it a more holistic and accessible experience for the public at large. Yet cultural excellence continues to be celebrated for its separate mediums, largely diverse practices and elite audiences. Notions of cultural experience are still classed in the various sensibilities of sight, sound, taste, touch and movement. The 'high' arts and the 'popular' or 'low' arts are still considered in isolation just as the old idea of a natural division existing between 'fine arts' and 'craft' persist. Western culture is only now embracing the concept of collaborative expression after a long period of celebrating the 'genius' of the individual creator.

These ideas about cultural practice being divided between the high and popular arts reflect the cult of the individual that has swept the democratic world. Democracy is a difficult concept as it embodies the contradiction between the self and the collective. It is founded on pragmatic compromise. Other social models subsume the individual into the whole, such as happens in ideal utopianism, religious visionary perspectives, and the economic models like feudalism or tribalism. Karl Marx makes this point in his text, *Grundrisse*. "The more deeply we go back into history," he writes, "the more does the individual, and hence also the producing individual, appear as dependant, as belonging to a greater whole: in a still quite natural way in the family and the family expanded into the clan [*Stamm*]; then later in the various forms of communal society arising out of the antithesis and fusions of the clans. Only in the eighteenth century, in 'civil society', do the various forms of social connectedness confront the individual as a mere means toward his private purposes, as external necessity. (Marx 1973 p 84) Indeed, Marx attempted to expose the internal contradictions that necessarily would collapse the individuated capitalist society into its communist expression. He suggests that "The human being is in the most literal sense a political animal, not merely a gregarious animal, but an animal which can individuate itself only in the midst of society". (Marx 1973, p.84)

These social-communalist models fixed the co-dependency contract between the individual and the community. Culture, in these societies, refers to communal activities rather than the celebration of individual genius. Here culture expresses living as a collection of vital everyday experiences, where life and art are difficult to distinguish between. The first sign of the weighting in favour of the individual in the democratic contract is to see culture as somehow separate from everyday living, to see it as a higher form of living. In the highly individualized society into which we are now heading via new technology such as the Internet, notions of local, regional and even national community are collapsing from the loss of any real meaning, while our celebration of individual artists, and celebrity itself, has never been greater. The social machinery that wheels a revolving cycle of international artists for our entertainment makes little room for local artists, and less room for art within ourselves.

Against this trend has been any number of artist manifestos published across the 20th century, calling for the retention of the holistic and accessible nature of cultural expression. It could be argued that, at heart, the Cubists wanted to find that place where two-dimensional optics connected with three-dimensional touch. The Constructivists wanted the dynamic temporal experience of life embedded in their engineered expressions of it, whilst the Surrealists did not want to separate reason from passion. Even the highly abstract works of the Supremacists, the lyrical colourists like Vasily Kandinsky or the severe Greenbergian Minimalists sought archetypal pre-conscious expression as a hoped for universal language with which to heal the fracture between the individual and his/her community. Artists like Kafka and Camus, who expressed the 'outsider' view, depict the danger and confusion when the instinct for individualism overwhelms the instinct for communalism.

The terms of expression for these grand hopes held by so many artists were rarely found, in a party political form. Even in their manifestos, artists spoke in the loftier terms of the harmonies and juxtaposition thrown up in the developing technologies of material; of the interconnectedness and resonance between line, colour, volume, mass, timbre and movement and so on.

One group of artists made plainer calls for political solutions to the cultural dilemma they faced. Stanislav Zadora writes of the Soviet Art Institute, 'Inkhuk' (Institute of Artistic Culture, whose staff included Rodchenko, Tatlin and El Lissitzky) "Underlying Vkhutemas ['Higher State Workshops for Art and Technology] was the plan to get rid of the gulf separating art from industry and artists from the masses. This was one of the ideas that motivated the Constructivists. As early as 1919, replying to Maiakovsky's poem *The Poet is a Worker*, Osip Brik wrote in *The Artist and the Commune*:

"In the Commune everyone is a creator – not in dreams but life,...They carry out specific, socially useful tasks... Such works gives the artist the right to place himself on the same level as other groups of workers". (Fauchereau (ed) 1988, p.98)

Lissitzky made a nine-point statement about the objective nature of art. "The new art," he declared, "is founded not on the subjective, but on an objective basis. This, like science, can be described with precision and is by its nature constructive. " Magolin writes that he "concluded his speech by calling for the founding of an International of Progressive Artists which would fight for a new, though unspecified, culture." (Magolin 1997, p.59)

These are calls for culture to become one with the everyday life and times of people living together in a community.

The American Humanist philosopher John Dewey sees this connection between everyday experience and cultural experiences as fundamental to the satisfactions and pleasures that art can offer us. He writes “In the collective life that was manifested in war, worship, the forum, [they] knew no division between what was characteristic of these places and operations, and the arts that brought colour, grace, and dignity, into them. Painting and sculpture were organically one with architecture, as that was one with the social purpose that buildings served. Music and song were intimate parts of the rites and ceremonies in which the meaning of group life was consummated. Not even in Athens can such arts be torn loose from this setting in direct experience, and yet retain their significant character. Athletic sports, as well as drama, celebrated and enforced traditions of race and group, instructing the people, commemorating glory, and strengthening their civic pride”. (Dewey 1934, p.7)

Another who sees the need for a new aesthetic is Suzi Gablik, who has written a polemic treatise called ‘The Re-enchantment of Art’. In this she argues that the Post-Modern has a deconstruction phase and its reconstruction phase, and that it is now time for the reconstructive vision in the arts to emerge.

This vision should link the experience of art with the experiences of ecology and politics. Gablik writes, “There is a need for new forms emphasizing our essential interconnectedness rather than our separateness, forms evoking the feeling of belonging to a larger whole rather than expressing the isolated, alienated self.... Exalted individualism, for example, is hardly a creative response to the needs of the planet at this time, which demand complex and sensitive forms of interaction and linking.”(Gablik 1998, p.5-6)

And again, “The remythologizing of consciousness, then, is not a regressive plunge into the premodern world; we are all being drawn to “the multi-sensory phase of evolution”, as the next step in the evolution of consciousness.” (Gablik 1998, p.57) Gablik calls this the ‘reenchantment of art’. She does not claim to have a “fully realized framework” for this notion. The issues she raises are her “attempt to think about a new connective, participatory aesthetics, and to speak for a value-based art that is able to transcend the modernist opposition between the aesthetic and the social.” (Gablik1998, p.9)

In this thesis I want to show that the Bell sculpture installations, as well as my other public-space works, are a contribution to this “reenchantment” of cultural expression and cultural experience.

They are the pathways to finding these “new forms emphasizing our essential interconnectedness rather than our separateness” and the key within them is, I believe, to focus particularly on the ‘experience’ that cultural expression offers us.

I believe this focus on the experience of culture is the way we can return to the promise of accessibility made by the avant-garde Cubists, Suprematists and Constructivists at the beginning of the last century.

I have divided my explanation of how I think cultural practice might better rejoin the individual to his/her community into two general proposals. The first proposal concerns this need to privilege experience over other ways of considering and valuing cultural expression. The second is to be aware of how dangerous our continuing oculo-centrism (dominance of the visual sign) and belief in 'visual languages' is to our sense of community. These two proposals are each side of the one coin.

This Chapter shows how the experience of a cultural event can be made richer through the spectator being made a participant and the participant being made a collaborator in the cultural expression.

While it may seem obvious that the experience of cultural expression would seem to be the point of anyone creating cultural expression, the quality and accessibility of existing cultural experiences varies greatly across the social spectrum. Experience, in its fullest sense, means participation. Participation, in its fullest sense, means collaboration. In this thesis and through my work as an artist I want to promote the significance of the 'experience' that cultural production makes available directly to those who participate in the expressive work. The next chapter will examine the damaging effects that language, as text and as 'graphic image' has had on the task artists have undertaken to connect individuals to their communities. These connections are the ways and means by which we are commissioning the construction of the secular society.

A secular society has never been finally achieved. Perhaps, with pluralism, the secular society cannot find any kind of absolute construction, yet its dynamic and elastic evolutions are true expressions of its natural form. All of the Western democracies are works in progress. Grand plans for social order have tended, when put into practice, to create situations of great human misery and social cost. We call these planners 'Utopians' if we do not call them tyrants. It is clear to me that every artist who signs on to making art has signed on to the great task of building a community which connects one another of its membership. A community founded on communication between its every part. In the modern, post-religious age we are in, this community tends toward a secular expression of the communal spirit. That is, artists intend to raise a sense of the communal above the idea of the individual. The very urge to cultural expression is exactly this. I am not suggesting that much unity exists between these cultural practitioners with their claims for community, only that their work attends to the task of persuading those about them that they have ideas, feelings and visions which they need to share.

Sharing my own work, both with the audience and in collaborations with fellow-artists, has shown me that shared experience can develop a sense of community. I love people engaging physically with my work. That is, handling that which I have designed and handled myself, with a tactility and kinaesthesia that does not require speech. Every sculpture exudes its own spatial area, across which it connects people who orbit around it. As I will explain more fully, engaging with three-dimensional objects in three-dimensional space activates every sensory receptor in the participant. If the sculpture itself is especially spatial in the challenge it issues, as it often is in an installation, or a performance work, the primacy of a kinaesthetic and temporal engagement becomes obvious. Nevertheless, every sculptural experience requires some level of physical engagement from a participating audience.

The claim that the central value of an artwork lies in the experience it offers people who visit it would seem utterly unremarkable to earlier communities and societies more bound by the authority of the communal experience. Once we in the 'first world' privileged the 'I' before the 'We', and the 'Eye' before all other sensory perception, we entered a world where we lost confidence in the ancient and familiar understandings of place and identity. Cost and value have become unreliable guides.

The Bell sculpture installations, Tilly Aston Bell and the Federation Bells in Birrarung Marr Park, which I shall discuss in detail in chapter 6, are an attempt to re-position our sensory experiences, to draw back the modernist optic dominance in favour of a multi-sensorial response to cultural experience. As well, these installations promote accessibility at two levels. The first is, as shown in the Federation Bells Project, to create an instrument with which anyone could express her/himself. The Federation Bells Carillon is available to anyone with access to the Internet as a musical instrument for which they can compose works. The other significant accessibility the Installation offers is it being an experiential site to which all are welcomed. You move through this installation, responding kinesthetically and temporally to the physical dynamics of the bell sculptures, while being tuned into the field of sonic vibrations generated both in the bells and from the larger sonic environment. This experience is enhanced by it being shared with others in the 'field'. Like the very physical experience found in a Buddhist temple, and like the sensationally physical experience to be had in a Gothic Cathedral, the site becomes a place where people gather together and share in experiences that are rooted in the mysterious. In the experience of sacred places people recognize each other and themselves as part of a community with meaning well beyond the 'ken' of daily polite accord.

Communities need such sacred sites. Tacitus reports upon the practices and peoples of the Roman era. In *Germania* he writes "Their holy places are the woods and groves, and they call by the name of the god that hidden presence which is only seen by the eye of

reverence." (Tacticus 1964, p.108) "Their practice of questioning the notes and flights of birds is, of course, known also to us; peculiar to the Germans is the seeking of presentiments and warnings from horses. These horses are kept at the public expense in those sacred woods and groves that I have already mentioned; they are pure white and undefiled by work for man. The priest or king or chief of the state yokes them to a sacred chariot and goes along with them, noting their neighing and snorting. No form of auspices inspires greater trust, not only amongst the commons, but even among the nobles and priests. They themselves are only the servants, the horses are the confidants of the gods." (Tacticus 1964, p.109)

H.D.F Kitto in his book, *The Greeks*, writes of the ancient Greek mentality that was holistic, and not at all of our tradition of specialization and categorisation. That is, where *Aretê*, meaning 'excellence', referred to man, then every part of his being, cultural, physical, mental and moral behaviour exhibited *Aretê*. "It was as natural for the Polis to have gymnasia as to have a theatre or warships, and they were constantly used by men of all ages, not only for physical but also for mental exercise." (Kitto 1957, p.173) The oracles and the temples were sacred sites, places where Greek citizens (if not slaves and others less privileged) of a community could entertain the experiences that delved into the mystery and wonders of communal life. But every day living was not separated from this mystery, as the presence of the gods and their interaction with the people's daily lives was a vital and powerful explanation of, and invitation into, the complexity of life as lived.

Our under-construction secular societies need sites such as these where the community can gather and experience itself. One could be tempted to see a place like the 'Crown Casino' in Melbourne as one such site. There are multi-sensory experiences such as flaming towers, and dancing water spirit sculptures, but within this palace of pleasure what may seem a community recognizing itself is actually a program of ravaged and despairing individualism in operation. Within this 'sacred' site both the 'eye' and the 'I' are celebrated at their coarsest aspect.

The Lyndal Jones review I have quoted at the head of this chapter refers to an installation work which offers those who enter the gallery a multi-sensory experience. It attempts to convert them from visitor to audience and then from audience to participant. The work attempts to 'implicate' those who enter the space with the experience being offered. Jones' installation offers those who visit it a space in which an experience, a cultural experience, an emotional experience can be had. Adrian Henri, in his book, *Environments and happenings* writes "Similarly, much of the art discussed in this book appears inconsequential because it is an appeal to pure imagination, by-passing reason. This has always been a characteristic of the kind of environmental art to which this book is devoted - for which Pater's contemporary Richard Wagner adopted the significant term *Gesamtkunstwerk*, 'total art-work'. Such a work,

like one of Wagner's own music-dramas, sets out to dominate, even overwhelm, flooding the spectator\hearer with sensory impressions of different kinds. It is not meant as information but as experience". (Henri 1974, p.10) Gesamtkunstwerk is a call for cultural expression to be experiential rather than conceptual, to be participatory rather than a spectacle for its spectator audience.

The urge to create works of art which invite participation and multi-sensory experience has been a strong and recurring feeling across 20th century cultural expression. This was one response to the elitism and hierarchy of 19th century class structure so well reflected in the European 'salon' culture with its exclusive and competitive celebrations of the precious art object. The salon foreshadowed the celebration of the immaculate object, much as it continues to be celebrated in the collection philosophies of our national, state and regional art galleries.

The other response to this conservatism was the belief, encouraged by the philosophies of Freud and later, Jung, that an archetypal commonality connects all of us. Our inter-connection is through 'streams of consciousness'. Both of these modes of cultural exchange share a commitment to the accessibility of cultural activities to everyone. The innate expressiveness of some art works can still startle us: for example, our unexpected joy at seeing tribal works of art that are full of freshness. Such works do not transport meaning (as we do not understand them), only feeling; feelings that include us and seem too, a natural part of us. The more informed we are of the content and context of the work, the more the work transports agreed and conventional meanings, and the sooner its fresh surprise evaporates for us.

If we fail to notice the experiential nature of a cultural event it can be too easily dismissed by the commonly off-handed attention we bring to much of our daily lives. Indeed, being sensitive to cultural experience should alert our attention to the amazing and vibrant detail that make up life experiences everywhere. What distinguishes cultural experience from everyday experience is that we very often enact and engage the latter with a familiarity that blinds us to its moment, while the former attunes us to the magic of all living experience. Caught in a light that imbues the ordinary as extra-ordinary, we see a thing that we already know as if for the first time.

Of course we know and accept that in religious communities the shared experience of daily life is marked by small rituals and ceremony that offer those who participate in them the ecstatic and vivid experiences that religious devotional life is known for. Cultural experience is our secular pathway to such understanding and enlightenment.

As Suzi Gablik puts it “Our loss of ecstatic experience in contemporary Western society has affected every aspect of our lives and created a sense of closure, in which there seems to be no alternative, no hope, and no exit from the addictive system we have created. In our man-made environments, we have comfort and luxury, but there is little ecstasy - the cumulative effects of our obsession with mechanism offer no room for such a way of life. Ecstatic experience puts us in touch with the soul of the world and deepens our sense that we live in the midst of a cosmic mystery”. (Gablik 1998, p.84)

The secularized and increasingly individual orientation of modern society has been organised along rational lines with a focus on efficiency. The ‘divide and conquer’ endgame perhaps. Our obsession with all matters economic, our replacement of community with society, and society with economy leaves very little room for the expression of the communal so fundamental to the arts. It certainly is not the basis of an ecstatic and visionary lifestyle for all. Where public good is thought to be synonymous with public education, public information and public knowledge, we depart further from the mysteries of our collective 'knowing'. When Culture is didactic, it is no longer an acknowledgement of what we all knowingly share. Culture becomes imperial. It lives in venerable institutions. It requires an education and a dedication for the citizen to access.

Here I should recount my experience of attending the first public practice of the 'Handbell and Brass' Centenary of Federation project. On the same Saturday that an exhibition, in which I was represented, was opened at the Bendigo Regional Gallery, I visited the old fire brigade building near the gallery to briefly watch the first gathering of the Bendigo handbell ringers. There I found 50 varied citizens of Bendigo with two sets of the Harmonic handbells which Neil McLachlan and I had made. I joined in the bell ringing exercises that renowned percussionist Graeme Leake led us in, and within minutes everyone in that room was in a very special mood. Like children with a new toy, we beamed delight as we made music together. The 48 bells were passed around between people, and conducted by Graeme, we co-ordinated our ringing to make wondrous sounds. This communal experience was ecstatic and profound for all those who participated, as the beaming faces and the great enthusiasm of everyone showed. I barely managed to attend the gallery opening on time.

What is it that makes bells and the experience of bell music such a powerful agent in the arousing of communal spirit? For it was communal spirit that was experienced with the handbell project’s practices and performances, and a community gathering in joy can be experienced at the site of the Federation Bells when the bells are playing. Bells have long been used to connect their audience members to the ‘one experience’ of community, and so to stake their territorial claims against other communities, and sometimes, in the case of ‘weather bells’ against nature. Alan Hartley, Chairman of the Handbell ringers of Great Britain, wrote in his foreword to W. Butler’s ‘Musical Handbells’, “The magic of the instrument

is that anyone can pick up a handbell and create a tuneful sound. And two or three people can soon create a repertoire of simple tunes just by ringing two or three bells each – its like sharing the keys of a piano and just playing the ones in front of you.” (Butler, 2000, p ix)

The radiating sound waves from a bell make a kind of territorial claim on those who hear it, which is why larger and louder bells have been hung in higher and higher towers to lay claim to an ever-greater geography. It is to be remembered that the 'Leaning Tower of Pisa' is a campanile, that is, a bell tower. While living in the countryside in Italy in 1988, I was astounded at the ferocity with which church bells on top of every hill in the area would ring out in the evening. They sounded very like cannon fire, as if the church artillery were firing across the valleys between, in the great and final battle for lost souls camped in the valleys below.

The Federation Bells are the first purely musical bells of the modern era. They are secular bells because they are designed from inception for musical purposes rather than being church bells tuned as best as possible for an improved musical sound. Amongst this collection of unique bells is one European bell. Apart from this bell, the Federation Bells make no reference to the Christian church bell experience. This degree of control of bell vibrations has only been possible through recent technology. The world's first purely secular bells, I believe, are appropriate forms with which to build a sacred secular site of cultural experience. The bell itself carries archetypal memories of its place in the forging of a communal spirit from the past, and it is this, I think, which allows them their amazing attraction to people everywhere, and at all levels of life. As Gablik suggests "When art is rooted in the responsive heart, rather than the disembodied eye, it may even become to be seen, not as the solitary process it has been since the renaissance, but as *something we do with others*." (Gablik 1998, p106) Or as John Dewey suggests "In the end, works of art are the only media of complete and unhindered communication between man and man that can occur in a world full of gulfs and walls that limit community of experience." (Dewey 1934, p.105)

I wish to examine more closely the two aspects of this special experience that the arts make available to their communities. The first is 'Multi-sensory experience', and the second is 'participation'.

2. Multi-sensory experience

Dewey wrote of the unitary nature of our sensory reception. "...when the range of senses is extended" he writes, "in the most catholic manner, it still remains true that a particular sense is simply the outpost of a total organic activity in which all organs, including the functioning of the autonomic system, participate. Eye, ear, touch, take the lead in a particular organic

enterprise, but they are no more the exclusive or even always the most important agent than a sentinel is the whole army." (Dewey 1934, p.218) This idea of the interdependency of our senses is compellingly shown by the very interesting work of Steven Feld.

Feld made a study of the 'acoustic ecology' among the Kaluli people of Bosavi in New Guinea. He found that "sound is the most culturally attuned sense in Bosavi, audition is always an interplay with other senses, particularly in a tense dialectic with vision" (Feld 1995, p.9). This is because in the rain-forest, what is heard often precedes what can be seen. Responding with a holistic sensibility to the environment is fundamental to the daily living and the artistic expression of the Kaluli. Feld suggests that he has documented an 'acoustemological' understanding of the life of the Kaluli.

The Anthropologist E T Hall suggests in his text, *the Hidden Dimension*, that changes in our pattern of living have consequential changes to our sensory perceptions. He makes the point that humans were originally 'arboreal' animals who mostly used smell to hunt, but climbed down from the trees to hunt in open terrain and that terrestrial life favoured sight over smell. At which point our sense of smell ceased to develop. Had we maintained our sense of smell we would be subject forever to emotional shifts as we could smell people's emotions and past presences would be current so long as the scent remained. "Man's ability to plan has been made possible because the eye takes in a larger sweep; it codes vastly more complex data and thus encourages thinking in the abstract. Smell, on the other hand, while deeply emotional and sensually satisfying, pushes man in just the opposite direction" (Hall 1969, p.40)

And further, Hall suggests that "Man's evolution has been marked by the development of the 'distance receptors'-sight and hearing. Thus he has been able to develop the arts which employ these two senses to the virtual exclusion of all the others".(Hall 1969, p.40) This view of our destiny keeps us removed from the 'emotional' receptions, which stand for those connections between us, in favour of the distancing receptors which underwrite self interest. Certainly the idea of the individual is one of being alert and on the 'look-out' (so to speak) for one's own best interest.

Donoghue, in his text *The Arts Without Mystery* (an expanded version of his BBC Reith lectures of 1982), suggested that our 'planning' capacity and our abstraction from nature has led to the situation where we have lost our instinctual and emotional connections to objects and experiences which are magical and mysterious. Part of the reason for this is the reproduction and replication of images and objects, and that this has diminished our instinctual connection with cultural experiences. He writes that "The proliferation of images from every known society can be felt as plenitude, but not as order. Apart from many other considerations, these images have had to lose their historical significance so as to gain the

boon of ending up in our museums. Our relation to them is synchronic, not diachronic...The work of culture in the age of mechanical reproduction, to revert to Walter Benjamin's theme, loses its historical density by becoming picturesque; we welcome it as a picture and not as an action or as a narrative. Indeed, the notion of play, and – I would now want to add – the even more fashionable notion of indeterminacy in interpretation, are attractive to us, I think, as a strategic answer to the surfeit of cultural images calling for attention.”(Donoghue 1983, p.70)

If actual experience is central to the value of cultural expression, then 'experience' denoted by a graphic or other shorthand markings, whatever other benefits they may confer, or however evocative of actual experience is not the same as actual experience. You were either there for the experience, or not there. The 20th century celebrated its eclectic collection of diverse cultural artifacts, notably the fashion for Japanese prints in the 1880s and continuing, to the present contemporary post-modern delight in any de-contextualized image or object. The stripping away of context and consequential loss of the essential meaning of objects through re-contextualization or reproduction excites the aesthetic and intellectual 'eye'. It alarms one's sense of 'rightness' and 'proportion' to the world. In the next chapter I will examine the 'graphic revolution' that has swamped cultural expression in closer detail. For now, it is important to note that a multi-sensory model of experience is directly opposed to the optic-centred graphic experience prevalent today with the vast array of images and ideas disconnected from one another. Or connected often in the most unsatisfying and unfelt of ways.

The fragmentation of images and objects from the context in which they were created, mimics the fragmentation of the communal into the individual. In both cases some of their meaning is lost along with this loss of context. The mechanical reproduction of visual art images and sound recordings apparently makes cultural expression accessible to everyone. But the experience of a commercial print of a Van Gogh painting is something quite different from the experience of the painting itself. One simply has to be shocked in the presence of a work, such as I was in front of a Vermeer, after believing that I knew the work well from reproductions, to know how true this is.

The technologies of photography and film and other two-dimensional representations of three-dimensional experience is part of our 20th century ocularcentrism that is inimical to the sensuality which I believe is fundamental to enriching collective cultural experience.

The visual arts have seen painters seek a pathway into three-dimensional values, such as Cubism and multi-media practices, in an attempt to defy the optic-centred focus of elite medium expressions. Interestingly, Greenberg's comments on the cubists offers an opposite insight into the ocularcentrism (dominance of the visual sensibility) of Modernist art.

According to Greenberg "...Cubism ended up with an even more radical denial of all experience not literally accessible to the eye. The world was stripped of its surface, of its skin and the skin was spread flat on the flatness of the picture frame. Pictorial art reduced itself entirely to what was visually verifiable and Western painting had to finally give up its five hundred years effort to rival sculpture in the evocation of the tactile". (Greenberg, 1965, p.172). Even Modernist sculpture, he argued "...turned out to be almost exclusively visual in its essences as painting itself." (Greenberg, 1965, p.142)

I think, on the contrary, that the acts of collage with wallpapers and metro tickets speak more clearly for the Cubist desire to reach into the two-dimensional plane and find exquisite three-dimensional internal and external form. The complete object. One has only to think of the paintings of Picasso that have a small shelf in front supporting sculptured fruit to see the drive to bridge the gap between spatial dimensions. I think the cubists sought to connect the every day living in a real world to the realm of the arts as embodied in the metro ticket artifact. They wanted to connect painting to the vitality of life. What Greenberg sees is the failure of the venture, rather than its aspiration, when he points out the graphic vision that came to dominate both painting and sadly, sculpture by his own time, and with his own encouragement and behest.

It is a conviction of mine that sculpture, as with all the visual arts, is about feelings. Ideas, if they can be separated from feelings, are more readily unearthed in other media. Sculpture, in particular, is a powerful pathway, through our senses, to our emotional responses to and about the act of living. Our feelings are intimately and inextricably connected to the physical and material world.

Object fetish underwrites materialism, and materialism springs from our deepest needs and feelings. In earlier ages, when our sensibility was more broadly employed than it seems to be in our age of optic and graphic celebration, anthropomorphism of an object was a better understood process. A sword became infused with its owner's courage and intensity. How it looked was a small part in how it felt in the hand. An object, through use, could grow a 'soul'. A bell, in such times, could be baptised and christened. Today, the faint echo of this embodiment remains in the biomorphic extension whereby our motor cars become the extent of our bodily sensibilities. Typically, as these are the objects we use and empower, so we might say that they have become in our age the aesthetic objects that connect us directly, through sensory reception, to our innermost emotions.

One is only left to wonder what is the meaning of those objects we, in the 21st century currently call "sculpture".

Greenberg suggested that Modernist sculpture 'turned out to be exclusively visual in its essences'. "Sculpture" he writes, "can confine itself to virtually two dimensions (as some of David Smith's pieces do) without being felt to violate the limitations of its medium, because the eye recognizes that what offers itself in two dimensions is actually (not palpably) fashioned in three." (Greenberg, 1965. P.143) Contemporary object sculpture, which makes a feature of being determinedly useless, can often exhibit a quality like that a three-dimensional signpost. Such works are to be read, in the quite literary manner this expression mostly suggests. A number of my own works fall into this category, such as the 'Red Running Tiger' bronze sculpture sited on the corner of Punt and Bridge Roads Richmond. This work was developed within a narrow literary conception and the image was exaggerated to achieve a stylized effect from one viewing point.

Post-Modern visual arts practice has encouraged experimenting with multi-media expression, and Installation Art, which I will discuss in detail in Chapter 5. The increasingly graphic solutions found in Modernism, and its high-point, Minimalism, are being rejected by artists seeking a more socially responsible position for cultural expression. There are many solutions that have been offered by contemporary artists toward this end. One is to take direct political action and engage in the processes of social policy as has Christo working on his great communal projects. Another strategy is Performance Art, with its often strongly political focus, as recently demonstrated by Mike Parr's self-mutilation in homage to the boat-people detainees. To engage with community issues does not require using the most recent technologies. Juan Davila happily utilizes traditional painting and drawing mediums to challenge the prevailing social and political hegemony.

However, to my mind, contemporary art remains embedded in the ocularcentricism that is so fundamental a force of 20th century cultural expression. Rather than creating 'experiences' that affirm a pluralist communal perspective, 'imagery' is the weapon of choice taken up by the sectional interests contesting for legitimacy and power. That is, the re-contextualised fabrics of one history are pitted against the re-contextualised detritus of another history. This battle of ideas based around gender, class and philosophy serve to fragment the forces seeking a 'better' world. It is time to find a way to join all progressive forces to the one social good.

My attempt to re-assert the power of the physical and sensual experience of life and society through art has convinced me that works of art need to be invented and designed in terms of the multi-sensory experience they offer their audience. Not the image they present to their audience. A convincing 'experience' can be measured by the degree the experience transfers its audience into its participants and collaborators. My public space installations are developed as places of experience. They are designed to arouse emotional responses in those who experience them. My experience of temples in Asia has informed some of the

sensations I encourage in an installation. These temple experiences have strong sensitivities and qualities such as the contrasts in tactility between smooth and rough, shiny and dull, dark and light, silence and sound and the changing effects of night into day and day into night. To move through a temple or other multi-sensory space is to become aware that these are places which speed away from one's eye as you move through the site. That is, one sense of the space changes as you move through it. They are sites that cannot, from one position, be seen whole, or known in a glance. It has something to do with heightening one's peripheral vision and I have tried to achieve the effect in the design of the Victoria Police Memorial. In that design, complex form is developed at the periphery of one's vision as you moved through the site, but kept simple when approached directly.

Sculpture in the 20th century might be seen as having lost much of its power as a felt experience with an increasing interest in manifesting sculpture as a visual medium.

To only look at a three-dimensional multi-sensory sculpture is to receive a quite limited, even untrustworthy, sense of its whole. For on moving around or through a site of sculpture, the vision changes and what was first seen is now not seen. The way to approach a site of sculpture is to alert all your senses to feel the mass, the scale, the energy of the objects and their spatiality, ('in the pit of your stomach', so to speak) to intuit 'your' physical place in the active spatial domain, and to move through this domain. Sculptural experience is a physical experience, and while people tend to prop themselves in stillness before a painting, you are recommended to travel through and around an installation, to be guided by the way the site draws you through. This is so whether you are in an architectural space or the space of an object.

In its most important sense, sculpture is experienced as a set of physical sensations. Multi-sensory installations should be, on entering, 'experienced' rather than 'read' or 'understood'. I suspect that a person's experience within a site is similar to that magical space/time experience felt by the artist(s) in the making of the work. In any case, the participant will be in the moment and in touch with their intuitive self and with others within the experience, and will find it liberating and exhilarating.

In this commune between the artist and the participant an exchange of 'knowing' is made. I can speak about this with a little authority, for I regularly revisit those works of art that are important to me. I do not revisit the work to celebrate the work itself. I go and touch the work, if it is sculpture, to touch the hand that made the work. It is a great comfort to me to be able to 'feel' the spirit, the confidence and the joy of an artist through their work. Those works which are important to me are mediums through which I connect with people whose clarity and breadth of passion re-confirms my own passion, and strengthens my resolve to keep making works for people now and people yet to come. So, as an artist, I have a community to

which I belong, and for whom my work is created. My work is a continuation of their gift to me. Most members of my community of artists are dead. But their vision, humour, courage and nobility lives on as fresh as when they, say, chipped the stone into form.

Everyone is able to access these gifts of passion and vision. Unfortunately, these gifts are too often mistaken for artifacts from the past rather than as living shrines able to refuel the spirit of those who connect with them. As a society, we bury these artworks in gallery museum mortuaries. I have been ordered away from Rodin's bronze sculptures at the National Gallery in Canberra, and elsewhere for wanting to touch their sculptural forms. I was amazed when, in 1981, whilst looking at Michelangelo's 'The Dying Slave' marble in the Louve Museum in Paris, a teacher and twenty primary school children entered the room and climbed all over the work. The guard said nothing, and as soon as they departed I was also able to touch and feel the sculpture freely. O great joy!

There is a place for collections of artworks in art galleries if the artworks are treated as vibrant and active refueling stations for the people who visit them. As 'spirit bowzers', people should gather around artworks and noisily, joyously and physically respond to them as living proof of victory of life over death and courage over cowardice. In Rome, Michaelangelo's 'Moses' is completely accessible to everyone in a small church. Every day parishioners and visitors alike kiss Moses' marble toe. Saliva over the centuries has made the marble of Moses' toe as translucent as glass. This toe remains for me a definition of all that is sublime in art.

Collected together, people discover their shared 'knowingness' in such experiences. A shared look and a knowing expression can instantly transports us back into this commonality we call 'our culture'. Perhaps not our 'State Culture' or culture with a capital C, but certainly our community culture. This is the collective knowing which we rarely refer to or admit to, strangely preferring to converse in the simpleton languages of spoken and written knowledge, which often sounds as inept as, for example, the parliamentary 'exchanges' we hear from our political leaders.

But it is important to remember that multi-sensory experience should not be treated like a carnival experience. We have a succession of ersatz historical sites, like 'Sovereign Hill' and the 'Warrnambool Port' to see how badly we can overplay the sensory experience that binds us to our community emotionally. Disneyland certainly attempts to answer this need, but necessarily betrays it, for the experience is self-consciously theatrical and whatever connection is reached between the performer and audience, the audience remains segregated from one another. The experience is unilateral and one-dimensional, and the walls between audience members never more exaggerated than in the massed crowd at a spectacle. The 'blacksmith' is not blacksmithing, the 'press' does not print a newspaper.

Nothing is as it seems. Experience ought to be embedded in real social exchanges and values.

This point about the ersatz experience is well made by Hall who wrote "In recent years, the sense rich work of Eskimo artists has been cherished by collectors of modern art, partly because the Eskimo approach is similar in many ways to that of Klee, Picasso, Braque and Moore. The difference is this: everything the Eskimo does is influenced by his marginal existence and is related to highly specialized adaptations to a hostile, demanding environment which allows almost no margin for error. The modern artists of the West, on the other hand, have through their art begun to consciously mobilize the senses and to eliminate some of the translation processes required by objective art. The art of the Eskimo tells us that he lives in a sense-rich environment. The work of modern artists tell us just the opposite. Perhaps this is the reason why so many people find contemporary art quite disturbing." (Hall 1969, p.90)

Whereas with traditional theatre the audience looks into a set as context for the action that takes place within the set, sculpture is a site, a physical presence, a three-dimensional actual space an audience enters. It gets well beyond 'the look' of a thing. Theatre essentially invokes space as an 'idea', while sculptural installation connects people into the palpable and visceral actual world. Both experiences can bring on emotional responses in their audiences, but one is projected, and the other is found within the people around and through the object. To a sculptor, the power and presence of objects are deeply significant. An object is a talisman for human passion. This is materialism at its fullest extent. This is why we save objects in history museums. The locket with a bullet marking found at Lone Pine evokes in us the fear and trembling and maddening hopelessness of our emotions. We know of those murderous assaults, they are embedded into the artifact. Objects themselves connect us to our emotions, and, as any boy or girl who kicks a stone along a road can say, the stones become repositories into which we invest feelings. A stone newly kicked along can be easily lost, but one you have kept in play for some time is sorely missed on its losing. It is like losing a part of yourself. Our materialism can be inverted, has been inverted, as fetish mentality. An image comes to stand for, in place of, the sacred object. For the New Guinea tribesman's 'cargo-cultism' the worship of Campbell's soup can label, or the construction of emblematic cars or aeroplanes are vain attempts at empowerment over the material world. Advertised objects are very exciting to buy, to unwrap, to first use, but quickly lose their glitter, and join the other now familiar goods and objects that we have accumulated. Advertisers sell to our inverted materialist 'cargo cult' natures, but every time we use an object, a tool, say, or chair, we (should) feel the deep emotional connection to the actual, real world to which the object connects our consciousness.

3. Participation

The importance of participation in cultural experiences is well made by Gablik. She writes “I believe that what we will see in the next few years is a new paradigm based on the notion of *participation*, in which art will begin to re-define itself in terms of social relatedness and ecological healing, so that artists will gravitate toward different activities, attitudes and roles than those that operate under the aesthetics of modernism.” (Gablik 1998, p.27)

The usual way we experience culture is through audience attendance to hear a recital, or viewer attendance to see an exhibition. Cultural expression has been largely organized to arrange spectators' attendance at spectacles. The viewer is encouraged to be informed about the spectacle they attend. At one level this education surely enhances the pleasure and enjoyment of the spectacle to the audience members, but at another, it increases the clear separation between the various parties to the event. It separates those that observe from those that perform the expression. It encourages a hierarchy amongst the community between those that attend and those that do not, and between the more educated and the less. Ideally the shared experience of both the audience and performer results in those transporting 'magic moments' that make cultural experience so wonderful. However closely shared the transforming moments in a cultural event between the performers and their audience, they are not the same experience. It is one thing to be moved and to enjoy listening to the playing of a violin. The actual playing of the violin is entirely another.

This separation between appreciating cultural expression and enacting cultural expression is similar to the watching and playing of sport. In the case of both activities, the spectator seems to need to construct a dialogue around the action which would be incidental to the performer. This dialogue seems to consist of statistical information, certain verbal and literary lexicons that categorize the action and other general bodies of 'knowledge' and sets the context in which the expression is received. If an audience member were suddenly transferred from the audience onto the field or stage, the spectator would quickly realize that an altogether other body of 'knowing', scarcely related to their 'audience knowledge', is required to enact these expressions of feelings, passions, dreams and ideals.

Audience participation can dissolve this dichotomy between the creator of the cultural experience, and the receiver of the cultural expression.

This happens when the cultural site becomes interactive. This interactivity transforms the audience into 'active' participation. Suzi Gablik, as did Robert Hughes on his television series on contemporary art in America, features the work of the North American landscape artist James Turrell who has carved out the cone of an extinct volcano with bulldozers to create a viewing platform of the sky. To experience the site, visitors are expected to lie down on their backs in the crater and look up. Turrell has shaped the cone of the crater to give a 360-

degree view of the sky. Gablik recounts Turrell's own view of his work. "The viewer who comes to Roden Crater - in the tradition of the vision quest or pilgrimage, since it is not easy to get there - makes the transition from spectator to participant. And once up there, according to Turrell, 'the separation that occurs in a gallery between an artwork is impossible when the 'work' surrounds you and extends for a hundred miles in all directions... Central to Turrell's conception of Roden Crater" writes Gablik "is his desire to set up a situation.... and let you see. It becomes your experience". (Gablik 1998, p.83) Gablik continues "The artist does not own the experience; instead, he puts *us* in front of the thing itself, so it becomes our experience - we get inside the landscape and can develop our own affective ties with it. This is "non-vicarious art" which, according to Turrell, is very different from, say, Cézanne's paintings of Mont Ste-Victoire that present the viewer with multiple views of the artist's experience while looking at a particular mountain."(Gablik 1998, p.83)

As Adrian Henri wrote, Art and cultural events are "not meant as information but as experience". He makes the point that participation is fundamental to cultural experience. Henri comments upon the relatively recent development of individualism and the far more ancient practices of community and ritual; "that the divorce between 'fine' and 'folk' art, and also between hand-made object and physical ritual, is of course a recent one in historical terms. The isolated, individual artist, the unique, irreplaceable object, have been part of the human consciousness for about two thousand years: for how much longer has art as magic, as ritual, as disposable object, as body-adornment, been part of our heritage?" (Henri 1974, p.7)

The more interactive the work, the more the interaction conditions the work and allows individual participants to contribute to the authorship of the cultural expression. In any case, participation and the inclusion it fosters, generates other cultural experiences as a natural part of the engagement and enactment of cultural expression. That is, soon, everyone is having a go and making their own cultural expressions as a contribution to their own community. Such activities are central to the hope of dissolving the distinction between art and life.

All of my sculpture, from the first student works of three specialist bicycles that could be ridden, to a corrugated iron crocodile canoe which floats, have attempted to over-ride the divide between the art object and the audience who looks at it. My work attempts to arrange experiences for participants. I have always made multi-sensory sculpture, using water-pumps, LP gas fire works and sound elements. My 1989 work 'Lonesome Cowboy', now in the Jean Sherman collection, successfully used sound and electrical power. This work is fabricated in 44 gallon drum steel welded into a saddle form, with a working radio, and cigarette lighter, and a speaker set into that part of the saddle seat to give just about the best ever vibrations possible when someone is astride it.

My sculpture evolved naturally into bell sculptures, which later, in collaboration with Neil McLachlan, have developed into very sophisticated bell sculpture installations.

4. Collaboration

Collaborating with Neil McLachlan on the bell sculpture installations and with Marcus Ward on the Victoria Police Memorial has been entirely consistent with the participatory desire fundamental to these projects. Charles Green, in his text on the collaboration between artists, 'The Third Hand' suggests that collaboration between artists is a mark of the transition from Modernism to Post-Modern practice and theory. "The proliferation of teamwork" he writes, "in post – 1960s art challenged not only the terms by which artistic identity was conventionally conceived but also the "frame" –the discursive boundary between the "inside" and the "outside" of a work of art. (Green 2001, p. x – Introduction). The active exchange that collaboration offers artists, I suggest, is a 'space' left in the work that remains open for others to contribute to and participate in the project. It is possible for others to contribute their own specialist experience, which fit easily into the open woven fabric of a collaborative project. For me, one of the great pleasures of collaborating with others is the welcoming of audience participants and fellow creators in the experience of the site in action.

In truth, most public-space commissioned work of art, while identified as the work of a single artist, are in fact fabricated by a hinterland of technicians, artist assistants and commercial expertise which usually goes unacknowledged. Being familiar with the bronze casting industry, I know just how essential to, and, often what large aesthetic contributions are made by such workshops to public-space works of art. Some artists, such as Michael Mezsaros, list every contributor in the plaque next to the work. Most do not. In the case of the Bell sculpture installations collaboration, while Neil and I bring quite distinctly different skills, knowledge and experience to the projects, many others also contributed to the design and performance of the resultant installation. We all shared in the steep learning curves facing those involved in innovative works. The collaborative effort to bring an installation to life must incorporate a spirit of participation, and this inclusive spirit attracts others to the site and its experience. In so doing, these participants are invited, in composing for the bell instrument, to collaborate with us in the ongoing project.

5. Conclusion

I have suggested that sculpture, as with the other plastic arts particularly, needs to be 'felt', (in both senses as multi-sensual and emotionally) before being 'seen' or visualized in any sort of exclusive way. The plastic arts convert generic space into a specific place by initiating an emotional experience within a particular site. A felt place is able to connect people into

the palpable and visceral world of feeling, and intuitive 'knowing' that becomes available when a community gathers together.

We need to create more 'sites of experience', along the lines of those explained in this thesis, in which people are empowered to realize their own innate creativity through participation and collaboration. Rather than educate and civilize the citizenry from 'on high', culture should be a celebration of, and awaken an awareness in people's own bright and wondrous imaginings colouring their own lives.

We do have an innate need to make strong cultural connections between ourselves. Henri asks us to imagine when art was communal magic, was body adornment and communal ritual, long before it became a unique object from an individual artist. Feld laments the "visualism deeply rooted in the European concept of landscape" which has framed ethnographic and cultural geographic studies which might otherwise have developed a "multi-sensory conceptualization of place" (Feld 1995, p.4). Gablik agrees that we have lost contact with our deepest and most powerful sensual and intuitive capacities. "We have no prescribed way to do the vision quest," she writes, "no ceremonies for meeting the gods in the magic circle; the faculties with which we might have joined them have atrophied." (Gablik 1998, p. 43)

Gablik's book, 'the Reenchantment of art' is a cry for a new aesthetic theory and practice in the name of protecting our endangered ecology. She writes " I see the task of this book as encouraging the emergence of a more participatory, socially interactive framework for art, and supporting the transition from the art-for-art's sake assumptions of late Modernism, which kept art as a specialized pursuit devoid of practical aims and goals. " (Gablik 1998, p.7)

I see my work as a sculptor, and as a collaborating artist on large public space installations, as working toward an emergence of 'socially interactive' cultural expression through specific sites of cultural experience. Gablik calls for "new forms emphasising our essential interconnectedness rather than our separateness, forms evoking the feeling of belonging to a larger whole rather than expressing the isolated, alienated self". (Gablik 1998, p.6) I believe the bell sculpture installations, along with other sensitive installation works, provide places where communal feelings can submerge the egocentric individualism that so rampantly directs nearly every facet of our present social order.

In this thesis I have set out the contextual understanding underwriting my perspective on the collaborations in which I am engaged. Naturally, this is my own view, and my fellow collaborators will have other, their own, views on our joint projects. My views, however, revolve about the fundamental importance that we ought to attribute to the 'experience' of

cultural expression over every other approach we may take to such expression. If we make experience the 'centre-piece' of cultural expression, then we are bound to see that experience can only occur when the audience transforms to participants. Participation is more than presenting at a site of cultural expression, it infers an engagement to the creative experience that amounts to collaboration in the collective experience the installation offers those who enter it.

There will be greater or lesser degrees of collaboration, depending on the commitment of the individual and the degree of inter-activity of the site. However, as in the pre-modern context, such as a tribal community, a 'site' of cultural expression should be entirely accessible to those in the community who wish to heighten the act of their living.

That we live in Australia intensifies our need to develop forms of cultural experience that incorporate this ancient landscape, much as the Aboriginal communities achieved. Our European ancestors arrived here largely unprepared for this unique environment. As Amos Rapoport wrote "What to an European arriving in Australia is an empty landscape is, to the aborigine, an extremely rich environment full of sacred sites, ceremonial places, tracks of dreamtime beings". (Rapoport ed 1972, p.8) We sorely need sites of cultural experience that make sublime echoes with sites of experience once familiar to the daily lives of the multi-sensory rich Aboriginal cultures with their essential connection to this land. We have to make our own connection to this land through our own sites of experience.

We can forestall the bureaucratic and hierarchic models of art and culture that are fully imported from our colonial past and are so deeply imbedded in the consciousness of our divided communities. We need to create sites and places where people can come together to recognise themselves as a community. Each of us, then, can make our contribution to those cultural expressions that match our experience of being together.

A society that connects its daily living with its expressions of self, and imaginations of the place in which they live is on the path, in the Post-Modern world, to finding the vivid and richly textured secular social experience that is worthy of being lived within. John Dewey gives us a taste of Art exercising its recuperative powers when he writes "To the being fully alive, the future is not ominous but a promise; it surrounds the present as a halo. It consists of possibilities that are felt as a possession of what is now and here..." "Art celebrates with peculiar intensity the moments in which the past reinforces the present and in which the future is a quickening of what now is." (Dewey 1934, p.18)

It is in exactly this spirit of optimism and hope that we have invented these installations. Installations that treasure the experience, in all its mystery and surprise, that lie at their centres.

Chapter 2 THE CODIFICATION OF CULTURAL EXPERIENCE.

“I want to talk about the arts in relation to the mystery that surrounds them, not as a problem to be cleared up but as the very condition in which they appear at all. In that sense mystery is to be acknowledged, not resolved or dispelled.....But I want to reinstate mystery and to distinguish it from mere bewilderment or mystification. One of the strongest motives in life is to explain everything and preferably to explain it away. The typical mark of modern critics is that they are zealots of explanation, they want to deny to the arts their mystery, and to degrade mystery into a succession of problems”.

(Donoghue 1983, p.12)

1. Language as Code
2. Knowledge and Knowing
3. Graphic Language
4. Conclusion

1. Language as code

When you enter a temple, or some other 'sacred' public place, the multi-sensory experience that you participate in, is, if you connect with it, an experience that is inexpressible. The ineffable, the mysterious, revelation and epiphany are properties of those experiences that connect us to our world. They are fundamental to our religious experience and fundamental to our cultural experience. Although these experiences, be they religious or secular, can be described, to engage in such description within the experience is to have fallen out of the moment, the place and one's connection to the experience. To be moved emotionally in a sacred space, to be enveloped in the reality of the experience is to become unselfconscious. When you have parted with your ego and suspended your disbelief, in such places, there can be no reason, reasoning or conditioning of the experience you are having. There is no language here at all, when you are tuned in to the people, place and moment. It just is!

In the same way, any description of an experience after the fact, however evocative, just cannot recreate the experience. This is because analysis attempts to make sense of the experience, to fix it in a context of general categories of experience, and to round up its component parts in to some sort of order. This translation of experience into language filters out all of the magical bits inherent in the experience itself.

It is true that our systems of communication are manifold and flexible, and attend to our daily needs surprisingly well. As a community we take great pains to school our young in the skills of communication. If working in small groups, most of our time can be spent in the reactive and responsive exchange of ideas and feelings through language. The facility of language begins to unravel only when we enter unself-conscious experience. Unself-conscious experience is a common thread linking religious faith and cultural expression. These types of knowledge are founded on experiences that are difficult to name and catalogue. Such experiences are not particularly 'out there and unknown'; they include the very difficult experience of simply 'living in the moment'.

As a sculpture student and since, I have listened to countless references to the 'language' of the visual arts. It is as if forms might craft meanings as words craft ideas. Students are encouraged to develop their own 'language of art'; their personal iconography. It may be suggested that this could constitute a set of images or forms that presumably will grow more precise in their personal 'meanings' over time. Artists tend to be rewarded for their development of a singular style. Consistency is highly valued. Many artists differentiate their work from others with a 'personal language' of symbols and stylistic mannerisms which becomes a life's 'body of work'. The rather sad outcome for those artists whose later works are stylizations, even parodies, of their signature style comes from this sorry hope of using forms and images as if such forms were a coherent language.

And yet, so much cultural expression is to be understood through being read by its audience. A design ethos has developed in the architectural and visual arts domain that is powerfully 'graphic' in its orientation. In fact, the word 'design' has become almost synonymous with grand graphic gestures and gratuitous fashion consciousness. Graphics is a stylized and popularized set of expressions, a kind of library of recognized and accepted symbols. We have common code of forms and images that is readably accessible to those able to 'read' the language. The graphic is visual form and imagery reduced to the function of simple and direct communication; to give public direction or commercial persuasion. Graphic symbols are signs and as we know, signs issue directives.

Public space is flooded with advertising and other commercial and social signage to persuade, influence and instruct every citizen every moment of their every day. That the arts can be drawn into this didactic way of thinking is evidenced by earlier aesthetic theory where

the 'Arts' were seen as a conveyor of meaning to a population in need of education. Such conservative aspirations are demonstrated in the work of the 1930s art historian and theorist, Herbert Read.

Read suggests that while the views of Tolstoy and Matisse on the purpose of art have much in common; "Tolstoy demands that the artist should not only succeed in expressing his feeling, but also in transmitting it. That, I think, was the mistake which landed him into such difficulties. Because, if you put the artist and his feelings on one side, *to whom*, on the other side, must he convey his feeling? Naturally, Tolstoy had to conclude to every man. And if to every man, then art must be so intelligible that the simplest peasant can appreciate it. So good-bye to Euripides, Dante, Tasso, Milton, Shakespeare, Bach, Beethoven, Goethe, Ibsen – in fact, good-bye to almost every-thing except stories from the Bible, folk-songs and legends, Uncle Tom's Cabin and A Christmas Carol." (Read 1954, p. 190)

"The function of art" Read suggests "is not to transmit *feeling* so that others may experience the same *feeling*. That is only the function of the crudest forms of art – 'programme music,' melodrama, sentimental fiction and the like. The real function of art is to express *feeling* and transmit *understanding*. He goes on to write "Our homage to an artist is our homage to a man who by his special gifts has solved our emotional problems for us." (Read 1954, p.190)

Read cannot see art as pleasurable experiential. There are so many lessons to be learnt; so many emotional problems to be 'solved' by the arts. The "transmission of understanding" reduces art to the didactic. Understanding infers a cohesive and structured ordering of certain kinds of knowledge. This is exactly the kind of knowledge that Donoghue rails against "The strongest justification of management is that language itself is managerial. This is well recognized in *The Renaissance* where Pater refers to the way in which our flickering impressions, unstable and inconsistent, seem to become objects because of 'the solidity with which language invests them'. In language, it is almost impossible to bear in mind that there is not a name for everything. Humanists like to think that everything has a name, lest they have to conclude that some things or some events lie beyond our knowing." (Donoghue 1983, p.86)

This is also exactly the kind of knowledge which turns art about feeling into the sort of units of understanding we live with in commercial billboard design and the extended exhibition catalogue essay that seems now to necessarily accompany the actual work in a show. In both cases the codification of the experience of art, in both its high and low manifestations, mask the actual experience of the work. In my view, Tolstoy is right. Read looks to the lesser benefits of cultural expression, when the really complex and interesting connection between humans through art is the 'feelings' they transmit. Understanding is merely the rationalization that makes the truth palatable to ourselves. Anyone can take pleasure in the music of Bach

and all of us are moved by Beethoven's music. Goethe and Dante's writing, so long as we can read or have them read to us, affect our emotions similarly. Who can say otherwise? Though you may draw distinction between the intellectual response of the scholar and the uneducated to such works, you cannot comparatively value the emotional complexity between the members of that audience at all!

How has language managed to be privileged in comparison to the experience of cultural events?

Those who write about the arts, the curators, critics and theorists for example, code aesthetic experience into a more portable form; language and text. A translation of the experience of cultural expression necessarily distils some 'meanings' of the work. It is as if the naming of experience is poison to its continuation in the way prior to its designation. Matisse delicately infers this when he directs his viewer to think as little as possible about the work in order to experience it fully. "The thing," he writes, "is to direct the attention of the spectator in such a manner that he concentrates on the picture but thinks of anything but the particular object which we have wished to paint, to detain him without embarrassing him, to lead him to experience the quality of the sensation expressed. There is a danger in taking him by surprise. It is not necessary for the spectator to analyse – that would be to arrest his attention and not to release it – and there is a risk of setting up analysis by a transposition that is carried too far..." (Read 1954, p.188)

Of course, those who write about cultural expression would concede that this writing merely points an audience toward the experience of the actual cultural event, and in no way threatens to replace the cultural practice. Dewey certainly argues this. "Because objects of art are expressive," he writes "they are a language. Rather they are many languages. For each art has its own medium and that medium is especially fitted for one kind of communication. Each medium says something that cannot be uttered as well or as completely in any other tongue. The needs of daily life have given superior practical importance to one mode of communication, that of speech. This fact has unfortunately given rise to a popular impression that the meanings expressed in architecture, sculpture, painting and music can be translated into words with little if any loss. In fact, each art speaks an idiom that conveys what cannot be said in another language and yet remains the same." (Dewey 1934, p.106)

We can all acknowledge the impossibility of speech, or the written word to replicate the physical meanings that architecture or, say, a painting express. We even easily see that a text based work, such as a poem, remains beyond the capacity of prose to achieve anything other than introduce the work to an audience. What then is this other 'language' to which

Dewey refers? He wrote that because 'art is expressive, it is a language', and so he seems to believe that language and communication are synonymous.

Since the Enlightenment of the 18th century the European quest has been to collect and cross-reference all knowledge into one great matrix of interconnected information. This Encyclopaedic obsession began with Descartes' 'self evident premises' and continues through the tradition of the scientific processes to 'proof truth'. Bertrand Russell describes the logical process as follows; "Starting from one or more propositions called premises, we can deduce other premises through the process he [Aristotle] called Syllogism. A syllogism is a subject-predicate argument that has one term in common. The middle term disappears in the conclusion. 'Thus, all humans are rational, babies are human, therefore babies are rational' The operation of a syllogism leaves the premise unproved, and Aristotle said that science must begin with statements that stand in no need of demonstration. These he called Axioms. Though logics have to do with words, it is not the same as grammar. Logics is not so much about what is as about our way of knowing it. Logics is not about psychology, that is not the deductive process so much as the resultant structure achieved." (Russell 1978, p.84)

Arguing from first principals, the quest began well. Mathematics and study of the natural order culminated in categories, such as those devised by Kant, that sought to fix in place our collective knowledge gathered across many long centuries, and win more secure truths from the analysis of experience. The exploration of the newly discovered 'worlds', the Americas and Asia, with their exotic flora and fauna, encouraged, with renewed enthusiasm, this penetration into the mystery of life to expose its certain knowledge. The first stumble began with George Berkeley's recognition that his own perception of reality could not be eliminated from the equation, after John Locke found that sensation must be held as separate from reality. The great quest has not recovered from Berkeley's revelation. David Hume (1711-1776) wrote of this great doubt to ever distil reality: "I can never catch 'myself' at any time without a perception, and never observe anything but the perception" (Russell 1978, p.226)

Since then, the intellectual work has focussed upon our instruments of perception, that is, how we process sensory information. While Goethe among others sought to recast our sensory systems, suggesting, for example, a contrary 'colour theory' to the Newtonian model. (Goethe ascribed certain colour affects to projections from our eyes), the more popular analysis examined our conceptualization and categorisation of experience. The categories of experience devised by Kant fixed associative functions together, but as it is not possible to check these against 'reality', or 'noumena', such orderings remain highly speculative.

We are comfortable communicating to one another in the symbols and signs we call language. Language is constructed with ideas that have been stripped of the difficult and contradictory evidence of their experience. In place of emotion we exchange ideas or images

of emotion. The word sad is not sad; it is the idea of sad, and when we are "sad", the word 'sad' seems totally inadequate as an expression of our feeling. In recent technology we have exchanged even the word 'sad' or 'happy' for 'emojicons'; those graphic symbols that show up on the mobile phone screen.

In this way language is a self contained mode of communication, where communicants are required to have an equivalency of a shared knowledge to carry out the transaction, an exchange of meanings and agreements of understanding.

2. Knowledge and Knowing

What we 'know' is shallow in comparison with our shared 'knowing'. While poetry and prose can elucidate, unearth perhaps, exquisite and sublime invocation, language as utility remains mechanical and crude. Everyday language reduces our everyday communications to cliché and statements of the obvious. This encourages a use toward restraint and constraint. We would exchange with one another like simple robots were it not for the 'sea' of 'unspoken knowing' we also share. Cultural practices are carried out between these realms, and are profoundly connected to our shared experiences. Text can work this magical exchange between people as does the multi-sensory plastic arts, when it is at the level of poetry, play, song and those expressive places where imagery sparks a sensation of the sublime. Such sensations reside and remain in the visceral, palpable body of the 'knowing'. Knowing cannot be drawn from the known except by inference.

If there is, for instance, any such thing as 'The language of Sculpture' as suggested by Tucker's text on modernist sculpture, it is clearly of no use to anyone who participates in the 'experience' of sculpture.

As ideas are not geared to experience, except nominally, language is the perfect medium of exchange between people in an ideal world. In the actual world of experience, language can easily spin freely, when un-gearred from experience. Jonathan Hale suggests an alternative currency when he writes "Form is a highly charged subject because it makes us aware of unknown power inside us and outside us. ...intuition can link us to the universe without mystical explanation." (Hale 1994, p.74) He argues that while form can link us to experiential awareness, "all symbols" he suggests "are freighted with verbal meaning while composition is non verbal." (Hale 1994, p.70)

Certainly, three-dimensional form is poor at conveying ideas. The medium is too literal and while ideas glint and shift in the glare of attention, like looking into a multi-faced crystal, feelings transmit to others as slowly as a grudge forms or anxiety looms. We have lost much of our understanding of the emotional, the sensual and the felt insight and experience. We

are no longer able to fear the touch of a sacred chalice or other power object. Our culture has converted sacred objects into imaged objects. We 'cargo-cult' lust after the Ferrari or Porsche, where once we trembled to touch the hem of the gown of a holy man or kiss the reliquary.

For Donoghue, society cannot abide the mystery that is fundamental to the experience of the arts. He writes "What language is mostly doing to us is supplying a set of bins into which our feelings are supposed to be thrown; thrown, rather than delicately placed, because it is something we're meant to do as if spontaneously. If the particular bin doesn't seem to be the right one, we take time to look for another, but normally the readiness of the bin urges us to be satisfied with it". He continues, "The point is that this procedure tends to give people not only descriptions of their feelings that may or may not fit: it gives them conclusions before they have felt the need of them. Which is what administration does. Administrators don't merely meet a situation which has been causing trouble. They devise a system of management: once the system is in place, it needs to occupy itself, if only to keep itself in trim and develop its capacities." (Donoghue 1983, p.87)

If, as I am suggesting, written and verbal language are an unreliable medium (or concept) through which the Arts and Cultural expression generally might be accessed, except in a most cursory fashion, can this passion and emotion and insight be conveyed through the 'language of forms' we know as graphics?

3. Graphic Language

The last century, I suggest, should be considered as 'the period of the rising influence of the graphic'. Perhaps its beginning was with the Kazimir Malevich supremacist imagery in which shapes and colours became codified into the graphic language of the Russian Revolution. The power of graphics to communicate mood and aspiration was understood quickly in the market economies, and by the 1950's had developed sophisticated devices and a market-tested efficacy for selling products continuing to the present.

That graphic design is at the service of social persuasion is indicated in the graphics textbook for VCE students *Visual Messages*. "As printed words are of such a specialized nature," its authors C.J. Breckon, L.J.Jones & C.E.Moorhouse write, "they are generally considered a specialized language area. Visual images in the form of pictures and drawings can also be considered as a language...Yet, if visual devices other than written word are to be effective, they must conform to sets of conventions which are understood and adopted by those involved in the communication process. It therefore cannot be over emphasized that the application of graphic communication, irrespective of whether one is the transmitter or receiver of the communication, is not a natural instinctive operation that is common to all and

in which no instruction is needed.” (Breckon et al 1986, p. ix) “All graphic communication is based on symbolic systems of one kind or another which form a visual *language* or *grammar*,” they also write. (Breckon et al 1986, p.1)

The success of graphics was not based on a campaign to train people in the 'language of forms'. This 'not natural' aptitude for communication through forms, as suggested by the writers of 'Visual Messages', has always, in fact been a part of the human experience. It is our 'pattern identifying' and 'pattern making' powers which has played such an important part in the species' survival. Jonathan Hale's *The Old Way of Seeing* argues that pattern-making and intuitive design is fundamental to the quality of the built environment in which we live. He sets out to show why architectural design has lost its confidence in intuition and playful patterning, and how it might restore the magic and delight that all works of art should impart.

"One might think" he writes, "that the people of Belmont [a routine suburb] deliberately chose poor design. But the lines of their clothing are far better than the lines of their houses. And in the driveways of those houses are truly elegant Tauruses, Audis, BMWs. People do have innate standards, but most do not know how to get at them. It is hard for people to separate the important from the unimportant, the primary geometry from the secondary applied symbol, if they do not know about pattern. Pattern is very simple. It is very easy. It is already there in us: we *want* to make patterns. The routine houses of suburbia are full of patterns, although they are incomplete. Pattern is the norm. Even now, even in our time, which seem so lost, pattern is still, under it all, the norm." (Hale 1994, p.25)

Our sensitivity to and requirement for geometric design has never left us. From ancient pottery and cave wall paintings we see our love of geometry, and pattern making. The talent to notice a pattern change is fundamental to our adaptability after all. Pattern through mathematics as well as alchemy connects us to the great mysteries that surround our moment of existence. But a strange perceptual shift took place early in the 20th century when Malevitch created paintings of geometric symbolism. A white circle, a red square, a triangle in blue, these shapes and arrangements seemed to connect geometry to narrative. The Agit-plot trains that transported Trotsky across the Soviet Union at the end of the First World War, were painted in this new symbolic imagery. As it sped by, the peasantry could read the symbols showing, in graphic form, the white counter revolutionary armies being crushed by the red Bolshevik workers.

This symbolic geometry has evolved into the commercial graphic imagery that is pumped into our fields of vision by every conceivable technological delivery system that has become available. Students of Graphics, as we have seen, are instructed in the system of communication to effect subliminal as well as overt persuasion. And they have a great deal to learn if Vance Packard's 'The Hidden Persuaders' charts an accurate guide to the

marketing of products to consumers. Packard quotes from an interview in the *New York Times* of Gerald Stahl, executive vice-president of the package design council. "To get the women to reach and get the package in her hands," Stahl explained, "designers are now using 'symbols that have a dreamlike quality' To cite examples of dreamlike quality, he [Stahl] mentioned the mouth-watering frosted cakes that decorate the packages of cake mixes, sizzling steaks, mushrooms frying in butter. The idea is to sell the sizzle rather than the meat." (Packard 1963, p.95)

Our world is now engineered in design self-consciousness. Sculptors like Ron Robertson Swann design works like his 'vault' for Melbourne's city square, (fig 52, p.149) in a perfectly graphic style, such that its three-dimensionality is always confounded by each two dimensional aspect or view it allows its viewers. It was not long before the architect would see that they should design the sculptural aspect to their projects. At DCM, Denton, Corker & Marshall, they did exactly that. They designed the 'Gateway' at the end of the Tullamarine Tollway. This installation is clearly designed to be driven through, as Joe Rollo, 'The Age' Architecture critic, makes clear, writing that "You can only get its full impact at speeds of up to 100km/h". (Rollo 1999, p.173) The result for me is a confirmation of the supremacy of graphic design over a more sensual and complex response to the world.

Changing fashions swap one image for the next, giving off an appearance of change in the face of a constant barrage to buy that and think this! The recognition factor explains the repetition experience we are subjected to. The basis of Andy Warhol's work is exactly this repetition/fame graphic at the root of fashion and taste and commerce. Recognition is the continuing thread connecting the style changes. So it has come that even our major landmarks are designed within the same instant image gratification parameters as are our common road signs, and industry logos. You might therefore be tempted to suggest that the corporate society has affected a level of common experience between the great and small moments of daily life. But banal common denominators such as these remind one of the uniformity of community mindsets achieved at the Nuremberg rally and in other totalitarian hysteria. Community experience is not of one mind, one dream, one Reich. Community is founded on the pluralism of experience shared between everyone in the community.

The last 100 years has been a period of unprecedented development in our technology, our knowledge base and our economy. These changes have impacted on the range of materials made available to us, and therefore, the forms we have designed for ourselves. As we peer out into the cosmos and down into the microscopic, we see new patterns and recognize familiar shapes and forms. What we have foregone as we have looked out into the universe has been our faith in our own intuitive powers of revelation. Hale says that with a little more trust in our innate capacities, and ourselves, we can find the complete patterns that link elements of a form together in the mystery of balance and natural grace and order.

But I think we need to change our thinking away from the surfaces of things toward the substances and purpose of things. It is better not to design for the look of a building or the look of a dance performance or the look of some other plastic art expression. Our design should be conscious of how those participating in the architecture, the dance or the aesthetic experience will feel. Enfolded by the space and its construction, we need to engage the centre of the experience. Felt from within, the design should unfold itself as a set of organic and natural relations between every part of the building, the dance performance, and so on.

The design for such 'sites of experience' does not need to be programmatic. Rather, these are places where the magic and mystery of the everyday can be experienced. "A work of art" writes Donoghue, "is in some sense mysterious; but I see no evidence, in contemporary criticism, that the mystery is acknowledged or respected. Two reasons suggest themselves; one, that the dominant force in our engagement with experience, cannot admit mystery or respect it; and two, that discursive practices don't recognize what can't be explained." (Donoghue 1983, p.8) Central to the multi-sensory installations in which I am involved is the acknowledgement of mystery and wonder that are warp and weave to our 'tapestry' of understanding, and our shared knowing. I cannot think about the bell sculpture installation at Birrarung Marr Park without feeling a child-like glee at how amazing the site is every time I experience it. Walking amongst chiming bells should relieve people of their need for critical analysis, it being futile in the face of such delight and simple joy. Our understanding of such direct and joyful experience should have no need of explanation. People, being people, will rationalise, conceptualize and proselytize their experiences, but the experience itself, if unselfconsciously had, will be impervious to these distractions and embellishments.

The previous Chapter was concerned with the experiential focus on cultural expression. In this chapter I have argued that an ocularcentric culture privileges the image and the graphic and text over experience. That is to say, the signs of experience rather than experience itself. To privilege the optic before all other sensory receptions and to encode the experience into language is what I refer to as the 'codification of cultural experience'. This codification has been the main task of Western technical and philosophic knowledge building: to categorize and catalogue the patterns we can discern from swirling nature. Wittgenstein's claim that all that is knowable by us is already buried within our language leads us to the false hope that, in time, everything can be known. This illusion of science unraveling strings of knowledge from the knot of experience is countervailed at every step by artists whose works attempt to lead their communities away from exceeding confidence and toward the source of all mystery, the vivacious living of daily life.

Science, the methods of its logics and the resulting outcomes has wonderfully improved the quality of life at every measure. The benefit of science appears, in recent times, to have

grown exponentially. In the past three hundred years each succeeding generation has led lives of comfort almost unimaginable to the generation before it. Scientific research has given us unprecedented levels of control over natural events.

The techniques that have given us so much knowledge, *Ceteris Parabus* (fix relativities of variables except one) and *Mutandis Mutatis* (let variables adjust relativities from a single variable change) depend upon assumptions that cannot be made for the actual world. In an organic and dynamic model of life and experience, static methods of analysis seem hopelessly mechanistic. Although scientific procedures are increasingly shaped to mimic the dynamic and matrix relationships in nature, nevertheless, the intentions of contemporary science would be familiar to Newton with his clockwork mechanical world-view.

Differentiation is the key to building the library of human knowledge. Analytical comparison, it is generally believed, will shed light upon the sublime mystery that is life itself.

Morris Kline, in his text 'Mathematics in Western Culture', examples the effect of the new enthusiasm during the Enlightenment for science and mathematics on poetry and the arts. A new spirit arose to fix language to the sort of permanency of meaning that mathematical terms had achieved: "The writers began reconstruction by standardizing the language." (Kline 1972, p.310 & 311). The mark of this was the encyclopaedic movements, and "culminated in one of the landmarks of the English language, Samuel Johnson's Dictionary. Johnson undertook to regulate a language which had been 'produced by necessity and enlarged by accident'." (Kline 1972, p.311). Kline quotes a famous populariser of science of his time, Le Bovier de Fontenelle (1657–1757) to show this spirit for science. "The geometrical spirit is not so tied to geometry that it cannot be detached from it and transported to other fields of knowledge. A work on ethics, politics, or criticism, perhaps even a work of eloquence will be finer, other things being equal, if it is done by the hand of a geometrician. The order, the neatness, the precision, the exactness prevailing in good books for some time may well have arisen in that geometrical spirit now more widespread than ever." (Kline 1972, p.313)

However, many artists recoiled from this Newtonian confidence of having pierced the mystery of life with reason. Kline writes of a "dinner party in 1817 [where] Wordsworth, Lamb, and Keats, among others, drank a toast that ran: 'Newton's health, and confusion to mathematics'." Kline continues "Though Blake, Coleridge, Wordsworth, Byron, Keats, and Shelley understood what mathematics and science had accomplished and admired the accomplishments, they protested, nevertheless against what had happened to the essence of poetry." "William Blake called reason the devil whose high priests were Newton and Locke. 'Art is the tree of life...Science is the tree of Death.' He felt that the mechanical account of nature is hopelessly inadequate to render nature;
Tiger, tiger, burning bright

In the forests of the night,
What immortal hand or eye
Could frame thy fearful symmetry?" (Kline 1972, p.320 & 321)

"The poets of the nineteenth century" continues Kline, "chose the concrete experiences of nature, 'sensations sweet, felt in the blood and felt along the heart.' They enjoyed the sounds, light, smells, and sights of life itself. Sunrise and sunset bedazzled the mathematical analysis of light; the living fire of the sun overpowered its gravitational attraction of other masses; and the wild west wind – the 'breath of autumn's being', the uncontrollable spirit moving everywhere, and the waker of the blue Mediterranean – swept away the regular, mechanical motions of the air molecules." (Kline 1972, p.323)

In our age, an age of continuing enthusiasms for science, for technology, and for the enhanced communication and information available through these technology systems, it is appropriate to remember the Romantic poets' cry against these inadequate means of rendering the knowing into our fabric of knowledge. Indeed, the bell sculpture installations would not be possible without the use of such science and technology. These installations are, in part, wonderful expressions of our technological capacities and imaginations. Even so, the bell sculpture installations, while celebrating technology, logic and reason, are sites for the sharing of culture in all its unutterable mystery.

4. Conclusion

Now is the critical time, I am suggesting in this thesis, for our finding sites and experiences which echo the temple experiences of religion-bounded communities, and build a secular society in which we can live aesthetic everyday lives. Experience itself, rather than conceptualization of experience, administered through images and other language codes, seems the fruitful pathway to such a goal. For a secular society needs to embrace citizens as complex and interwoven identities, rather than as individuals identified statistically from one another. Just as people are inter-connected, multi-faceted and organic social clumps to which primary identification as 'individual' is an obvious oversimplification, so our language poorly attends to the complex sensations of our lives through the simple act of naming things or generating images of those things or relations.

When the image of the body, through the media, overwhelms our connection to those pleasures and physical joys our own bodies offer us, and when this disconnection also separates us from those around us, through self-consciousness, then we are a divided identity. Our culture has substituted sensual physicality with the gymnasias and self-conscious

body-culture of performance. Power walking and Aerobic exercise, for example, do not connect us to our bodies, they connect us to a generic image of 'the body' which tends to weaken our confidences.

Donoghue suggests that "The administration of the arts begins with the moment in which we give them their names. As soon as you think of something as sculpture, you have a slot for it: it's because the word 'sculpture' is available that we can talk about it. The object may challenge these considerations or refute them, but at least they are there" (Donoghue 1983, p.72). The naming of a thing can limit it. One of the wonderful things about sculpture is that so many other cultural practices have collected under this heading, often due to their not fitting into other practice definitions. This has given 'sculpture' so diverse a set of practices as to almost render the title redundant. It makes for a great deal of freedom of practice in the field. So many 'cross media' and 'multimedia' practices have fallen from other cultural expressions and have collected in and expanded the field of sculpture. Apart from objects and object spaces, sculpture includes Performance, machine art, kinaesthetic works, new digital technologies, 'Happenings' and perhaps more recently, 'installation'.

It is from this field of exciting and challenging activities that the multi-sensory bell sculpture Installations arise, in the hope of making 'sites of experience' that celebrate communal life in favour of individual virtuosity and audience education. The following chapters of this thesis examine the traditions and history of bells in Eastern and Western religious communities and other multi-sensory installation work as context to the bell sculpture installation's place in contemporary secular culture.

Chapter 3 THE ASIAN BELL TRADITION.

“.. both the throaty note of the Shinto *nurite* heard close by and the tenuous roll of the *bonsho* over the hills had been part of their life for so many centuries. As their poet Basho expressed it:

Who said there were only eight views of Biwa?

The ninth view is the sound of Mii-dera’s bell”

(Price 1983, p.49)

1. Preamble
2. The Chinese bell tradition.
3. The Korean bell tradition.
4. The Japanese bell tradition.
5. The Thailand bell tradition.
6. The experience of Buddhist temples
7. Conclusion

1. Preamble

I should like to recount a special experience of visiting Kuro-dani temple that may explain my interest in the creation of authentic multi-sensory places of experience. Prior to visiting Kyoto to research bells, Neil McLachlan and I had asked fellow Australian Owen Smith, who has lived in Kyoto for the past decade, to arrange an itinerary of important temples and bell foundries from which to collect data. Most temples were pleased to accept our research request, sometimes allowing us access to remarkable bells not kept in public places. We were able to visit their bells and sample their sounds, document physical dimensions and record iconographic markings. However, Kuro-dani temple, with a renowned bell of some five tonne refused our visit. We decided to visit the temple at 5.30 am and to be at the bell when the monk who regularly rang the bell came out to ring it to mark the first meditation for the monks who lived at the temple. In darkness we traveled by taxi to the temple, and walked up the steep hill to enter its torii gate. Nothing stirred in the blackness of the temple grounds. Slowly the night sky lightened, and the shapes of buildings emerged from the darkness. Ancient pine trees surrounded the temple, which consisted of the main temple building, a spacious building nearby in a similar design in which meditation took place, some small other buildings and the bell tower. The morning sky was crystal clear and bright blue when it brightened, and the shaggy pines

made beautiful shapes around and between the consummately constructed wooden temple buildings as shadows shifted away.

Huge black crows danced on the temple roof and on the gatehouse, now and then breaking the stillness and silence with calls of "quaarrk" which might have been the plaintive call of lost children. We were ourselves lost in the magical theatre unfolding around us. A line of sleepy-eyed monks shuffled into the meditation building, opened the sliding paper and wood wall panels, and began, with low murmurs to sweep out the wooden floor of this now open space. Just then, an old man came out of one of the small buildings close by. He stared at us with surprise. After a quick look, the old monk turned and walked across the temple forecourt to the bell tower. We recorded, on digital tape and video, the bell being tolled eight times. Each time the monk rang the bell he moved one of the white stones he had lined up on the bell-tower frame to count the strike.

The combination of aural and visual sensations of this sublime experience will never leave me.

The fragility of the Japanese temple, for all of its ancient and beautiful wholeness, lies exactly in the extraordinary confidence with which it is used. The difference, I feel, between the aesthetics of the West and those of the East lies in this. Old ruins and ancient buildings in the European landscape tell of other times and are symbols of 'history', even while they are still being used, for example the architecture of Oxford University. Time clings to them like a patina. In the Japanese temple a continuing use in no way displaces the ancientness of the place, and so an undifferentiated history very lightly filter's ones experience of the place.

Elements in a Buddhist temple, especially the Japanese temples, feel 'lightly' arranged rather than 'glued' to its spot by time. One always felt they could be rearranged; a stone shifted perhaps, if done with sufficient confidence, and the whole would remain complete and true in its travel along the river of time. If one changed the position of a stone on a Western ancient structure it would feel like an act of desecration.

This sensation of remaining an open and fragile arrangement, made in perfect confidence marks the experience of a Japanese temple as an exhilarating place. In this space you are challenged to respond with a confidence and clarity equal to that of its creation.

In this chapter I will outline the research I have undertaken, and am continuing to undertake, in the search for an understanding of the Buddhist bell. This search has two connected elements. One is to understand the ritual significance of the bell as an object in respect to its physical dimensions, surface detailing and acoustics. The other is to see its place as an active element in communal space conditioning communal self-imagination. Such understandings must come out of the context of the bell in the greater Asian culture generally, as well as documenting specific Buddhist bells in particular communities in Asia.

This understanding will answer the puzzling question surrounding the place of musical relationships in Asian bell design. I am keenly interested in this particular question. My experience in various parts of Asia of the multi-sensory experience of temples and temple bells has highly coloured my work as a sculptor and my philosophic contributions to the collaborative public space Installations that are central to this thesis.

This research into the Asian bell context was a necessary part of our designing the Federation Bells project. This was because the Federation Bells Carillon, as explained in chapter 6, references Asian bell traditions both as bell shapes and in the way bells are experienced in the public domain. As well, the Federation Bells Carillon intended to combine for the first time the two, long separated, bell traditions of the East and the West in a single installation.

We traveled extensively throughout Asia in search of an understanding of Buddhist bells. We have built a library of acoustic recordings of individual bells along with their measurements and iconographic details. We have visited two of the three major Japanese bell foundries and watched bells being made, cast and finished. We have visited and documented a small sample of the 500 bells held at the Beijing Bell Museum, and visited some the major temples and temple bells in China, Korea, Thailand and Japan.

It was a privilege to be introduced to Amano Sensei, the head monk (Ju-shoku) of Jikko-in temple set in the Hills near Kyoto. Amano Sensei has a reputation for his serious interest in the sound of the Bonsho bell as well as the other musical instruments. He showed us his temple's wonderful collection of ancient musical instruments, including a small lithophone. This collection had been built up by succeeding head priests of Jikko-in, who each made contributions to the study of *shomyo*, which is sometimes called *bonbai*. These are Buddhist hymns intoned in one voice or in chorus by monks at Buddhist ceremonies. This chanting dates from early Indian Buddhist practice, and was introduced to Japan, via China, in the Nara Period (710-784). Tendai *shomyo* is one of the two streams of the practice developed in Japan, and Jikko-in is the centre of this practice. These hymns are thought to be central to the tradition of Japanese music. William Malm writes in his text 'Japanese Music and Musical Instruments', "When we want to know about the background and origins of Western music, we turn to the ancient collections of Gregorian chant or refer to the theories of Odo of Cluny, Guido d'Arezzo (the inventor of *do, re, mi*), and a legion of other monkish scholars. If we seek a similar heritage in Japanese music, we must look to such works as the *Shomyo Yojinshu* by Tanchi (1163-1237), of the Tendai sect or the main codex of the Shingon sect, the *Gyozan Taikaishu* (1496), with its important theoretical appendices by Chojei." (Malm 1974, p.66)

Amano Sensei conveyed to us his growing dissatisfaction with the sounds being achieved by contemporary bell founders in Japan. He had traveled to Korea in search of bells with a satisfactory

voice. His opinion at the time of our audience with him was that the Emile bell in the National Treasures Museum at Kyong-ju gave the best sound for a Buddhist bell. The 'best' sounds in a Buddhist bell would awaken a state of consciousness, known as 'the call of Buddha' in men. He encouraged our interest toward designing a Bonsho bell that was an improvement on the acoustic values of bells currently being cast in Japan.

Since then, our examination of many Buddhist bells in Asia and the few examples in Australia, has been undertaken in the context of these questions; is this particular bell an example of a successful Buddhist bell? How is the experience of this bell fundamental to the community that uses it?

Given the great variety of Asian communities and traditions, it is only possible to prepare a general overview of the place of the bell in a number of Asian countries that our research has taken us to.

As the bell was first cast into bronze in China, and China has heavily influenced the traditions and cultures of Korea and Japan, we begin this necessarily brief history of the bell in Asia by starting with China. I will then discuss in detail two particular bells from China. I shall follow on with a history of the bell in Korea, and two example bells studied in detail, followed by the history of the bell in Japan, with two sample bells. Finally, having visited a bell foundry in Thailand, I will conclude this overview into Asian bells, with a consideration of Buddhist bells in Thailand.

2. The Chinese bell tradition.

Whereas the first bronze bells dated in the west occur around 1200BC (though clay bells have been found in Knossos and Crete dated from 2000BC) in China an early bronze casting technology had developed in the Shang dynasty (1520 to 1030 BC). Amongst the casting of bronze weaponry are fine examples of ritual bronze vessels that were used in sacrifices to ancestral spirits.

The early Chinese bells from the Shang dynasty are called *nau*. (fig 1, p.60) They are typically elliptical in horizontal section, and have a strict iconographic form in line with their ritual function. The *nau* has a panel on each side with nine nipples, called *nai tou*. These are thought to be fertility symbols or orifices through which the sound of the bell might travel to the spirit world. The rim of the *nau* is 'fish-mouthed', which gives these bells the look of a grain scoop. On some are a *nau* a *t'ao-t'ieh* monster/dragon mask that commonly decorates bronze ritual food vessels and warns against avarice and greed. Percival Price, in his text 'Bells and Man' quotes Needham's claim that these bells were grain scoops and "that a standardized size for pitch became a standard measure" (Price 1983, p.2 & 3), though Price himself doubts that the elliptical bell would produce a clear pitch. Lehr, in his text, 'The Art of The Carillon in the Low Countries', makes the point that *nau* bells are not elliptical, but the intersection of two circles.

Price does make the suggestion that the Chinese treated sound very seriously. They believed that sound was a manifestation of the universal essence, and bells were probably used to sustain universal harmony. As the improper use of these powerful objects could destroy universal harmony, they were decorated in dragon and other fierce animal images to warn off unauthorised ringing.

The Chou dynasty, lords of the Wei, (1027-256 BC) annexed the Shang dynasty. Important changes took place during this long dynastic reign, including the birth of Lao Tzu and the founding of Taoism, and Kung Tzu, known as Confucius. A number of bells were developed during the Chou dynasty. The *nau*, when used as a single stationary bell, was called a *po*. A smaller bell which was hung on the corners of pagodas and rung by wind moving a clapper was called a *to*. The *to* was intended to frighten away evil spirits.

The *nau* also was developed as a musical bell in a set of bells called the *pien chung* (fig 2, p.60). This musical instrument typically consisted of 16 tuned bells in a group and its development is an example of the sophistication and civilization that took place across the Chou dynasty. Michael Sullivan suggests that this musical use of bells was possible because “Confucius, like Pythagoras, upheld music as an aid to good government and the creation of a harmonious society. Prominent among the instruments used in ancient ritual music were sets of bronze bells and stone chimes (lithophone) of graded sizes suspended from a wooden frame and struck with a wooden hammer.” (Sullivan 1973, p. 17) The *pien chung* is the oldest known bell instrument on which melodic music can be played. While the early bells-sets differ greatly from each other, making it unlikely that the pitch of any two could be the same, by the fifth century BC the bell had become more rounded and started to lose their ‘Fish-mouth’ rims and reduce the scale of the nipples. As the musical imperative became stronger the bells were cast with thinner walls and increasing ratios of tin in their bronze alloy to clarify the note they produced. Price writes, “It was not loudness which was sought, but a mysterious, sweet tone” (Price 1983, p. 8)

Lehr, who has closely examined a number of *pien chung*, makes these remarks upon the tuning of the chimes: “In speaking of the purity of the Chinese chime, one should exercise a great deal of discretion. Deviations of a quarter-tone and more were not in the least uncommon, in spite of the fact that efforts were made every now and again to give it its correct tone through a local thinning. In order to prevent any misunderstanding, the sought-after purity was of the same nature and magnitude as that later sought after in the West, according to many of the earliest Chinese theoretical writings on music. In the same theoretical dissertations, moreover, one can read that essentially a five-tone or pentatonic rather than a seven-tone or heptatonic series was pursued.”(Lehr 1991, p.16)

The largest bell set discovered to date was found in the province of Hupei, near Beijing and dated around 433BC. This chime set consists of 65 elliptical shaped, fish mouthed bells from which two notes or pitches per bell can be rung, according to whether they are chimed in the center (this note

is called *sui*) or played at the edges (this note is called *ku*). The original Marquis Yi *pein chung* (fig 3, p.60) is held in the museum near to the archeological site where they were found, with a replica set kept at the Beijing Bell Museum in Peking. This replica set is used for official functions, most recently at the ceremony for the handing back of Hong Kong to China in 1998. The banquet hall, in which the chime set was found, was buried underground, and consisted of a space of about 200 square meters and included over 7000 objects including 124 musical instruments. This hall was arranged as if the musicians and dancers might entertain the Marquis at a moment's notice on his journey in the afterlife.

We were invited by the curator of the Beijing Bell Museum to play the replica set of Marquis Yi's *pein chung*. Striking the larger bells gave a satisfying boom, and the small bells played with a bright timbre but with little sustain of the notes played. (CD. Track 18.)

A development of the *nau*, writes Wan-go Weng & Yang Boda, was into the Zhong bell (fig 16 p.52) during the Western Zhou dynasty: "sets of Zhong number seven or nine...most of the bells give a difference of three intervals between the two tones, and a complete set of nine bells, affording eighteen musical notes, could make a very respectable performance." (Wan-go Weng & Yang Boda, 1982 p.130) This ancient bell seems to me to be a precursor to the mysterious ritual Dotaku bells found in Japan and Korea (discussed later on).

The Han dynasty (206 BC-AD 220) was founded by a soldier of fortune, Liu Pang. He became emperor under the title Kao-tsu, and reunited the kingdom after the long period of violence that had weakened the Chou dynasty. As a devotee of Confucianism, his rule maintained the traditions of the court. The Han maintained contact with the peoples of Central Asia. Even as the crotal bells the tribesmen decked the harnesses of their war-horses and chariots with became popular throughout China, Buddhist faith and practices, the primary religion of these peoples, was contained by the Han Emperors and kept from spreading throughout China.

Buddhism began in Northern India around 500 BC. Sakyamuni who had achieved enlightenment through meditation, and became Buddha, the enlightened one, founded it. His disciples and followers developed into two streams. The Mahayana (the greater vehicle) traveled northward into China, Korea and Japan, whilst Hinayana (the lesser vehicle) travelled to South-East Asia. Buddhism had spread across India by the third century BC. It came to be the state religion in China by the mid fourth century AD and entered Korea in 372, through the Koguryo Kingdom. It reached Japan in the reign of the Emperor Kimmei in 552 AD through the gift of a gilt-bronze Buddha and volumes of sutras from the Korean kingdom of Paekche.

The Han dynasty fell in 220 AD to the incursions of the restless northern tribes, and the country divided into three kingdoms, the Wei, the South and the West kingdoms. This fragmentation of a highly civilized imperial court was accompanied by the spread of Buddhism through China. The fall

of the Han Dynasty, after almost four centuries of unbroken rule, brought China into its 'Dark Ages'. This period of turmoil, between 221AD and 589AD, is called the period of the three kingdoms and six Dynasties. The country was divided between the north and the south. In the north the Wei, a Toba Turkic nomadic people forcibly replaced Taoism and Confucianism with Buddhism.

As the remnant Han institutions in the Southern Kingdom of Wu and the Western Shu-han Kingdom collapsed, so Buddhist philosophy came to dominate society. As Peter Swann suggests, this period saw a questioning amongst Chinese intellectuals and government officials of the long-held idea that China was the centre of the universe and the ultimate civilization. This turmoil paved the way for Buddhism, which saw life as “full of suffering whose cause is desire. Salvation comes through the eradication of desire and the way to this is through the eight-fold path-right views, intentions, speech, conduct, livelihood, effort, mindfulness, and concentration. The ultimate goal is a complete extinction in *nirvana* which brings the ending of the chain of successive deaths and rebirths and hence of the suffering they entail” (Swann 1963, p.62)

The Buddhist bell that came with the religious practice typically had a disc symbolizing a lotus to indicate the place on the bell surface to strike with a wooden shaft. Often the bell is shaped in the form of the lotus flower, including the scalloped rim. It is noteworthy that there are no *nai-tou*, or nipples on the early Buddhist bells but they recur on later Buddhist bells, which indicates a tendency among Buddhists to assimilate into local custom and belief. Buddhism typically was most popular amongst the poor and powerless masses, while the ruling elite practiced Confucianism. The earliest of the larger Chinese Buddhist bells on record is in Japan and dated 575AD. It is about 60cm in diameter and 75cm in height. Its horizontal form is circular, and its rim is straight.

Given the circular horizontal profile of the Buddhist bell, its sound will be generally more resonant than the *nau* with its elliptical horizontal profile. It should be noted that the *nau* bell had, prior to the coming of Buddhism, been developing an increasingly axis-symmetric horizontal profile in its search for a more satisfying musical sound. However, the spread of Buddhism and its single temple bell seems to have displaced the *nau* bell form altogether before it had found an axis-symmetric iteration.

China was re-united under the T'ang dynasty in 620AD. The centralised government embraced Buddhism as a 'state' religion. Within this religion the bell was significant in the process of worship, as the sound of the bell was thought to awaken the 'call of Buddha' consciousness. The larger the bell, the louder and further the vibrations carried, and so the greater the area over which 'the call of Buddha' is felt. Price reports: “About the year 712 the emperor Hsüan Tsang had a bell cast for Nanking which was two meters in diameter and weighed over twenty tons. As far as we know, it was the largest bell ever cast up to that time. It is still *in situ*, and appears to be of Korean workmanship.” (Price 1983, p.10 &11)

The Mongol dynasty collapsed in 1368. It was followed by the Ming dynasty. The first Ming emperor made Nanking his capital and ordered the casting of four very large bells for the city. The only remaining one of the four was cast in 1389, weighs over twenty tonnes, stands 3.6 metres high and 2.4 metres diameter at its mouth. This period of intense interest in the Buddhist bell continued with the emperor Yung Lo, who, in 1402, ordered the casting of possibly nine bells for Peking that were to weigh twice as much as the great Nanking bell. The most famous of the three huge bells still existing is called the 'Yongle Bell'.(fig 4, p.61) It hung originally in the 'Temple of the great bell' which was outside the city. It stands 6.75 metres high and 3.3 metres diameter at its rim. This truly amazing bell weighs 46.5 tonnes. The whole bell is covered in sutra calligraphy. This consists of more than 100 kinds of Buddhist sutra and incantations made up of over 230,000 Chinese characters. It is difficult to see markings showing the casting processes on this bell, which is readily observable on most other Chinese bells.

The casting of this bell is superb, and I examined it as intently as was possible to find evidence of reworking of the surface after it had been cast. I could find none. The incised characters were sharply defined, and only the slight shift in surface levels indicated the segmented moulding process used in the casting process. Apart from several other Ming dynasty bells that must have been cast using the *cire perdue* (lost wax) casting process, and are equally brilliantly cast, there are few bells that I have looked at that can compare with this degree of skill and workmanship.

Price remarks upon the purpose of these great bells: "In each city, one colossal bell was reserved for the sacred function. The making of the bell for this use in Peking was placed under the direction of the magician Ya Kuang-hsia. The prayers put on its surface, so as to go out with its sound, consisted of selections from Buddhist scripture forming a text as long as the four Christian gospels and the book of Acts, and completely covered the bell both outside and inside. So as to be in the most perfect handwriting possible, they were inscribed by the noted calligrapher Shen Tu, sub Chancellor of the Grand Secretariat under Yung Lo. According to legend the bell was poured three times before the desired tone was achieved." (Price 1983, p.15)

Social unrest caused the bell to be buried to protect it. In 1743 it was dug up and hung in a bell structure in the Chüeh Sheng Temple outside the city walls to the northwest. Here, where north and west meet, the emperor recited the annual prayers for rain. Its location here was deemed propitious, for 'metal produces water'. The temple became known as Da zhong Si 'Temple of the great bell' and is now the site of the Beijing Bell Museum.

Neither the great Yongle bell or the Nanking bells are presently rung, but no ruler of China has dared to destroy these bells. In 1662 the Ming dynasty surrendered to the Manchu, from the north of China and Manchuria. The history of China has seen a succession of vigorous peoples from the northern plains conquering a dynasty that had grown complacent. The Manchurians favoured the musical qualities of bells over the Buddhist magical and sacred purposes, and encouraged the re-

invigoration of the *pian chung*, along with the practices of Confucianism. The first Manchu emperor ordered a new 16 bell *pian chung*.

While the educated classes took up Confucian beliefs and ceremony, Buddhism remained the faith of the masses. Temple bells were still cast, but more often in the cheaper, and less sonorous metal, iron. Though still kept alive in the Korean Imperial court, by the time of China's republican revolution in 1911 the musical tradition of the *pian chung* had died out, and the casting of Buddhist bells had diminished seriously in quality and quantity of both sound and iconographic elaboration.

The Communist revolution's rise to power in 1949 signaled the end of the state's support of all religion, and the closing of temples across China. Temple bells were confiscated and collected in the temple where the great Yongle bell hung and, later, this collection of bells representing the objects of a discredited faith, became the Beijing bell Museum. Interestingly, in the courtyard hang a number of bells, most of which are the more recent cast iron examples, while the more extraordinary bells of the T'ang and most particularly, the Ming dynasty, with their elaborated and skillful shapes and iconographic detail are resting on stone bases which prevent their being heard. One Ming dynasty bell (fig 5, p.60) has beautifully modeled dragons emerging from high relief, and could only have been the result of a lost wax casting rather than the more usual clay and sand casting process. This and several earlier bells with very careful proportioning deserve to be heard and to have an analysis made of their acoustic spectra.

Examples of Chinese bells in detail

To demonstrate some of the general features of the Chinese Buddhist bell I have selected the Powerhouse Museum bell in Sydney and the bell that is hung at the front of the Beijing Bell Museum. Both bells have the lotus form with scalloped mouth, and are bells that demonstrate the technical ability of the Chinese bell foundries. We were unable to ring the most important bells at the bell museum, and of those that we could record, many were in very poor condition or cast in iron.

The Powerhouse Museum Chinese bell.

(Chinese bronze bell H7752 at the Powerhouse museum Sydney.) (fig 6, p.61) (CD. Track 10)

After six months of negotiations with curators at the Museum, we were invited to visit the bell, to ring it and to make a digital recording of its sound. While the Museum staff were very reluctant to risk ringing this bell, they had misplaced a sound recording of the bell taken, I believe, twelve years earlier by Hervey Bagot. Several weeks before we attended the bell, it was x-rayed by metallurgists to establish the extent, if any, of potential cracking of the bell if it were rung. We traveled to Sydney in 1998 to record the bell.

The bell is 218cm high and 152cm wide and weighs 610kg. It was cast in 1438. The bell came to be in Australia through an act of theft by the Australian military forces in China. The Bell was souvenired by members of the NSW Naval contingent who served in China during the Boxer Rebellion and was brought back to Australia in 1901. It was apparently found partly buried in the grounds of a temple in the Beijing region. The Museum has, in its records a newspaper cutting showing Canadian troops unearthing another bell which was taken to Canada, so this removal of hidden bells seems to have been regarded as an ordinary 'spoils of war' activity.

Hervey Bagot examined the bell in 1990 using a stethoscope and piezo-electric vibrator to excite the partial tones of the bell. Neil McLachlan and I wished to make a digital audio tape (dat) recording of the bell and analyse the sound spectrum. We also needed to measure the physical dimensions of the bell as completely as possible to develop our understanding of the qualities of both sound, form and iconography desired by the Chinese bell-founder when they designed, made and cast their bells.

The inscription on the bell establishes the bell as from the Ming dynasty, a period of enthusiastic bell casting, in which bells were cast to very large sizes with surfaces that were exquisitely modeled. This bell appears, at this point in time, not to be especially significant, but rather to be a generic item, produced in numbers to satisfy an increasing demand for bells at a time when Buddhism was in ascendancy throughout China. A rough translation of an inscription cast on its flank is as follows; "The Emperor is permanent,
The Buddha's radiance grows forever brighter,
The way of the Emperor ensures lasting prosperity,
The wheel of (Buddhist) law turns forever,
Cast on an auspicious day of the second month in the third year of Emperor Zhengtong's reign of the Ming Dynasty."

The bell is surprisingly thin, with an average thickness of 12 mm except near the mouth of the bell, which thickens substantially. This thinness ensures the bell has a low frequency, despite its relatively small scale.

We have collected a substantial set of acoustic data from Buddhist bells across Asia, and intend to research the comparative acoustic qualities of these and other Asian bells at a future time. Until this work has been carried out I am not in a position to substantiate any particular position on the acoustic values of Buddhist bells. Our journey to sites holding significant bells, to national museums with collections of bells and to bell foundries was important for the design of the Federation Bells Carillon. Our experience of and understanding about the context of the bell in Asian communities has been incorporated in the sculptural design of our bell installation. Where a spectral analysis suggests a possible pattern and I refer to this, I intend the reader to be aware of the highly speculative status of these acoustic observations. With this noted, the spectral analysis (Fig 24,

p.67) of the Powerhouse Museum bell shows that the partial overtones that constitute the bell's sound are seemingly chaotic. The bell sounds like any metal drum does when struck, until the hum partial frequency, its lowest pitch, continues to sound after the other partials have decayed. I suspect that this desire to cast thin bells is to achieve the lowest possible frequency per bell metal weight, given that a thinner bell has a lower frequency fundamental than a thicker one of the same scale. And given that lower frequency sounds travel further than higher pitched sound, this is a strategy to send the bell sound as far as possible.

The Beijing Bell Museum Chinese Bell.

The second bell I wish to discuss stands in front of the Beijing Bell Museum.(fig 8, p.61)(CD. Track 3.) While the museum staff were able to tell us a little about this bell, it was the largest bronze bell we were able to ring and record at the bell museum. The bell stands at around three metres high. Like the smaller bell held in the Powerhouse Museum collection, this bell was quite thin for its size, at 15mm on average. The sound of the bell, as shown in the spectra, is crowded with many overtones after the strike but soon damps to a not very long lasting fundamental pitch.(Fig 24, p.67) This bell is believed to be also of the Ming dynasty and shows a similarly plain surface marking as the Powerhouse Museum bell.

At this point it is difficult to draw any certain conclusions regarding the intentions of the bell founders and the way they measured the acoustic value of their cast bells. It remains our ambition to come to an understanding of the significance of Asian bell sounds at some future time.

3. The Korean bell tradition.

The ancient Korean courts very much reflected those of its most influential neighbour, China. Price relates the distinctiveness of the Korean adaptation of the rituals and philosophies that flooded in from foreign cultures. He remarks upon Korean pre-historic bells that have been found: "They are similar to pre-Han Chinese bells in that they have a flattened conoid shape and a fish-mouth rim; but they differ by having little slits or holes in their sides, or a single hole like an eye. A number have their flanks covered with hatching in close parallel lines. Some have been found buried in specially dug trenches. These features also belong to bells (dotaku) of the Yayoi culture that flourished in Japan during part of the same time. The Korean bells, however, appear to be the generic type out of which the Yayoi bells evolved, for they are small - none over 12 cm in height - whereas the Japanese bells, beginning like the Korean, become greatly developed both in size and surface treatment." (Price 1983, p.34)

The National Museum, situated in Kyong-ju has a collection of very early Korean elliptical and fish-mouthed bells which might be indistinguishable, at least visibly, from Chinese examples except for the distinctive chimney-form at the crown of the bell.

The history of Korea has been one of conquest and invasion, and as Price puts it "Korea, throughout her long history, has acted as a funnel into which cultural ideas have been poured from China, Manchuria, Mongolia, and Siberia, to be assimilated, and in some cases passed onto Japan." (Price 1983, p.34) One of the influences that came from pre Han China was the *pien-chung* that the Koreans called *pyung-jong*. I think it carries some significance that the *pyung-jong* musical bell instrument flourished in Korea, even when it had diminished in China. One reason for this was the lateness of Buddhism's influence on the Korean court and hence its use of musical bells. Nevertheless, large Buddhist bells were cast in Korea from the time of the introduction of Buddhism. The skill of Korean bell founders shows itself in their more uniform bell profiles and exquisite surface relief modeling on each bell. These are much in advance of bells cast anywhere else in Asia.

After 670AD, the Silla dynasty unified Korea, and Buddhism became the state religion. At this time the typical larger hung Buddhist bell, known as *chong*, was developed as a uniquely Korean expression of the Buddhist bell. The Korean bell is quite distinctive from the Chinese Buddhist bell and the Buddhist bell as it developed in Japan. The most important distinction lay in its sound. The Korean bell has, to my ear, a clear sound that I find most pleasing in comparison to Buddhist bells I have heard in other countries. I suspect this will be due to its unique cylindrical form that narrows toward its hanging canon (dragons) and a tendency toward thicker profiles in comparison to other Asian bell forms. More substantial reasons will have to await future research undertakings.

The Bureau of Cultural Property, Ministry of Culture and Information for the Republic of Korea has published a book on Korean art and artifacts. In this book, under the heading 'Bronze Bells', the authors (compilation committee) write, "Bronze bells are unquestionably the highest achievement of ancient Korean metalwork. Both at home and abroad their high quality, superb form, unusual size and great number have been widely recognized. Indeed, the largest and most beautiful Buddhist bells are in Korea; they have survived the vicissitudes which have destroyed much other ancient art. A number of Silla and Koryo bells are kept today in shrines and temples in Japan, an eloquent witness to our troubled history." (Ministry of Culture 1974, p.305)

Other distinctions of the Korean bell go to its sophisticated decoration on the surfaces including the bands of intense patterning and the flying diva images. The Korean founders favoured fewer nipples, usually 9 in four small panels, and a pipe extending from the top of the bell with the dragon or double dragons which form the loop from which the bell was hung. The Korean founders never followed the Chinese practice of adorning their bells with decorative bands, instead choosing reliefs of intense floral decoration at the lip and shoulder of the bell. Price suggests that these bell decorations are the earliest known examples of moulding on large bells by the *cire perdue* [lost wax] method.

But the most noticeable thing, for me, about Korean bells is their manner of installation in temple and other public space. Ancestor worship and the belief in the power of the sound waves vibrating from a bell to reach out to the ancestors is demonstrated in the way the temple bell is hung very close to the ground. A hole is usually dug beneath the bell. Price writes of this hanging system: "The Chinese Buddhist bell was hung a story above the ground, so that its emanations would come down on to a deity, exemplified by a statue, who would know how to distribute it. The Korean bell was hung close to the ground, only about 30 cm above it in some cases, and the ground hollowed out underneath and kept clear of earth so as to facilitate the entry of its emanations into the earth. In earlier times large pots were buried into these hollow places so as to echo the sound back into the bell and complete the tonal link with the earth" (Price 1983, p. 35).

The larger the bell, the lower the vibrations, and the better they may penetrate the earth. The Koreans seem to be very conscious of the radiating qualities of their bell sounds. The pipe coming from the top of the bell, often modeled as a tower structure, is hollow. Price suggests: "this pipe, Koreans say, is necessary to let the sound out of the bell; but the explanation is not so simple as this. It seems to be a carry-over from a pre-Buddhist magico-sacred use of bells, and a substitute for holes in the sides of much earlier small bells." (Price 1983, p.36). Certainly the pipe distinguishes Korean bells from other Buddhist bells. My own conviction is that the pipe is part of the casting process whereby the core, that is, the mould of the inside of the bell, is held in place by a single large 'core-pin' of iron which is removed as the bell begins cooling. The holes that are found on most old Buddhist bells are left when the four iron core-pins that are trapped in the bell at casting, rust away. Present day Japanese bell founders use exactly the same process to fix the top of the bells' outer and inner mould sections to the right spacing. I was unable to find any Korean bells with the usual core-pin holes, which strongly suggests to me that they avoided this more common method to align their mould sections in preparation for the casting of the bell.

The Emile Bell.

The most famous Korean bell, which, like the great Yongle Bell in Beijing, is no-longer rung for fear that it may crack, is the 'Divine Bell' of King Sondoc the Great. This bell is now known as the 'Emile bell' (fig 10, p.61)(CD. Track 13.) and is hung in the garden of the National treasures Museum in Kyong-ju. 'Emile' in Korean translates as 'mommy', and the legend associated with the casting of this bell is related in a pamphlet published by the Korea National Tourism Organization. "The bell's makers at first failed repeatedly to produce a bell with the desired sound. They succeeded only after sacrificing a child from the village. But the finished bell's peal had a plaintive, tragic tone. People thought the bell sounded reproachful, as if the dead child were crying, "Emi! Emi!" ("Mommy! Mommy!") So the bell became known as the "Emile bell". (Tourist brochure)

King Hyegong completed the bell's casting in AD 771 to honour his grandfather, the Silla king Songdoc. The bell has the following inscription: "True religion lies beyond the realm of visible things;

it source is nowhere seen. As sound is heard through the air without any clue to its whereabouts, so is religion. Thus we hang this great bell that it may awaken the call of Buddha. So ponderous is it that it can never be moved - a fitting place on which to inscribe the virtues of a king. Great Songdoc was his name, his deeds eternal as the hills and streams, his glory as the sun and moon. He called the true and noble to aid him in his rule. Fitting ceremonies and music accompanied all his ways. He encouraged the farmer to a joy in his work and the merchant to the exercise of honesty. Gold and Jewels were accounted as nothing in his sight, while useful knowledge and skill of hand were treasures above compare. His great aim was the right-ordered life, for this reason people came from afar to seek his counsel, and revered him for his worth." (Price 1983, p.36)

The bell is about 2.8m high and 2.27m in diameter and is estimated to weigh 72,000 kg. Its spectral analysis, taken from a recording of the bell, shows a very low fundamental pitch of 64 hz. (Fig 11, p.64) For over 900 years it was the heaviest bell cast and is the third largest sounding bell in the world. Other large bells were cast, one reputedly larger than the Emille bell, but they have been lost, as have so many Korean bells, from theft. Supposedly a great bell was collected by the Japanese in the sixteenth century, and floated on a raft toward Japan, only to fall into the sea. Attempts have been made in recent times to try to find this legendary great bell.

The Silla dynasty was replaced by the Koryu in the first half of the 10th century. The Koryu dynasty itself fell under the control of the Mongols, who held Korea as a protectorate and by the end of the 14th century the influence of Buddhism was weakening. The Yi dynasty replaced the Koryu dynasty and remained in control of Korea until Japanese conquest in 1910. During the Yi dynasty Confucianism became the state religion, and many large Buddhist bells were melted down, or lost to Japanese confiscation and wanton destruction during the invasions of the sixteenth century.

The rise of Confucianism encouraged the use of bells with more musical possibilities such as the *pyung-jong*. Price writes of the long tradition of courtly music maintained in Korea: "Fortunately for posterity the Korean court retained this music after it died out in China in the nineteenth century, and it is still played, and ancient instruments preserved. Performances on the sixteen-bell *pyung-jong* along with the single bell *tuk-jong* is taught at the Korean National Academy of Classical Music, and it is used in ritual music for the Imperial Ancestors' Shrine and the Confucius mausoleum as it was in ancient times." (Price 1983, p. 38)

Bells are placed in public spaces in villages, and on the top of mountains throughout Korea. The most famous public space bell is the Chong-ro bell. In 1468 a great bell was cast for a temple near a Queen's tomb, which later was moved to the South Gate of the City of Seoul and again to Chong-ro, the ancient main central intersection, where it hung until recent times. This bell has been moved to the National Museum, and a new bell hung in its place. Price writes of this impressive bell tower and its (original) bell: "It seems that a bell had hung at this cross roads since the fourteenth century. Every day shortly after sunset it sounded twenty eight strokes to signal the closing of the city gates

and the beginning of rest, and about an hour before sunrise it rang thirty-three strokes to signal the opening of the gates and the start of work.” (Price 1983, p. 38) Alas, the bell tower is now at the centre of a busy intersection and the bell’s regular ringing is drowned out by traffic noise. Nevertheless, I was assured by a Korean friend that this bell is loved and revered by the people of Seoul, who are mainly Christian, for it reminds them, in the midst of a busy life, of their ancient and proud history as a community.

The temple experience of Korea varies from very small and hidden rural temples to the most famous Korean temple, Pulguk-sa, (fig 12, p.62) near Kyong-ju. This temple had been ruined by the early Japanese invasions, and restored, only to fall into disrepair by the nineteenth century. It was again restored during the 1920s and is now a stunningly beautiful and complex arrangement of buildings on the side of a hill. Many visitors pass through this temple. Every Buddhist temple is open for anyone to enter and attend to the sculpture of Buddha, light incense and find a certain stillness and quietness in which to concentrate their thoughts. Close to the Pulguk-sa temple is the Punwhang-sa temple. Its bell is of a similar size to the Pulguk-sa temple bell and can be heard on the CD. (CD. Track 11.)

What seems clear is that a musical tradition in the culture of the people is carried into their bell casting. Something of their concern for the quality of sound in bells is perhaps shown in the legendary effort to recast the Emile bell several times until the sound was correct. My experience of a variety of temple bells in Korea was that they gave the clearest sound of any Asian bells I heard and so made the other Asian Buddhist bells seem less considered acoustically. This consistency of bell design is apparent in the similar profiles and surface decorations of large and small temple bells, for example the Emile bell and the Pulguk-sa bell.

The Pulguk-sa Bell

The Emile bell and Pulguk-sa bells, as shown in their spectral analyses (figs 11 & 14, p.64) exhibit a number of similar partial ratios to their fundamental notes. While the sets of partial ratios differ there is a surprising consistency to the sounds of these two bells. As shown in the table (fig 53, p.51) below, the much larger Emile bell has a fundamental at 64 hertz, and partials to this at 2.66 times, 4.44 times and 5.48 times its fundamental pitch. The Pulguk-sa bell (fig 13, p.62) has a fundamental note at 96 hertz with partials at 2.33 times, 3.22 times, 4.44 times and 5.65 times its fundamental pitch.

Emile Bell		Pulguk – sa Bell	
Ratio of partial frequencies	Hz (Cycles per second)	Ratio of partial frequencies	Hz (Cycles per second)
		5.65	542
5.48	351	4.44	426

4.44	284	3.22	309
2.66	170	2.33	223
	64		96

(figure 53)

It is fair to suggest that their almost identical relief decoration is matched by a close acoustic overtone ratio pattern. This suggests to me that the founders cast these bells with a constant profile, and scaling the bell to a desired pitch, as happens when casting a set of the musical *pyung-jong* (set of bells). The significance of the actual partial ratios desired for these bells is not yet known, but we can say with some confidence that they were both cast with a similar iconographic and acoustic intention in the founder's mind. Further research is required to better understand the significant intentions held for Korean bells.

4. The Japanese bell tradition.

The New Year Festival period in Japan is called Shogatsu Sanganichi. On the third day of the New Year an ancient music and dance ritual known as genshisai is performed at the imperial Court. On midnight of the 31st of December the Japanese gather to temple bells, called *O-gane*, notably around the important bell at the Chion-in temple at Kyoto, to hear the 108 rings of a bonsho bell. This ceremony is called hyakuhachi. The bell is rung 8 tolls for the old year and 100 for the New Year. These 108 rings represent the 108 worldly desires Buddhists believe darken the hearts of men. Each stroke of the bell relieves a false desire in the listener, but only if the person hearing the bell has settled all their debts before the bell is first rung.

The Japanese love feeling the vibrations of the bells 'wash' over them when they stand close to a larger bell. It is part of the cleansing attraction of the bonsho bell. The enormous Chion-in bell, the largest in Japan, rumbles its fundamental vibration through one's body, and this vibration continues well below the point of hearing the bell. In fact, you can touch the bell and feel it vibrating when you cannot hear it at all. This level of sub-aural experiencing of bells interests us a great deal, and we hope to cast low frequency large bells to enhance this kinesthetic experience that is so important to the Asian bell experience. This very physical and sensual use of bells in Japan contrasts sharply with the strongly aural value that Europeans place on their bells.

Bells existed in Japan prior to the arrival of Buddhism to the islands. These bells are the mysterious Dotaku, which are found in both clay and bronze examples. The finest clay example I have seen is held in the Japanese pavilion of the Los Angeles County Museum of Art (LACMA). Dotaku (fig 15, p.62) have been found in sizes from a few centimetres to some larger than a metre in height. It is uncertain as to what function they played in the culture of the people. They have been found in excavations in Korea as well, and were buried in trenches, perhaps as part of the connection to ancestors through earth rituals.

Some have been found with a clapper attached, or with a hammer, which suggests they were a primitive sounding bell. It is also considered possible that they were used to cover sacred objects or were a symbol of wealth. Price says: "There is little doubt that the dotaku were sacred objects, and that their burial was related to an agrarian society's concept of the powers of nature and of its expectations from them." (Price 1983, p. 40).

Interestingly, as referred to previously, the Palace Museum in Beijing has a Zhong bell from the Middle Western Zhou dynasty (fig 16 p.62) which could be the model for the Dotaku objects, and may have inspired the creation of these ancient bell forms.

Once Buddhism arrived from Korea it soon became the dominant religious form in the country. Michael Ridley notes that: "Although it had uncertain beginnings, it took a firm hold with the result that there are six forms in Japan today, Zen being the most important. The others are Jodo, Tendai and Shingon, which together with Zen(Chinese Ch'an) are of Chinese descent; and Nichiren and Shin which are indigenous". (Ridley 1972, p.16)

Ralph Adams Cram, a North American architect, traveled through Japan in 1911 and recorded his responses to the architecture and culture. He believed Western influences were threatening the traditional culture. His record of the experience of the Buddhist temple are poetic, and I will refer to them further, but he gives an interesting account of the effect Buddhism had on Japan. He writes: "Previous to the reign of the Empress Suiko in the latter part of the sixth century, Japan was a comparatively barbarous State, but the mixture of Tartar and Malay blood had resulted in a race that was waiting only for the impulse that should start it on its career of greatness. The ethnic religion was a primitive cult of the dead of which the modern Shinto is a somewhat artificial restoration. It was impotent of the highest spiritual good, and when the revelation of Buddhism burst upon the people of Japan, an entire race rose suddenly into splendid action. Buddhist priests and monks came from Korea to the waiting nation, and with them, at the instigation of prince Shotoku, came architects, sculptors, and scholars. Nara became the capital: in a few years the monastery of Horiuji was built by Korean architects, and of this first great work of art on Japanese soil, the Kondo, Go-ju-to, and Azeku-no-mon still stand, priceless records of the birth of a great nation." (Cram 1966, p.39 & 40)

The word Bonsho translates as the Brahmin bell. Sho means bell. The Buddhist bell came in a number of sizes, each serving a distinct function. The smaller bells include the densho, which is used to signal times of temple rituals. The most famous of the o-gane bonsho bells is the very first bonsho bell cast in Japan, a temple bell over a metre in height called the *Ojikicho* bell, which is still rung every day in a Kyoto temple. The bell house is called the *Shoro*, and in the more famous temples can be very colourfully painted, and be not much more than weathered timber in the smaller temples. Other bells used in the temple include the *rei* which is the Japanese version of the Indian

priest's handbell the *ghanti*. The wind bells hung under the eaves on the corner of temples and houses is called the *furin*, while the bowl bell on the cushion very like the Tibetan prayer bowl, is called the *kin*.

Examples of two Japanese bells

Hoko-ji bell (fig 17, p.62)(CD. Track 2.)

I have selected the Hoko-ji bell as one example of a Japanese bell's sound spectra. (fig 9, p.66) Price relates the story of this bell's part in the political history of Japan. In 1614 the bell was unveiled at the Hojo-ji Temple in Kyoto, the then capital of Japan. "The bell, a monster of nearly thirty tons, had been ordered to please the chieftain of the ruling Tokugawa clan, Ieyasu, but it had been paid for largely in gold which the rival Toyotomi clan had been storing for war purposes. At the imposing ceremony of dedication Ieyasu discovered the Chinese characters 'ie' and 'yasu' on the inscription in a position which he took to be an insult to his clan. Immediately he ordered the ceremony halted. One can imagine the consternation amongst the high dignitaries, the one thousand priests, and most of Kyoto and surrounding countryside who had assembled for the fete. The eventual result was war in which the Toyotomi were defeated, the capital moved to Edo (modern Tokyo) and a new historical epoch begun. The bell still sounds over Kyoto from the Hoko-ji, joined since 1636 by another of practically the same size in the Chion-in." (Price 1983, p. 49)

Price writes evocatively on the every day uses of the bell: "...The *bonsho* is sounded for funerals, and is rung very much at the semi-annual fairs held at the larger temples. At these, ringing in connection with individual prayers for the dead is especially demanded. People line up to give requests for it along with the saying of sutras for departed loved ones." (Price 1983, p. 48) The Japanese have also kept a tuned set of musical bells, called *hensho*, which is made up of 12 tuned bells of quite small dimensions. We were shown, and invited to play a *hensho*, which was included in the bell collection of Amano Sensai at Jikko-in.

The Cowra World Peace Bell

The Cowra world peace bell (fig 18, p.63) is a modern Japanese bell cast at Oigoworks bell foundry near Kyoto. It is one of many similar 'peace' bells being gifted to countries around the world from an organisation called the 'World Peace Bell Association', based in Hiroshima. Each bell is cast from the copper coins citizens have collected and sent to the foundry to be cast into their bell. This bell commemorates the Japanese prisoner of war camp at Cowra, from which there was a major breakout of prisoners in 1944. Twenty-one Japanese were killed in the breakout. The Mayor of

Cowra unlocked the chiming log of wood for us and rang the bell. The bell is 1006cm high and 60cm diameter and weighs 477 kg.

The bell spectra show (fig 19, p.66) that when the higher partials dampens after it is struck, the sounding fundamental pitch is being supported by the second partial being one octave above the fundamental. This gives the bell a certain clarity of tone. Interestingly, the bell is one of Iwasawa's Korean styled bells in both narrower shouldered form and a thicker than usual wall profile in comparison to their more usual Japanese bell styles we were able to measure. The wooden hammer, a log suspended perpendicular to the side of the bell, was both too light and too hard to get the best sound from this bell. An Asian bell should be rung in a way that suppresses the higher partials of its sound structure and excites its lower overtones that give the bell its clarity of sound.

5. The Thailand bell tradition.

In Bangkok we visited several temples, notably the Golden Mountain temple, which has its bells, all less than 100 kilograms in mass, set in long lines. People ring the bells in turn as they pass up the staircase to the temple courtyard at the top of the hill. (CD. Track 8.)

Through contacts in Thailand, we became aware of a small bell foundry in Chiang-Mia. Near the start of the Federation Bells project we were visited by a small delegation from the Victorian Vietnamese Buddhists who were interested in our work on bells. They made it clear that bells differed greatly between countries in South East Asia, and so we took the opportunity to spend some time in Thailand to research their bells and temples.

The Chiang-Mia bell foundry was small and primitive in its technique. They turned up a clay core shape on a simple vertical lathe, and wrapped warmed sheets of about 12mm thick wax around this core. This wax false bell was then lathed and decorated, and finally covered with wet clay and straw mud, leaving a small hole in to which the metal could be poured when the mud had dried and the wax had been melted out from the mould.

We visited one of Thailand's most sacred temples, 'Wat Phra That Doi Suthep' in the hills above Chiang Mai, with its famous 300 steps up to the temple between the *naga*, the undulating bodies of two dragons. A very large bell (fig 20, p.63)(CD. Track 1.) hung in the courtyard around the temple, along with a large gong. Many small bells, in line, and very similar to those around the golden mountain temple, were installed here, as well as an ornate medium scaled bell, and a huge, perhaps 7 tonne, cast iron bell which looked quite neglected and badly hung.

The Wat Phra That Doi Suthep Bell.

The large bronze bell at Wat Phra That Doi Suthep has a fundamental pitch at 90 hz, and two sustained partials at 230 hz and 380 hz. (fig 21, p.65) The sound of the bell, whilst not particularly sonorous to the ear, was made more complex by being in an enclosing bell tower that reflected the ring to advantage. The bell was about 20mm thick overall, except for around its mouth, where an external sound bow ring thickened the bell's form. The general shape of this large bell was similar to that of the many small bells around the temple, and it looked to have been made in the same way as was the bell we watched being shaped at the Chiang Mai bell foundry.

The small temple bell.

We recorded the sound of a small Thai bell on the Golden Mountain that had the typical general shape common to most of these smaller bells, but each with a quite different sound. These small bells (fig 22, p.63) are arranged in lines along the temple walls, and people ring each one in succession as they pass along on their way up to the main temple area. Every bell had its own sound unrelated to the others, with a number being crisp and many sounding quite dull. This particular bell spectral analysis shows a fundamental at 210 hz, supported by partials at 530hz and 680hz. (fig 23, p.65) Again, we have yet to understand how accidental this acoustic structure is in Thailand's Buddhist bells, except to note the very wide differences acoustically and in form between each bell we have tested. We place these results in the context the selection of wax thickness and forms that seemed fairly unconsidered in the bell foundry at Chiang Mai.

The temples we visited in Thailand, including the stuppas around Chiang Mai, exhibited little of the delicacy of those in Japan or Korea. The Buddha images were laden in a 'skin' of gold leaf (which you could buy as sheet and apply yourself to the sculptures), and the gilding of every architectural feature soon dulled one's response to the plain structures and simple spaces. These were places of devotional practices for religious ideology rather than sites of aesthetic experience hinged to sublime natural forms, it seemed to me.

6. The experience of Buddhist temples

The Buddhist temple, both as architecture and as places of ritual and religious experience offers a distinct experience to those who visit them. Naturally, these sacred places have degrees of meaning and elements of experience accessible to those who use them, and less so to those, like myself, who visit them as non-Buddhists. Nevertheless, the multi-sensory stimulus these places offer everyone who attends to them is universal and can be shared without the need for the particular knowledge that the devotee brings to the experience.

For me, the overwhelming quality felt, on entering a temple, is the wholeness of the experience. You enter a space full of intense visual patterning, and aural spaciousness, where stillness enhances the smallest chirping of a bird or cricket. Your hands and feet are in contact with tactile contrasts between ancient and worn materials next to fresh materials, such as daily food and flowers. The sound of a bell and the regular high pitched chiming, with chant, of the prayer bowl, pulsates across the site and heightens the other sensual experiences. Incense fragrance weaves trails of scent throughout the temple site.

In China, the Temple experience is necessarily muted. The Communist regime banned religious organisations and suppressed religious expression. The Beijing Bell Museum is situated in a seven-acre former temple but operates as a state museum. Nearby, the Mongolian Lamasery temple is open, and full of tourists, with monks seemingly on guard. Rather than performing the religious functions of an operating temple, the monks resembled no one so much as the bored guards found in any National Art Gallery. A queue formed for the only bell, each with a ticket, like myself, to ring it.

The Temples of Korea, such as the ancient and beautiful Pulguk-sa temple are national monuments, and have a stream of tourists visiting them which lessens their sense of being used in an entirely devotional manner. This makes some sense as the majority of the Republic of Korea's population is Christian. Out in the countryside, however, one can discover many very small temples, each with a wondrous bell, and fresh food offerings at the foot of the Buddha sculpture. These were mostly open and unattended.

For me, the undoubted spell of the temple experience was most available in the many temples of the Kyoto region of Japan. It is not hard to launch into poetry if you want to express the Gesamtkunstwerk experience offered by a Buddhist temple in Japan.

Ralph Adams Cram writes brilliantly in this poetic vein: "We had heard each evening down at our inn at Uji (our inn that was built far back in the days of Hideyoshi) the velvety boom of some enormous bell, a sound that seemed to draw one irresistibly to rise up in the still night and search for its source under the great, pale moon. In Koshoji we found the bell, and much more; a little oasis in the desert of steam trams and beer and liberal politics, and wanted to stay there forever. The old Japan has this charm, and I think it concentrates itself and becomes really quite irresistible, in the form of a scented temple garden in some forgotten Monastery, where the odour of incense mingles with that of box, where the patterned sand retains the lines of a thousand years ago, where tonsured bonzes in yellow robes move silently through the shed petals of a pink cherry, and a thunderous bell gives tongue at the rising of the moon." (Cram 1966, p.119)

Cram laments the coming of the Tokugawa dynasty of the 1600's, whose martial and feudal rule diminished the cultural development of Japan, a cultural diminution contributed to, at the time of

Cram's observation in 1911, by the imperialism of Western culture flooding into Japan. For Cram, the heights of cultural excellence in Japan began in Nara, with the Korean architecture of Horiu-ji completed in 607. "This group of buildings - gate, temple, and pagoda - is the most precious architectural monument in Japan, indeed in all of Asia, for it not only marks the birth of Japan as a civilized power, but from it we can reconstruct the architecture of China, now swept out of existence and only a memory." (Cram 1966, p.41)

As the architecture began to take on an increasingly unique Japanese format, Cram finds the results exquisite, "Whatever the treatment, the effect is always splendid and imposing, sometimes, as at Chion-in, unspeakably sublime, and matched, if matched at all, only by St Mark's in Venice, or the Cappella Palatina in Palermo." (Cram 1966, p.56)

But the coming of the Tokugawa, and the suppression of every religious organization that might oppose state rule, antagonized the Buddhists. The state attempted to revive Confucianism, which Cram suggests is "an empty system of ethics unvitalized by any religious element." (Cram 1966, p.60 & 61) This led to the revival of Shintoism under the Tokugawa, and a resultant fall in the cultural excellence of Japanese architecture. "So far as one can see," writes Cram "the period of good architecture is over in Japan. The native attack on Buddhism two centuries ago was the beginning of the end; the restoration of Shinto was its continuation, and the acceptance of Western Civilization was its consummation." (Cram 1966, p.72)

Still, Cram gives us an excellent description of the pre Tokugawa Temple experience when he writes, "The buildings seem almost to be a concentration and perfection of the hills and trees of which they seem to be a part. ...Another quality that is most salient is the exceeding unity and perfection of composition either of single temples or of whole groups, either of the exterior or the interior. The whole thing is built up with the utmost subtlety of feeling and delicacy of appreciation until it forms a consistent and united whole. The refinements of line and proportion have their equals only in the architecture of Greece and medieval Europe. The mere measuring of some one of the older buildings reveals a subtlety of feeling for proportion that is amazing. Such measurements show at once that every curve and every line has been developed with the most astonishing care. Still another quality that could be studied to advantage is that of the extreme solemnity of the temple interiors. For impressiveness and deeply religious feeling, together with extreme splendour of colouring and wealth of detail, they are almost unexcelled. The Gothic interiors of Europe have their own quality of awe-inspiring majesty which no other architecture has ever approached, but for effects of dusky splendour Byzantine and Japanese architecture stand together." (Cram 1966, p.74 & 75)

7. Conclusion

In Asia the temple is a significant place of public-space experience. Unlike the churches and cathedrals of Europe, whose doors 'seem' closed even as tourists stream through them, the temple is a welcoming place designed to offer a particular, often exquisite experience to whomsoever shall enter them. From small family run temples to large temples housing a bureaucracy of administrator monks, each offers a visitor respite from the rush of daily living without marking too clearly a separation between that everyday living and a spiritual life.

It is this quality of accessible and aesthetic experience that has been important for me in the design of the Bell sculpture installation and the Victoria Police Memorial. In both I have wanted the transition between being outside the installation to being inside the experience to be as fluid and seamless as possible. Both sites have a porosity of entry inspired by the Asian temple.

I hope that a heightened multi-sensory awareness is as much a part of my work as it is in Buddhist temples. While a detailed comparison between my installations in Melbourne and say, Chion-in temple may suggest that the comparison is overstated, in some important aspect these new installations do reflect the spirit of the Buddhist temple. Both are designed with the intention of finding spaces wherein a reflective and contemplative place can be found. The significant difference between the Buddhist temples and our secular temples, particularly with the bell sculpture installation, is the desire to keep our installations as challenging as possible of people's expectations, in order to heighten the excitement people feel once they are within the space.

For this reason our bells were installed 'upside down'. These were bells that needed to be re-seen as well as heard anew. Rather than sounding into the ancestor earth, these bells radiate into the cosmos. My experience of temples and temple bells in Asia has found expression in these Installations, and I hope that people enter these sites and find the same level of attention to detail that can be discovered in the intricate and 'timeless' experience of the Buddhist temple.

Future research

Neil McLachlan and I intend to continue our research of Asian bells. The question of identifying a generic acoustic form that makes sense of the diverse forms and sound we have experienced between Buddhist bells across Asia remains to be resolved. Naturally if such an acoustic form (spectra) can be discovered, Australian Bell would design and cast a Buddhist bell that sounded this specific acoustic quality. We would use similar technology to that which we used to discover geometry for a harmonic bell. What has been established is the uniqueness of each bell cast in Asia, and that this lack of acoustic control (if indeed this is what it represents) presents bells which are immediately identifiable, particularly through their sound, to the local community in which their particular bell is rung.



Fig 2 pien chung (Photo from Lehr)



Fig 1 Nau (Photo from Lehr)



Fig 3 Marquis Yi pien chung (Photo from Lehr)



Fig 4 The Yongle Bell, Beijing Bell Museum



Figure 5 Ming dragon bell, Beijing Bell Museum



Figure 15 Dotaku (Lehr, 1983)



Figure 13 Pulguk-sa temple bell, Kyong-ju



Fig 6 Powerhouse bell, H7752



Fig 10 Emile bell in Kyong-ju



Figure 20 Wat Phra That Doi Suthep Bell, In the hills above Chiang Mai, Thailand



Figure 17 Hoko-ji Japanese bell



Figure 16 Zhong bell (Weng-go Weng Yang Bato)



Figure 18 Cowra world Peace Bell

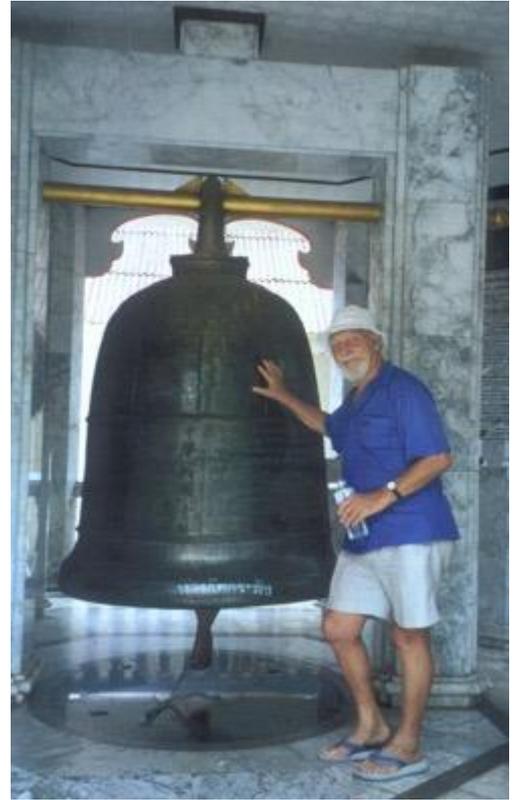


Fig 20 Wat Phra That Doi Suthep Bell



Fig 22 Typical Thailand small bell



Spectrograms

These graphs result from software analysis of sound files. They plot the partial frequencies (overtones) that make up the recorded sound.

The vertical axis plots frequency (zero frequency where the axis meet.)

The horizontal axis plots time from zero second. The graph records those partial frequencies that have been excited, their relation to one another, and the time at which they are damped. (And so no longer contribute to the overall sound that has been recorded and analysed.)

The interval ratios between partial frequencies determine the musical quality of particular sounds. Spectrograms show when the required intervals are achieved.

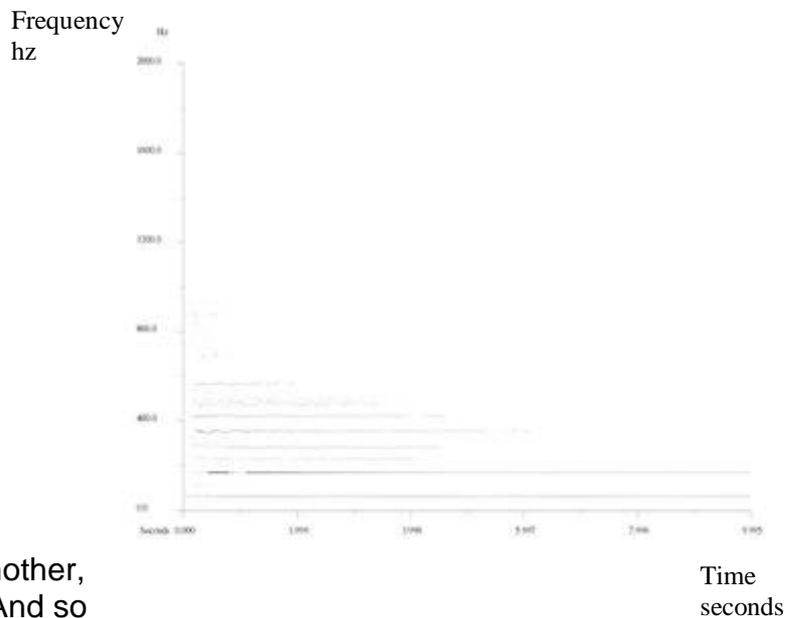


Fig 11 Emile bell spectrogram

Pulguksa Bell (cont.)



Frequency (Hz)	Amplitude at 500 msec. (dB)	Ratio
96	-22	
224	-22	2.33
309	-32	3.22
426	-50	4.44
542	-45	5.65

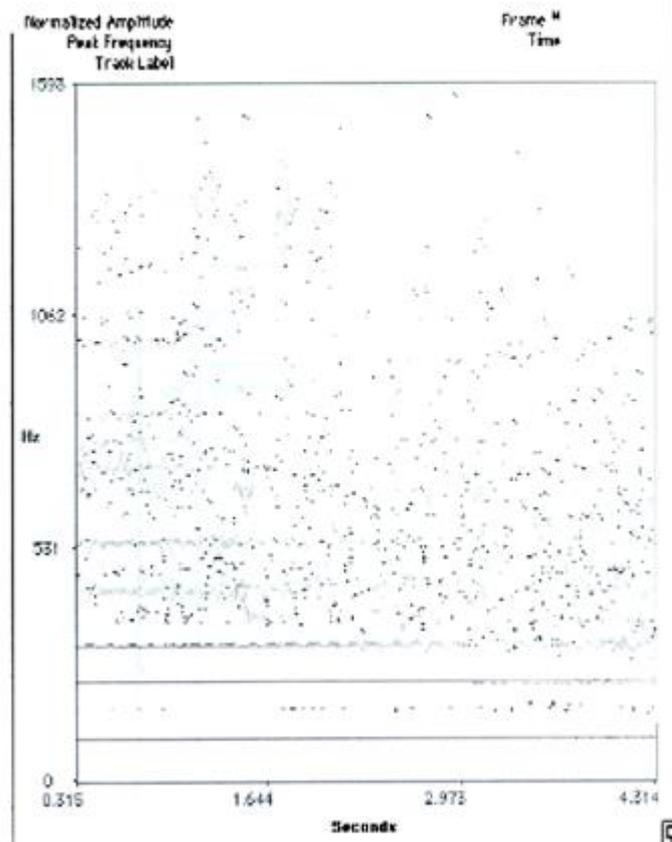


Figure 14 Pulguk-sa bell spectrogram

Frequency
hz

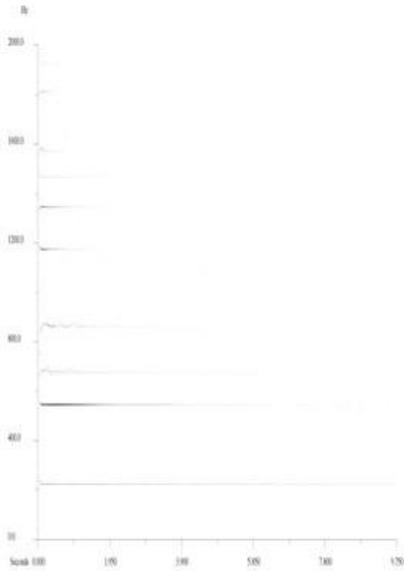


Fig 23 Small Thailand bell spectrogram

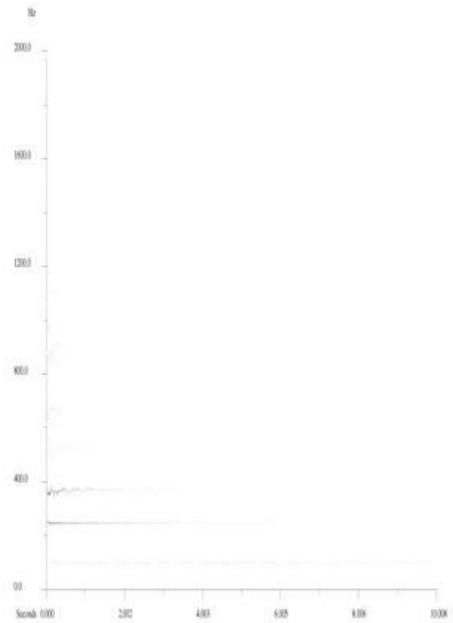
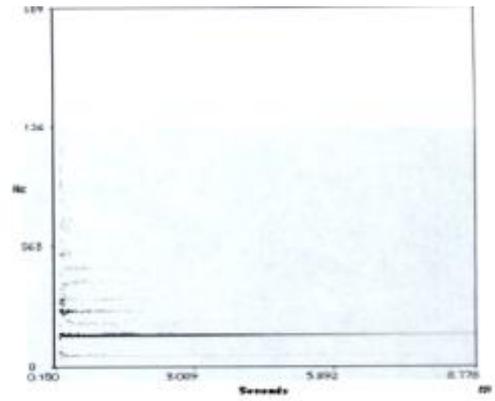
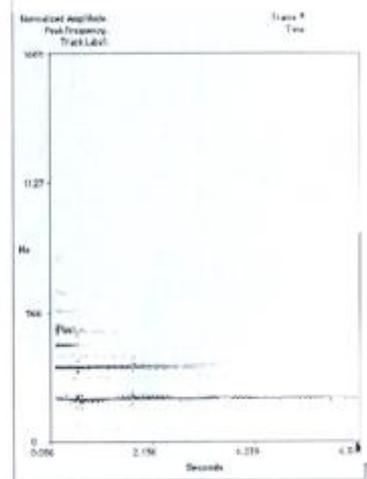


Fig 21 Doi Suthep bell spectrogram

Museum bell (cont.)



Frequency (Hz)	Amplitude at 500 msec (dB)	Ratio
• 53	-45	
• 128	-47	2.41
• 188	-21	3.55
• 277	-40	5.23
• 331	-23	6.25
• 377	-35	7.11
• 427	-30	8.06



Frequency (Hz)	Amplitude at 500 msec. (dB)	Ratio
• 55	-35	
• 150	-20	2.73
• 261	-27	4.75
• 400	-45	7.27
• 465	-45	8.45
• 530	-50	9.64

Figure 7 Beijing bell museum bell spectrogram

Figure 9 Hoko-ji bell spectrogram
(second largest bell in Japan)

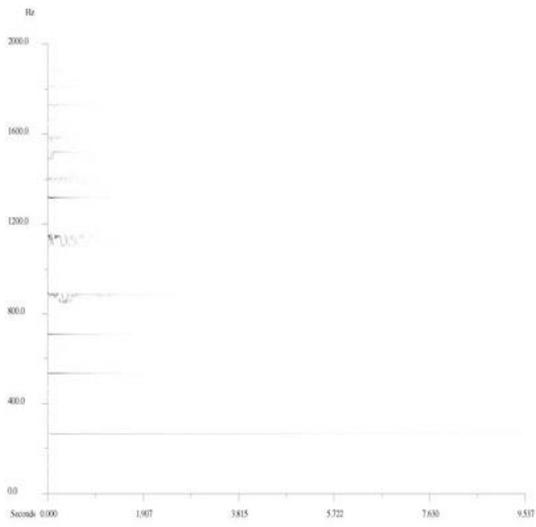


Fig 19 Cowra Peace Bell spectrogram

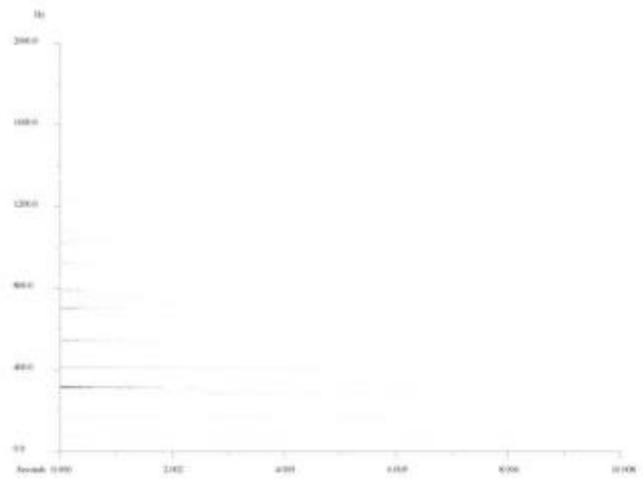


Figure 24 Powerhouse museum bell H7752 spectrogram



Buddhist priest chanting as community representatives prepare to examine the cope mould with the lettering pressed into its surface.
Iwasawa Bell foundry, Kyoto Japan



Assembling bell mould at Iwasawa Bonsho Bell foundry Kyoto

Chapter 4 THE EUROPEAN BELL TRADITION.

"All the while that they were talking the half-remembered rhyme kept running through Winston's head. Oranges and lemons say the bells of St Clement's, You owe me three farthings, say the bells of St Martin's! It was curious, but when you said it to yourself you had the illusion of actually hearing bells the bells of a lost London that still existed somewhere or other, disguised and forgotten. From one ghostly steeple after another he seemed to hear them pealing forth. Yet so far as he could remember he had never in real life heard church bells ringing." (Orwell 1987, p. 81-2)

1. The history of the European bell
2. The harmonic bell
3. European bell foundries and the differing techniques used to cast bells.
4. Australian Bell's casting of traditional European bells
5. Conclusion

1. The history of the European bell.

The Federation Bell Carillon, while marking a distinctly new direction for the use of bells in public-space artwork, and representing campanology brought into a contemporary design context, is nevertheless a public instrument arising from the spirit of the traditional European carillon.

This being the case, the history of the European bell tradition will be an important part of the context in which our bell installation can be understood. Since I am proposing that our invention of the harmonic bell represents, in some senses, the flowering of the European bell as a musical instrument, this makes an understanding of the bell's traditional context all the more important.

The trajectory of this history is from its mystical and religious origins to its use, increasingly after the medieval period, as a musical instrument. Indeed, the more recent development of bell design has been directed toward secular pleasures in place of religious duties. The Federation Bell Carillon, with its use of bells within the Asian bell tradition as well as within the European bell tradition, attempts, for the first time, to bring these traditions together in a new kind of bell architecture that encourages participation and collaboration from the public.

This short history of the bell in Europe covers its development from a sacred-religious origin to the contemporary secular uses for the bell in public-space installations. This transition has been driven by the search for a better-tuned bell by musicians and bell founders since the

middle ages. The source of information on the history of the European bell is narrow, and comes primarily from the text of Percival Price and from the text of Andre Lehr, the leading historians of the European bell.

According to Amano Sensai, bells in Asia have 'desirable' sound qualities, sounds that differentiate the most important and sacred bells from lesser bonsho bells. In Europe, the church bell has undergone a 500 year process of being made and tuned to an increasingly exacting and uniform standard.

The earliest European bronze bells are thought to be crotal bells found in North Iran, and their use seems clearly to have been to scare off evil spirits. This magico-religious use of bells continued in Europe with the ancient Greek and Roman empires, and was adopted by the emerging Christian church.

The origins of the bell in Europe are yet to be known. One possible source is from the earlier bell tradition of China. However, since the earliest bells that have been found in ancient Middle Eastern and Western societies are small objects, never larger than a hand-bell, historians are convinced that bells in the West had a separate origin to those in the East.

Percival Price, the author of the leading study of the history of bells, suggests that the crotal bell originated in the Middle East, with some very early examples, from the 9th and 10th century BC having been found in the area we now call North-western Iran. Andre Lehr, who wrote a history of the Dutch carillon, agrees with this proposition and suggests a fundamental difference between the bells of China and those of Europe. While the origin of the Chinese bell seems to be from 'ritual food vessels' that were chimed, that is struck with an external hammer, the Crotal bell appears to be derived from the rattle effect of dried pomegranates, with their seeds trapped inside a hardened skin. Amongst the many ancient crotal bells unearthed are a number of bronze copies of the pomegranate shape containing a metal ball clapper.

Interestingly, a passage in Robert Graves' book *The Greek Myths* makes a faint connection with the Greek use of the bell as food vessels, as in the Chinese tradition. "In ages past two black doves flew from Egyptian Thebes: one to Libyan Ammon, the other to Dodona, and each alighted on an oak-tree, which they proclaimed to be an oracle of Zeus. At Dodona, Zeus's priestesses listen to the cooing of doves, or to the rustling of oak-leaves, or to the *clunking of brazen vessels suspended from the branches* [my italics]." (Graves 1983, p.178)

Wherever the bell arose from, its use in pre-Christian Europe appears predominantly to have been designed to scare off evil spirits. Bells were worn on clothes and attached to horse harnessing to act as charms to protect the wearer from unnatural harm. This 'charm' function

for the bell, and the high value put upon the war-horse and chariot made the bell a more common and widespread object throughout the Middle East and Europe from around 1200 BC. The European sense of the bell has seemingly always been connected to its power against the dark forces of nature, and therefore had a base in religious sentiment.

The British Museum has a collection of small conical bells from excavations at Nimrud, in the Middle East, which are also depicted in the relief carvings at the palace of Nimrud which show the Assyrian King Ashurnasirpal upon a horse decorated with similar bells. Lehr is of the opinion that the Assyrian conical bell is “the finest specimen of a bell... from the 7th century B.C ... This small bell was an unequalled climax during the antiquity of the West.” (Lehr 1991, p.30) (fig 25, p.85)

The Roman Empire was the first great Western imperial expansion across Europe, and so represented a force for homogenization of social and cultural practice. Their use of crotal bells and small clappered bells on their horse harness, and the other ‘charm’ uses of bells stimulated the bell’s manufacture and distribution across Europe.

Price explains the embracing of the bell by the Christian Church: “The first tradition is that St Paulinus of Nola invented the church bell shortly after the year 400...The other tradition is that Pope Sabinianus, successor to Gregory the Great, instituted the ringing of church bells. Both these traditions seem to relate to the bell as an instrument to signal people to come to worship. This was not its first Christian use. The employment of the bell as an instrument of magic-sacred power which we found to be almost universal in other religions is so far removed from modern Christian thinking that it comes as a surprise to learn that this was its first use in Christianity also.” (Price 1983, p. 78)

Bells found in the catacombs evoke the talismanic power of protection that made them desirable to a persecuted minority. However, it was the reverence the early Christians held for the bell and its uses that ensured its continued rise in importance across Europe. Over time, as Lehr observes “The faint tinkling of the hermit’s bell in the desert to drive demons away from his cell evolved into the loud clanging of the church tower bells to drive them out of a whole city.” (Lehr 1991, p. 80)

The use of a bell as an instrument to call the congregation is not the only ‘voice’ a religious organization might use. In the early period of Christianity someone was appointed, called *theodromos* (messenger of God) who visited the congregation personally to advise on meeting times. Later, in safer times, the trumpet was used to call the faithful. The other important instrument was the ‘semantron’, which is a holy timber board struck with a hammer. This is still in use in orthodox Eastern churches, and carries with its use a sonic symbol of the building of the arc and of hammering nails into the cross.

In AD 630 Mahommed, relates Lehr, "called a council at Medina, to decide the means of summoning to Islamic worship. After considering the fire of the Zoroastrians, the rams horn (*shofar*) of the Jews, and the *naqus* [semantron] of the Christians, he decided that the human voice was the only instrument worthy to call the worship of God." (Lehr 1991, p. 83)

However, in the West, travelling Churchmen and priests used their hand-bells to collect congregations, and the bell slowly became the important instrument for calling congregations together in the western regions. With bell founding developing in monasteries, the hand-bell became transformed into stationary bells which, as significant ecclesiastic property of the church, were used to order daily duties and summon the monks. Price reports: "In the year 408 the edict of Theodosius which forbade all non-Christian worship throughout the Roman empire" (Price 1983, p.77) put pressure on the pagan uses of the bell such as the cult of 'regenerative powers' which hung both crotal and open mouthed bells on phallic images.

By the 700's AD, a ritual for the consecration of church bells had come into being and Lehr argues that the rise of the Carolingian empire under Charlemagne (742-814), with the renewed interest in technology, saw the spread of bell-casting technology and resultant increase in bell numbers throughout Europe. By 802 it was customary for every parish church to have at least one bell. The religious significance of bells had a prohibition against them being rung by laymen, only by priests. Up until the 12th century only monks were permitted to cast bells.

A bell was consecrated before it was dedicated. Charlemagne decreed in 789 AD that bells may not be *christened*. It is not clear if this was because bells were thought to be without souls or if he wished to make a stand against 'weather-bells'. Weather-bells were rung as a defense against the fury of nature, and so clearly were part of pagan usage.

The building of the great Gothic cathedrals in the late Middle Ages raised the bells to ever-greater heights from which they could broadcast their sounds to ever-larger Christian communities. The bell itself changed its form in the search for more sonorous sounds. The Monk Theophilus wrote an influential text entitled 'de campanis fundendis' in about 1125 AD. In it he described the processes and proportions for casting a satisfactory sounding bell. The Early Medieval bell form (generally called 'beehive') (fig 27, p.85) was an expression of the monk's formulae. This bell shape then slowly developed into the later Medieval bell shape (generally called 'sugerloaf'), (fig 26, p.85) a shape which had become familiar by the thirteenth century.

Lehr records the words of the Abbot of St Trond in Belgium who, in 1136, wrote: "Also I wish to write something to the glory of God about the bells which were either newly made or

recast by my labour. By God's help I made them so that they provoke the ears of God with praise by the sweetness of their sound...it is wonderful and delectable to see and hear how much they can do with their sweetness, each with its own tone according to its weight and size." (Lehr 1991, p.93)

The growing wealth of the church in a prosperous Europe manifested in the increasing numbers of bells in the increasing number of towers, as well as an increase in the size of individual bells that could be cast. When two or more bells are hung together, a musical relationship exists and musical possibilities present themselves. (CD. Track 9.) With the development of swinging came further musical expression from the bells, and each church would endeavor to make more impressive sounds and sound sequences ring out from their steeples.

The first swung bells rocked from side to side, to cause the 'dead hung' clapper to slap the sides of the bell. In England, though, an interest in controlling the bell ringing sounds took hold. The people who rang the bells formed themselves in 'bands', such as 'the Ancient Society of College Youths', founded in 1637 whose members rang St Paul's Cathedral bells and those at Westminster Abbey and the 'Royal Society of Cumberland Youths', which was formed in 1747.

A technical breakthrough that offered a high level of control over the order that bells could be rung in was the invention of the full circle swinging bell. A full wheel was attached to the bell, and the bell could be pulled to a mouth up position, and held at this point. At the command of the band 'conductor', each bell is pulled off this inverted position, and swings a full 360-degree circle. If the clapper is carefully weighted, it contacts the bell at one point only on its way down in the swing. Bands could now ring their bells in sequences, and bells could be rung in changing orders. This is called 'change-ringing', and its complete development found expression in the work of Fabian Stedman. A member of one of the bands, Mr Stedman devised 'methods' and 'principles'; that is sets of mathematical patterns to which bells are rung in cycles, and a sequence of bells is not repeated until the last cycle is rung. A sample sound file of change-ringing can be heard on the CD recording of the Swan Bell Tower. (CD. Track 6.) These bands increasingly took control of the bell music from the vicars and church authorities, ringing for church services but also for other more secular functions.

The musical perspective of bells necessarily marginalises the magical and sacred perspective of the bell. The musical relationship between bells becomes more significant to the ringer than the mystic values inherent in the sound of a single bell. The development of the musical bell signals a more general secularization of the European communities. Commerce and the marketplace became expressions of the emerging power of a new perspective on the issue of church and state. Transformed from an object of religious

mystery into a part of a musical scale, the bell began to lose its earlier terror and sublime connection to God.

The form of the bell shrank in the length of its waist and widened at its mouth opening as bell-founders sought a more musically satisfactory bell model. While in Asia the Buddhist bell was cast in ever-larger scale, in Europe, with its more difficult bell architectures of steeple and bell-towers and its growing interest in musical relationships between bells, groups of bells were augmented with further bells in preference to casting larger bells. A group of bells encourages greater control over the sounds of the bells played together, if only to reduce the discord of chaotic and inharmonic chordal intervals between the accidental overtones of each bell.

In the Low Countries the use of swinging bells diminished as the enthusiasm for hung sets of bells, called carillons, grew. Set in towers, both church and municipal, the bells are played from a baton keyboard, with wires running from the baton to the suspended clapper within the bell. Like a giant piano, the bells rang out popular tunes over community plazas and around churches as well as being used to call the congregation to service. Distinctions between change ringing and the carillon method of playing bells reflects numerous cultural differences between the British and the Continental bell enthusiasts. One difference is that the carillon system of playing bells exerted an even higher pressure on the degree of tuning accuracy required for each bell. Bells 'dead' hung have a better defined pitch sensation to its audience than swinging bells, due to the doppler effect on the swung bell. That is, the doppler effect has a pitch shifting affect on the listener. A sample of Carillon playing from the Wellington Memorial Carillon can be heard on the CD. (CD. Track 5.)

In the Southern Netherlands the carillon became the dominant bell instrument in the public domain. This occurred alongside a developing interest in bell music, and an increasing interest in the playing of bells as a public instrument, for the whole community to enjoy. "Time and time again," writes Lehr, "it seems that chiming had something of a festive character, adding lustre to both church and municipal life." (Lehr 1991, p.49)

From 1505 onward the casting of carillon bells becomes better recorded. Willam and Jasper Moer cast 14 bells for St. Jans Cathedral in their home town of s-Hertogenbosch, some with a clapper, which suggests a keyboard. In Oudenaarde in 1510 Jan van Spiere "installed a *keyboard in the tower in order to play the carillon*". It follows, suggests Lehr, that the "modern carillon originated in the southern Netherlands around 1500." (Lehr 1991, p.100)

The casting of carillon bells proliferated in the Lowlands, with several families dominant in the industry. The Van den Ghein Family cast their first carillon in 1529 and cast more than 20 instruments until 1644. Between 1502 and 1574 the Waghevens family cast at least 30

carillons of which only a few individual bells remain. The loss of bells can be attributed to church tower fires and other natural disasters, but also to the tradition of invading armies requisitioning the bells of a town to be cast into cannon, a practice upheld as late as World War Two. Bell metal, with its very high concentrations of tin, usually between 20 and 25 % by weight to copper, is a valuable bronze. So it is that few examples of old and complete carillons have survived into our period, and often the original sounds of these bells have been lost due to their re-tuning at later dates.

The catalyst for this growth of interest in the carillon was the development of a standard musical scale. The popularization of the pianoforte, and the equal tempered scale it was tuned to, stimulated the composition of music accessible to a playing public. Bell founders were interested to tune bells so that they might become a broadcast version of this instrument. That is, the carillon represented a loud piano that the whole community might hear familiar melodies and tunes being played upon in public. The early keyboards replicated the finger piano keyboard, but such a keyboard was unable to apply sufficient leverage for the striking of a bell to achieve the 'expression' a vigorously struck bell can excite in its audience. The invention of the hand and foot baton keyboard solved this problem.

The carillon, as an instrument, grew in numbers and popularity. "About the middle of the 16th century," writes Lehr, "these had a standard compass of two diatonic octaves with the addition of three semitones (a Bb in both octaves and an F in the upper register)." (Lehr, 1991, p.103) Comparisons with earlier models brought out previously unheard discords. Lehr relates that when an old bell set (from Peter van den Ghein foundry from 1554/56/57/83/93) was installed in the Rijksmuseum tower in Amsterdam in 1902, the residents living nearby complained about its noise, "pointing out that only odd sounds and *drunk's tunes* could be heard." (Lehr 1991, p.104)

Lehr describes the chaotic possibilities of the sounds from idiophones or percussion instruments. "In striking a large gong, for example, one hears all sorts of tones, overtones therefore, which have no harmonic relationship with each other and are thus not able to fuse together to make an indivisible sound. Every partial appears to be fighting in turn to take the lead, each of the tones seem to want to determine the pitch of the instrument. The result is that the listener is not able to attribute a reproducible pitch to that percussion instrument. This pitch sensation may not be important to a host of percussion instruments, but for those, such as the carillon, on which tunes, melodies and harmonies are aspired for, the tuning of these instruments is crucial." (Lehr 1991, p.108)

Founders and musicians had only a rudimentary knowledge as to how this tuning could be achieved. While bell founders and independent tuners practiced their arts of gouging and hewing the inner lip of bells in attempts to improve the bell sound, their tuning was guided by

the belief that each bell produced one whole sound. In this way, thinning a bell lowered its tone and shortening a bell raised the tone overall.

The problem of tuning bells was solved by the collaborative work of the blind carillonneur Jacob van Eyck and the Hemony bell founders in the 1640s. Jacob van Eyck understood that the sound of a bell was constructed from a multitude of overtones or partial pitches. He could demonstrate this was so with a wineglass, where he would whistle a number of single partial pitches at which the glass would continue to resonate. In this way he showed that a wineglass had a number of distinct partials in its whole sound when struck. He demonstrated the same properties on the bells of the Utrecht Dom, and could, by singing a pitch, make a bell sound without touching it.

"Van Eyck," writes Lehr, "recognized that a bell could be made to sound in tune at an unambiguous pitch." (Lehr 1991, p.122) He proposed that the lowest five partials should make up the chord c1, c2, Eb2 g2 c3 on the fundamental c1. The Eb is the minor third partial in the otherwise harmonic series of the bell. The ratio of partial tones in a European bell is 1 : 2 : 2.4 : 3 : 4, thus, the European bell could be tuned to a harmonic series of partials, and so have a strongly perceived pitch at its prime partial (and octave above the fundamental partial pitch), with a second perceived pitch at the minor third interval to the fundamental. (CD. Track 16.) This minor third partial was inevitably produced by the geometry of the European bell. The tuning of the European bell was necessarily polytonal with, hopefully, a strongly perceived pitch at its nominal pitch, and a weaker minor third secondary pitch perception.

Their collaboration began when the brothers Francois and Pieter Hemony were commissioned in 1643 to cast a carillon for the town of Zutphen's Wijnhuis tower. Jacob van Eyck was adviser to the town, and part of the commission brief required that the Hemony Brothers would work with Van Eyck on the carillon. Their work together was reportedly enthusiastic and successful. Their carillon turned out to be markedly superior to all previous carillons. The success of this carillon drew great interest and the brothers eventually cast 14 carillons in Zutphen.

The success of their research into finding the best possible model (bell profile) for a tuneable bell (fig 29, p.86) was aided by their discovery that it was better to cast a bell thicker than the pitch required. By careful use of a lathe to remove excess metal from inside the mouth and waist of the bell the partial pitch ratios can be found which best clarify the bell's sound. The casting of thicker bells and the knowledge of the effects of cutting in particular places on the bell became the secret of bell tuning.

Fletcher and Rossing write in their text *The Physics of Musical Instruments*: "Analysis of the rich sound of a bell reveals many components or partials, each associated with a different

mode of vibration of the bell. The various partials in the sound of a church bell or carillon bell are given such descriptive names as hum, prime, tierce, quint, and nominal. The most prominent partials in the sound of a tuned bell, like those of most musical instruments, are harmonics of a fundamental." (Fletcher & Rossing 1991, p.577)

The vibration of a bell, when struck, consists of the bell flexing three-dimensionally. These vibrations are transmitted through the air to the ear of the listener. A bell has many types of flexing, a number of which generate a perception of sound in the listener. These partial pitches or overtones, together make up the sound of the bell.

The arrangement of the partials is given by the geometry of the bell, and any desirable change in the ratio between the partials requires the bell's geometry to be changed. Putting a bell on a lathe and machining away metal alters its geometry, and so its mass and its elasticity. Using this lathe cutting process, it is possible to tune the bell to specific frequencies along its sound spectrum. The spectral analysis of the 'Hemony' style bell that was cast by Australian Bell (fig 32, p.87) shows the typical ratios of partials in a tuned European Bell. This bell was cast with an alloy of 80% copper and 20% tin, and scaled to a fundamental pitch of 220 Hertz, that is, pitched to 'A'. (fig 30, p.86)(CD. Track 16.)

After the death of the Hemony brothers, who were particularly gifted musically, the bell foundry passed to a son-in-law, and the understanding of tuning of bells fell into disarray. This loss of knowledge was probably felt less intensely amongst the carillon public because, suggests Lehr, the carillons were mostly used for melodic tunes rather than music which explored harmony.

Those secrets that were collected usually had the best chance of being kept safe from competitors through the tradition of passing on the craft and art amongst family descendants. This strategy also has the danger of being easily lost. Some bell-foundry dynasties managed long histories of continuously keeping the business in the single family, father to son. The Petit and Fritzen Bell-founders of Aarle-Rixtel in the Netherlands is the oldest family business operating in the Netherlands. They have been casting bells since 1660.

From 1890 onwards a number of scientific studies on the tuning of bells began to unlock these lost secrets of the vibration of bells and the methods by which they could be tuned once again.

In the January edition of the London, 'Edinburgh, and Dublin Philosophical Magazine and Journal of Science' 1890, Lord Rayleigh published his account of using Helmholtz resonators to examine the partial tones given by a bell. He remarks one of the objects of his research was to find out "wherein lay the difference between good and bad bells." This resolved itself

into two strands of enquiry; to understand the harmonious sequence of partial ratios in a bell and to determine the relationship between this series of partial tones and the strike tone of the bell, that being the note the bell is believed to have.

Lord Rayleigh examined a number of bells and determined that six tones could be heard and that the nominal pitch of the bell is governed by the fifth component tone. "It is the fifth tone in order which agrees with the nominal pitch of the bell." (Rayleigh 1890, p.11) Lord Rayleigh concludes his paper: "... it would seem not a hopeless task so to construct a bell that all the important tones should be brought into harmonic relation; but it would require so much tentative work that it could only be undertaken advantageously by one in connection with a foundry." (Rayleigh 1890, p. 12)

Another individual with a long interest in the science of bell acoustics was Canon Arthur B Simpson, Rector of Fiddleworth, Sussex. Canon Simpson examined many bells, both English and those from the Low Countries and from the early 1890's worked with Taylors Bell Founders of Loughborough. He used tuning forks to establish the importance of three partial tones, the *Hum note*, the *Fundamental* and the *Nominal* (his terms). This work was published in the *Pall Mall Magazine* as "Why Bells Sound Out of Tune," October 1895 and "How to Cure Them," September 1896. Simpson wrote: "For here we see that, in the *majority* of bells, we have three notes, very near to each other in pitch, though in different octaves, all struggling for the mastery, and each able - let us here say - under given circumstances, to assert its supremacy. Is it any wonder that even a skilled musician, if not learned in bell tones, should be in doubt as to the true note of a bell submitted to him? Is it so very surprising that experts differed as to whether the note of the 'Gloriosa' bell was C sharp or D?" (Simpson, 1895, p.189)

He asserted that while the English tune the bell for the nominal, the European bell-founders tuned their bells at the fundamental partial. Simpson believed that the finest musical quality of a bell required all three partial tones to harmonize, which they seldom did. Simpson proposed a method of tuning where the bell was cast oversize and cut at specific areas along the inside surface of the bell on a lathe to bring the partial tones into a harmonious set of relations.

The productive co-operation between Taylors Bell foundry and Cannon Simpson produced the most finely tuned bells since those coming from the Hemony brothers collaborations with Van Eyck. Jennings records the "first set of harmonic-tuned bells were hung at St Pauls Church, Bedford, during 1896." (Jennings 1987, p.107)

Cannon Simpson's pre-emptive publication of their joint research as his own soured their relationship. Taylors felt that they had simultaneously developed the tuning knowledge and

processes, and resented this confidential commercial information being placed on the public record. By 1898 Cannon Simpson was deliberately being starved of direct information on the tuning practice being carried out by the foundry and no further experiments were undertaken on Simpson's behalf. In fact, the foundry became very secretive over the developments in its tuning of bells, with only family members carrying out this work. Canon Simpson died in 1900, and the Taylor foundry were not represented at his funeral which suggests the distance that had developed between these rediscoverers of the Hemony/Van Eyck secret of 260 years earlier.

Before long the other major bell foundries had mastered the technique for tuning the five main partials of a harmonic polytonal European bell. The age was now past when unique, untuned bells characterised each church, such as St Clements and St Martins-in-the-field. The 'modern' bell with its uniform musical standard between and within bells was part of a renewed period of interest in and demand for carillons and bell rings, particularly from North America.

The advance of science and technology brought with it the next development of bell design in the Netherlands during the 1980s. A. Schoofs, F. Van Asperen and P. Maas from the Eindhoven University of Technology collaborated with A. Lehr, director of the Royal Eijsbouts Bell Foundry at Asten on the design of new bells. Their initial work was to use new computer engineering technology to understand the vibrations of the bell, and then to design a bell with a major third partial (fig 34, p.88)(CD. Track 14.) in place of the traditional minor third partial in a bell's harmonic series. A 'major third' bell would afford the bell a better musical relationship with other instruments and compositions. Lehr allows that the minor third partial is unusual in musical instruments (stringed and windpipe instruments form major third chords), and while it gives the carillon a musical identity of its own, this is the "reason why some discard the carillon as a musical art form." (Lehr 1991, p.299)

2. The harmonic bell.

In some sense, the major third bell represents the end of the European bell's development. The Eindhoven/Royal Eijsbouts team has cast a number of successful major third carillons but they also investigated the design and casting of a perfectly harmonic bell. The elimination of the second pitch perception, which Cannon Simpson called the 'foreign note', from the European bell would create a bell capable of full integration to the orchestral instrumental family. The bell model they began with was the traditional European bell. The Finite Element Analysis was able to optimise (generate a geometric solution) a bell with a very unusual shape. (fig 31, p.87)(CD. Track 15.) Royal Eijsbouts Bell Foundry cast one of their harmonic bell design which is in the courtyard of the Asten Bell Museum in the Netherlands.

Unaware of the work on a harmonic bell by Lehr and the Royal Eijsbouts Bell Foundry, Neil McLachlan and I brought our respective talents together in 1999 to co-invent the first harmonic bell. This collaboration between a sculptor and bronze caster and musician and scientist began, as detailed in chapter 6, with gongs in 1990 and later, on a number of bells for a bell commission for Vision Australia. At that time, Neil McLachlan had been advised of the published work of Lehr and Schoofs in the Spring edition of *Music Perception* magazine, 1987. He accessed software at the University of Melbourne to design the bells for this sculpture. The opportunity to seriously tackle the harmonic bell came about through the Melbourne Festival Bells project commission discussed in Chapter 4.

The form chosen as the virtual model for the harmonic bell, from a purely sculptural aesthetic, was a frustum of the cone. This bell model proved fruitful in the early finite element analysis carried out with Advea Engineering. However, the successful achievement of the harmonic bell to seven partials, required an intensive investigation of the modes of vibration in columns and cone angle variables.

We have designed and cast a large number of harmonic bells. It is a bell with wonderful musical potential. I will consider some of this potential in chapter 6, but for the first time the bell is compatible with orchestral instruments and musical scores requiring traditional notions of pitch and consonance can be played on bell instruments. We hope (believe) the harmonic bell will become the new standard of bells used in musical performance.

3. European bell foundries and the differing techniques used to cast bells

The history of the European bell has provided a context for the work we have carried out on the design of contemporary bell installations. One other significant aspect of our design has been the technology we have developed to cast these new bells. While we were aware of the various casting techniques and processes used in traditional bell foundries, the moulding difficulties that our computer-aided designed bells generated required us to invent new processes, and adapt old techniques, to achieve the degree of accuracy required to cast these new bells to tune.

The difference between the English and Continental bell traditions is surprisingly wide. They have different preferences in the way bells are played, and for the music performed on bells, and quite separate techniques for casting their bells. The bell industry seems to provide strong evidence of the insular nature of countries in European history.

The English bell-foundries cast in loam moulds, a technique in which the negative mould into which the molten metal is poured is constructed of sand bound with clay and horse manure. These moulds are turned up using strickle boards. Strickle boards are plates in metal or

wood that are shaped to the desired profile of the bell. One is required for the outside profile of the bell and another for the inside profile of the bell. (fig 33, p.88) Whitechapel and Taylors are the last remaining English bell foundries, and they specialize in full circle swinging bells which, when hung together, are called a 'ring'. They began casting carillon bells in the 19th century when the interest in these instruments grew, principally in North America.

The Dutch and Belgium bell-founders developed a more elaborate casting technique, at first for swing bells, then increasingly for 'dead' hung (fixed in place) carillon bells that were in demand. Their bells are turned up in wax over a refractory core. The wax bell, or 'false' bell, is strickled into its shape on which beautiful relief decorations, also made in wax, like the lettering, are affixed to the wax false bell. A mould is taken of the false bell before the core of the bell is heated to soften the wax, and the mould removed. While the bell mould is calcined in a kiln, to drive out excess moisture in the mould material of plaster and cements, the mould itself tends to crack, leaving a finned surface to the bell casting, which needs to be cut away after the casting. On the larger castings at the Royal Eijsbouts bell foundry we noted that the casting is fed from underneath directly into the thickest part of a European style bell; its 'sound bow'. It is desirable to have a metal casting 'set' first in the thinnest section and then progressively cool toward the thickest part of the casting. This keeps the metal as 'sound' (dense) as possible, and this level of innovation demonstrates the determination of Eijsbouts bell foundry to advance the technical skills of casting bells in the search for the best possible cast bell.

The English bell-foundries, once numbering in the tens, but now reduced to two, continue to use technology and equipment hundreds of years old. To visit their works is a visit back in time and observe a craft skill mostly unchanged from the middle ages. They set up casting boxes and base plates, themselves cast in the late 1800's, and patch them with bricks and loam clay. The horse manure is important because the uric acid from the horse urine hardens the clay/sand mixture. The outer and inner mould are strickled up and baked in an oven at about 150 degrees Celsius, to dry out the moulds. The cracks of the clay are filled with fresh loam and swept again, and again baked. This process may be repeated a number of times until a smooth mould surface is achieved. The mould surface is then painted with a fireproof compound. The 'outside of the bell' mould is put on rollers that allow it to be easily turned around if lettering on the bell is required. The line in which the letters are to be set is scraped out and new loam pressed into the channel. Impressions of lettering are then pressed into the new loam. It is baked for the last time before assembling the bell mould ready for the molten metal to be poured in at the crown of the bell and fill the mould's negative space.

This loam process, and having to work negatively into the mould surface discourages extensive and intricate decoration on English bells. The Low Countries use of a false wax

bell encourages their bells to be highly decorated in comparison. Both traditions cast the bell oversize, and tune each bell on a vertical lathe, trimming away metal until the fundamental and overtones are satisfactorily in tune.

The remaining bell-foundries currently casting tuned bells are the two Dutch foundries, Royal Eijsbouts at Asten, and The Royal Bellfoundry Petit & Fritsen. In France, the Paccard bell-foundry is held in high esteem, while there is a German bell-foundry that is well regarded by the Dutch foundries. Other European bell-foundries find it difficult to sell their bells on the rather small and competitive international market. The standardization of bell tuning has unified the sound of the modern European bell, to the point where they attempt to sell their products with strange differentiation. The English foundries make a great deal of their 'bell master', or foreman who over-sees the bell manufacture. In seeking advice on the cost of purchasing a carillon, it was suggested that 'this' foundry's 'foreman' was not having much success in recent times, and it would be best to refrain from those bells, whilst 'so and so' was casting excellent bells presently at 'that' foundry. Similarly, Fonderie Paccard advertise their bells on their Web-page as being designed to 'minimise' the minor third partial and so emphasize the harmonic series in their bells.

I will discuss the casting technique we have developed at Australian Bell. We cast our bells using sand mixed with phenolic acid resin and catalyst, which has been moulded using accurately shaped metal strickle boards. The outside bell mould is strickled up in segments, called cope rings, which disassemble. The strickle board for the inner bell mould or core is then attached to the bell-moulding machine and the core is shaped. When the rings are fitted over the core, a negative space remains, ready to be filled with molten bronze. Some of the bells we have cast have had quite complex profiles that could only be cast using this accurate moulding system. Not having to treat a resin sand mould in an oven or kiln, with the distortion that such heating incurs, can explain the superior accuracy this casting system offers.(fig, 30 p.86)

4. Australian Bell's casting of Traditional European bells

In September 2000 the Sacred Heart Cathedral at Bendigo contacted us about the casting of bells. We visited the church to view a small Warner bell cast in 1856, which the Cathedral owned. They wanted to gather information about this bell and wondered if it was possible to cast bells locally for the cathedral. At a meeting with the church bell committee we expressed the idea of the church commissioning our newly invented harmonic bells for their bellfry. We also suggested that we would cast a European bell taken from a Hemony design, if they wanted traditional bells. The central spire had been recently completed, and a space existed in it for a set of bells. The committee was committed to putting bells into the spire by September 2001 to celebrate the centenary of the original church.

In Dr Lehr's book 'The Art of the Carillon in the Low Countries', is a photograph of an original Hemony brother's carillon bell design drawing, showing the geometric calculations taken to arrive at the given profile. (fig 29, p.86) We took this profile and optimised it using finite element analysis. (fig 28, p.86) The profile did not change very much from Hemony's original design. Once we had this bell tuned, it could be easily scaled to whatever pitch might be required. The Hemony bell model (shape and profile) is quite an elegant bell, and thinner in profile than modern bells produced in Europe. We cast, in traditional bell metal of 80% copper and 20% tin, a bell with a fundamental pitch of 'A'. The bell weighs 41.6 kilograms. (fig 30, p.86) After casting, it required only a little tuning on the lathe to bring it into fine tune. We also cast a proposed 'church' harmonic bell in traditional bell metal, pitched at B, which weighs 79kg for the bell panel's consideration.

It seemed to me that Australian Bell's immersion into the traditions of the ancient art of bell casting is an important part of our great interest in new bell design. The context of the European bell tradition is an important foundation of the Federation Bells Carillon, and our knowledge of the intricacies involved in designing, casting and tuning traditional bells depended upon involving ourselves in these practices. Subsequently, we have been invited to quote for a number of traditional bell rings for churches around Australia. Whilst we do not see this work as central to our bell sculpture design work, it nevertheless connects our practice with the long history of the bell in Europe. Part of our connection to this history is possibly more direct. The Taylor Bell foundry has expressed an interest in our designing a new, harmonic set of handbells that they can manufacture economically and market competitively against handbell manufacturers in the U.S.A. Instead of each handbell being cast and tuned individually, they (or we) would use CNC lathes to mass produce our computer designed and tuned bells, much as we undertook for our 2001 handbell project discussed in chapter 6.

Finally, we were advised that the cathedral had elected to purchase Paccard bells supplied and installed by Hervey Baggot. Naturally we were disappointed to have lost this opportunity, especially having been unable to convince the church to install innovative and unique bells. But, as reported, other church groups are making their approaches to us, and I am sure we will find some clients who are as excited as us by innovation.

5. Conclusion

The long history of the European bell, and its changing geometry brought about in the search for a bell with greater musical possibilities, seemed to have reached its apex at the start of the twentieth century. Lord Rayleigh, as I have observed, had a view that the partials of a bell

might one day be aligned in a harmonic series, and Jennings records the Taylor bell foundry hanging the 'first set of harmonic-tuned bells' at St Pauls in 1896.

Since the 1980's and 1990's, the application of computers to bell design has opened up new possibilities of musical expression and new ways of experiencing bell installations. Our harmonic bell is central to the performance of the Federation Bells Carillon, and we believe it to be the appropriate bell for use in those new carillons that aspire to the highest quality of musical performance. In an email to me, Andre Lehr comments on his work on designing and casting a harmonic bell and on the Australian Bell harmonic bell: "The bell [designed by Eijsbouts bell foundry] has one great problem, because the strike note is not one octave above the hum note. The tone structure is C1 – C2 – G2 – C3 – E3 etc. The strike note is E2 which means that the bell starts with another pitch than on the end. And this is very disturbing. I think for that reason that your bell is much better." (email to A. Hasell 18/4/01)

The difficulty that Eijsbouts experienced was that they began with the traditional European bell model (shape) and the resulting thin profile shown in Figure 31 (p.86) produced a bell in which the minor third is masked by another partial. Our harmonic bell, starting from a new geometry, holds its pitch salience from the attack pitch to the longest decay partial of the bell, its fundamental.

So in the sense of the European bell-founders seeking a bell with the most salient pitch perception in which the partial ratios are in harmonic order, the Australian Bell harmonic bell must be considered as the climax of the quest to tune the European bell. In September 2002 Neil McLachlan and I will present our harmonic bell to the European bell enthusiasts in Brugge, Belgium, at the 'Eurocarillon' conference.

The harmonic bell completes the very long journey taken by the European bell from being an object of sacred magic and occult power to being purely a musical instrument, through the art of tuning. Lehr described the Assyrian bells from the 7th century BC as the "...unequaled climax during the antiquity of the West." (Lehr, 1991,p.30) I am conscious of a connection between this earliest conical bell form and our unparalleled conical harmonic bell of the present, with very few other conical bell forms known between these two magnificent bells.



Figure 25 Conical Horse-bells from the Amlash culture of Northern Iran, 150B.C to 250 A.D (Lehr, 1983)



Figure 26 Sugar-loaf bell form (Lehr, 1983)



Figure 27 Beehive bell form (Lehr, 1983)



Resin Sand moulds

Figure 28
Optimised Hemony
bell strickle
patterns.

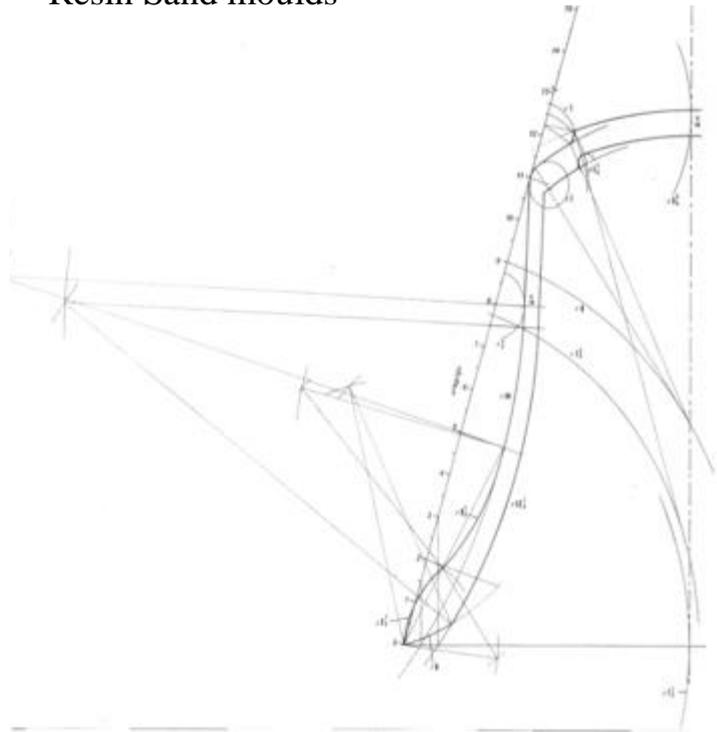
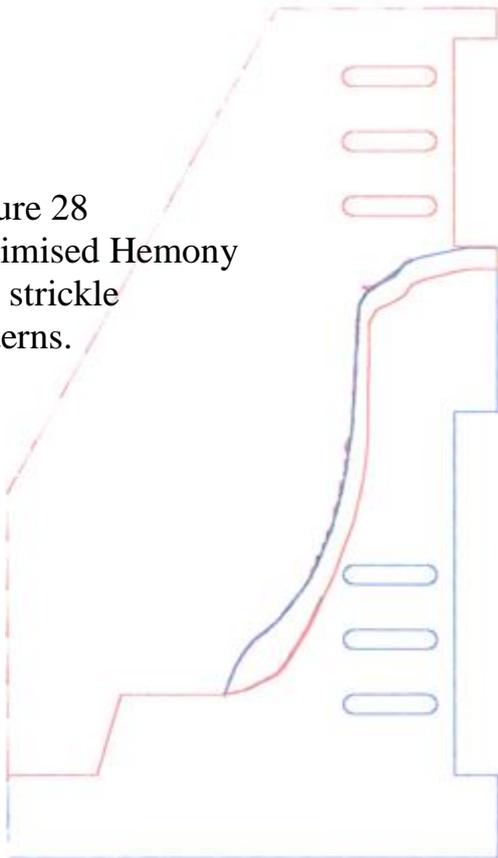
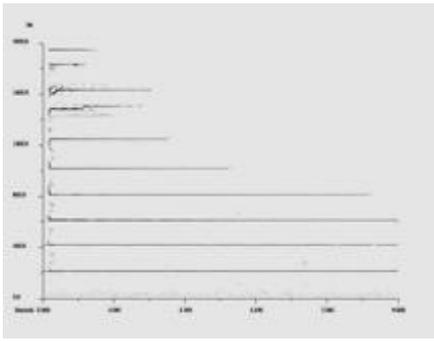


Figure 29 Original Hemony bell
design 1633 (Lehr, 1983)



Figure 30 mould and castings of Hemony-style bell by Australian Bell



Harmonic spectrogram

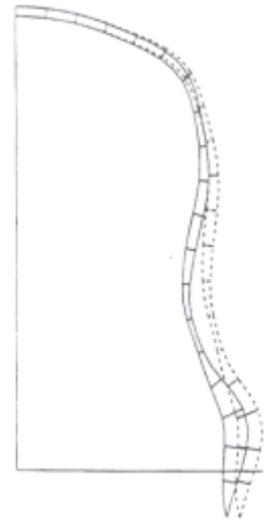


Figure 31 Andre Lehr's Royal Eijsbouts harmonic bell and Australian Bell's Harmonic bell at the Asten Bell Museum, Netherlands, September 2002.

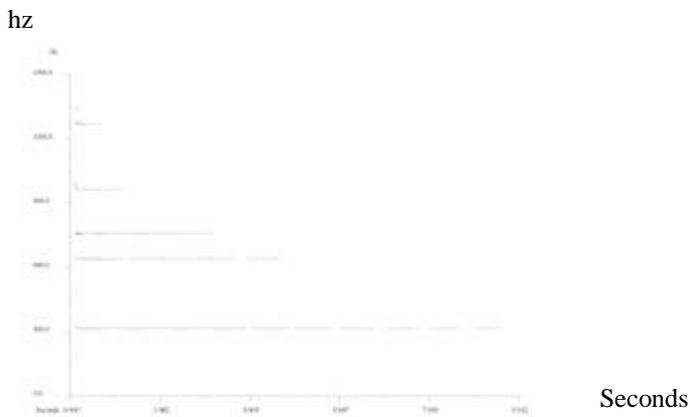
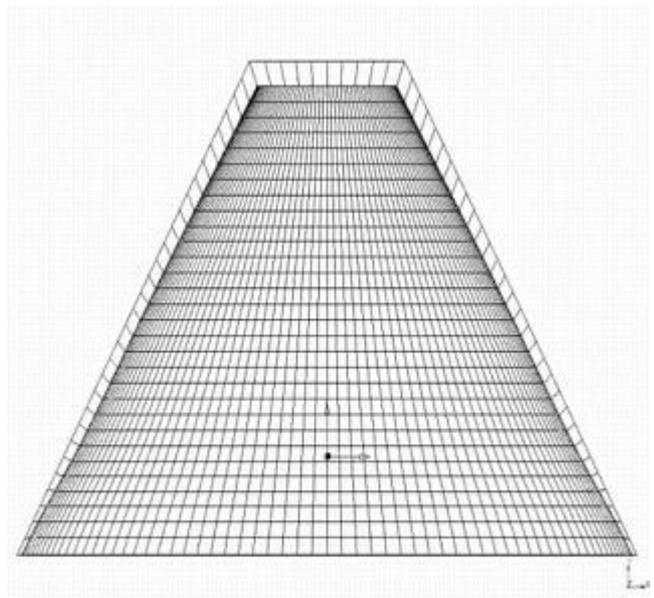
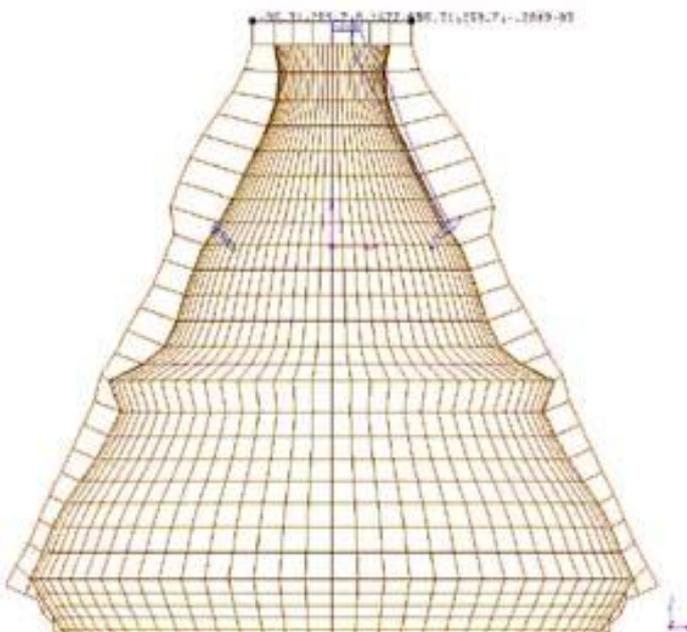


Figure 32 Hemony bell spectrogram showing the classic array of partial frequency in the European bell



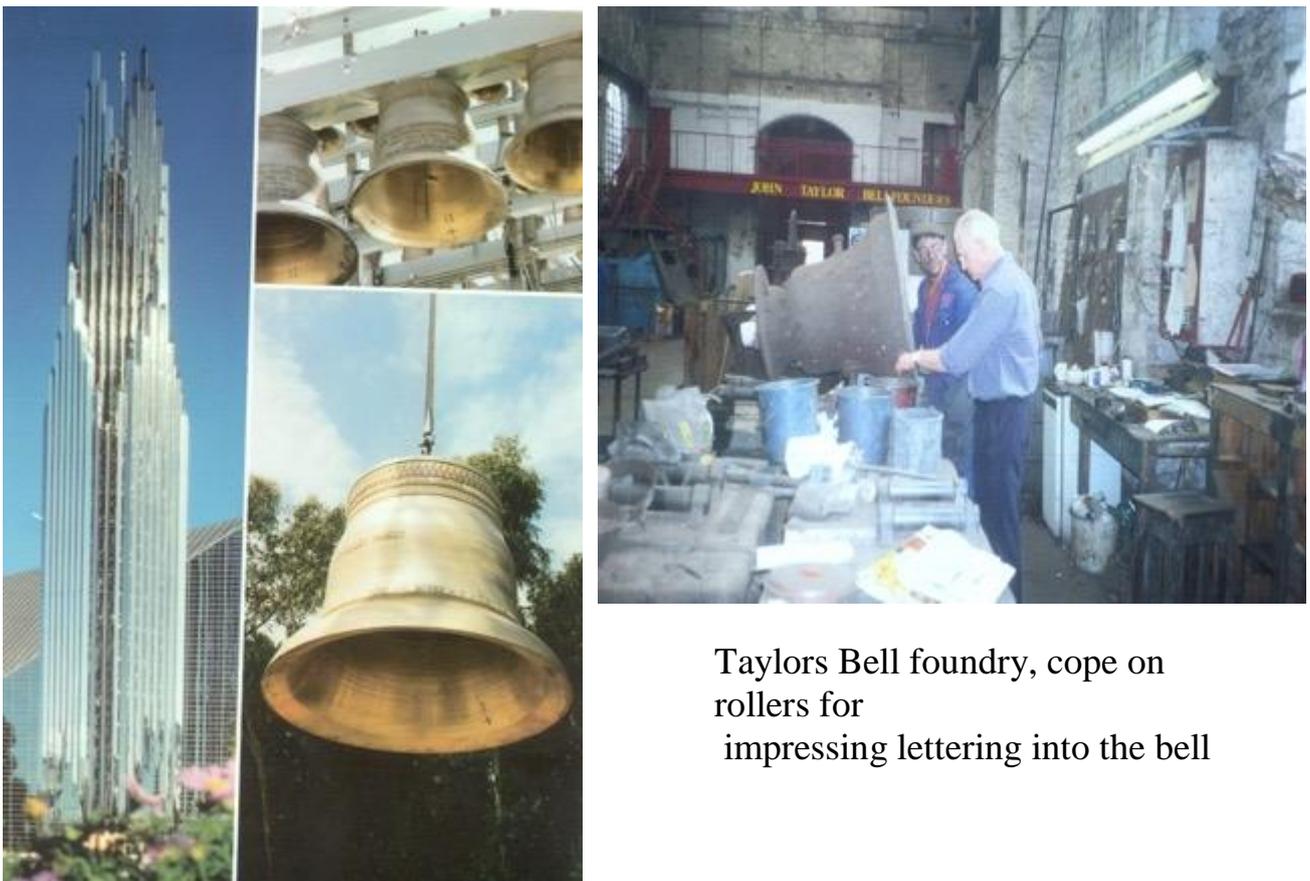
Computer design of Harmonic bell



Computer design of 9/5 bell



Figure 33 Whitechapel loam bell cope and a worker strickling up a core for a bell

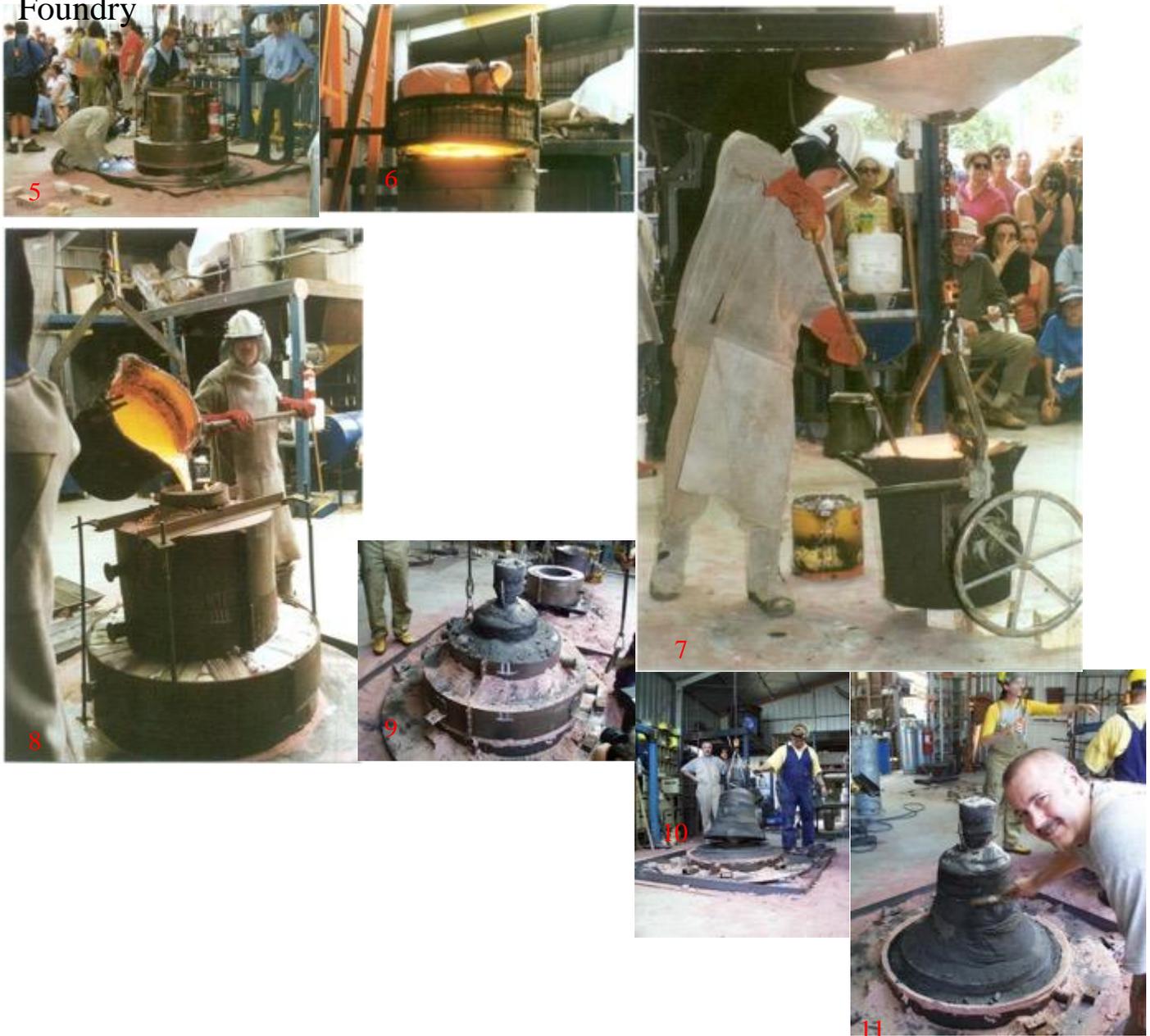


Taylor's Bell foundry, cope on rollers for impressing lettering into the bell

Figure 34 Royal Eijsbouts major third bell in the Crystal Cathedral, Los Angeles, USA.



The casting of a Hemony European bell at the Australian Bell Foundry



Chapter 5 BELLS AND MULTI-SENSORY INSTALLATION.

ORANGES AND LEMONS

Oranges and lemons say the bells of St Clement's.

Pancakes and fritters say the bells of St Peter's.

Two sticks and an apple say the bells of Whitechapel.

Kettles and pans say the bells of St Anne's.

Old Father Baldpate say the slow bells of Aldgate.

Pokers and tongs say the bells of St John's.

Brickbats and tiles say the bells of St Giles.

You owe me five farthings say the bells of St Martin's.

When will you pay me says the bells of Old Bailey.

When I grow rich say the bells of Shoreditch.

When will that be say the bells of Stepney.

I'm sure I don't know say the great bell of Bow.

Here comes a candle to light you to bed.

Here comes a chopper to chop off your head.

(Traditional English folk poem)

1. Sound sculpture
- 2 Installation Art
- 3 Swan Bell Tower project
- 4 Nigel Helyer's bells
- 5 The Tilly Aston Bell Installation
- 6 Conclusion

1. Sound Sculpture

The bell sculpture installation work of Australian Bell has a place in the Australian sound-sculpture movement. Sound-sculpture has its own place in contemporary Australian cultural practice. Our work makes a contribution to the celebration of the bell, a theme that is important in the practices of a number of Australian sound-sculptors. I believe that our work on the bell and bell installation offers new possibilities in the advancement of this interest in the bell.

The artist Nigel Helyer has created a significant body of work centered on the theme of the bell as an image. The artist Ros Bandt has created ceramic and glass bell instruments, such as her 'Flagong' made from tuned glass flagons, on which she performs musical pieces. I think that our work of designing and casting uniquely tuned bells and bell installations expands the practice of contemporary sound-sculpture into broader multi-sensory practices.

We have brought together the visual aspect of the bell with its musical aspect and tactile aspects. Our work opens new doors into the technical and aesthetic possibilities that can exist between sound and form and space.

It does seem strange to me, from the multi-sensory context, to keep the bell silenced, as it is kept silent in Helyer and MacGregor's 'La Zona del Silencio' (bells sealed in vacuum jars), and Helyer's 1988 huge fabricated steel bell Installation at the Seoul Olympic Park in The Republic of Korea titled 'Din: Ding-Dang-Dong'.(fig 37, p.109) The experience of visiting many beautifully cast bells at the Beijing Bell Museum that could not be sounded because they were set, mouth downward, on stone plinths was a frustrating one. I feel a similar exasperation, while acknowledging his intent to deny sound, with the soundless handling of the bell by Helyer. As with every 'idiophone', the form seems to beg its sound to be excited. If ever there was a tension between the function of the bell as an image and as a sounding instrument, then surely our work will dispel this dichotomy. The bell can have both a predictable musical structure and a form designed from a strongly sculptural perspective.

Our work of bringing campanology into contemporary arts practice comes at an exciting time in the development of the Australian 'acoustic design' movement. Ros Bandt's text *Sound Sculpture: intersections in sound and sculpture in Australian Artworks*, shows us the extraordinary range of diverse practices being undertaken by 'sound sculptors' across the country. Bandt's text surveys the experimental and exciting development of sound sculpture taking place. Bandt maintains that sound sculpture naturally references the sonic context of our unique and ancient landscape and the cultural practices of the indigenous people. She puts forward Belfrage's proposition that "the dominant paradigm of knowing is European, visual and scribal, in contrast to the holistic oral/aural tradition practised for so long in Australian soundscapes". (Bandt 2001, p.15)

She suggests that the overriding influence on the cultural and social experiment that is the Australian experience remains the unique spatial qualities of the Australian landscape. "Each space within Australia's soundscape," she writes, "is its own listening environment, a habitat for sound." (Bandt 2001, p.15) Any works of art, perhaps especially sound art does need to be sensitive to the long history of Australian Aboriginal experience. Bandt reminds us that contemporary sonic practices are in danger of overwriting an existing sonic ecology that already makes sense of the unique spatial experience of the Australian landscape. Nevertheless, where culture is an active and vital expression of the daily lived experiences of those who experience a place and time, creative expression is a renewable attempt to connect people to their experience of the landscape they inhabit.

Indeed, Bandt begins her history of sound sculpture in Australia with the work of Percy Grainger from the 1920s. She relates his interest in generating new music using machine

technology, such as his composing 'beatless' music by cutting pianola rolls. "It was a music of complexity," she writes, "predating the rhythmic complexities of Stravinsky and Stockhausen and using piano-roll technology while Conlon Nancarrow, to whom these innovations are attributed, was still a boy." (Bandt 2001, p.57) Bandt gives us a wide cross-section of the diverse activities, performances and sounding objects that inhabit the multi-medium, interactive and wildly experimental practices in the field.

Bandt's survey inspires a sense of confidence in the range of innovative and energetic activity being undertaken by contemporary artists. Much of this work has taken an interest in creating places into which people can enter to experience the objects within the space, the relationship between the objects, and the interaction of people within these sites of experience. These installations often seek to offer those who enter them something of a holistic sensory experience.

In this chapter, I want to concentrate on the development of 'Installation' as an exhibition format, and as a strategy to broaden the experiential focus of cultural expression. Installation makes it difficult to isolate 'the object' as a collectable artifact, and the consequential commodification of the object. Installation creates a site in which visitation is converted into participation, and when the site is inter-active, participation becomes collaboration, and so manifests, in my view, the high-point of a cultural experience. This occurs when culture is all-inclusive, and so manifests the sharing of life for all in the community.

Particularly, I want to consider those Installation works that are centred on the bell as both object and instrument. Convinced that the bell carries communal archetypal memories for us from its long use as an instrument to bind together various religious communities from our ancient past to our present society, the bell installation does seem to me to offer especially fruitful sites of collective expression and experience.

2. Installation Art.

What is Installation Art? Adrian Henri designates the Wagnerian 'gesamtkunstwerk' (total art work) as fundamental to progressive movements of contemporary cultural expression, and connects 'Installation' to the important practices of the arts throughout the twentieth century, including the Duchampian 'readymade' installations.

The authors De Oliveiri, Oxley and Petry, of *Installation Art* would rather the term 'Installation' to be reserved for more recent arts practice. While they do agree that the holistic, multi-medium and inter-active installation has a history across 20th century cultural activity, and certainly offers new possibilities for cultural expression, they contest the centrality of the 'gesamtkunstwerk' vision in contemporary 'Installation' works. They agree that

gesamtkunstwerk has a place in the definition of Installation but quote Michael Fried's assertion that "art degenerates as it approaches the condition of theatre." (De Oliveiri et al 1994, p.29) as drawing a limit between Installation and mass entertainment. They are concerned that Installation, if it is to be understood as a specific kind of practice, requires careful definition. "What one must be cautious of, however," they write, "is taking formal similarity for conceptual precedent. To call some disposition of materials, objects or artifacts an installation with any degree of authority presupposes familiarity with a clutch of related terms: location, site, site-specificity, gallery, public, environment, space - time duration. Consequently, a definition of installation must also shed light upon the contemporary significance of this surrounding vocabulary." (De Oliveiri et al 1994, p.14)

At the outset they acknowledge the attempt by 20th century artists to bring together culture and daily living. "Elitism versus populism," they write, "high versus low, avant-garde versus kitsch, individual creativity versus mass production - the distinction between the aesthetic space of art and the social space of the world around us has been drawn throughout this century with a variety of faces." For them, the "appearance of installation is but one expression of the gradual detachment in postmodern culture of meaning from things. "Meaning is no longer given, residing in the object until discerned by the perceptive viewer, it is something that is made in the encounter." (De Oliveiri et al 1994, p.20)

Although the strategy of Installation is utilised in Duchamp's 'readymades', contrasting the 'gallery against 'mass production', as well as in aspects of Futurism, Dada, Constructivism and the Bauhaus manifestos, De Oliveiri, Oxley & Petry suggest that the practice was incidental to those works. "In the 1960's," they write, "the terms 'assemblage' and 'environment' were most commonly employed to describe work in which the artist had brought together a host of materials in order to fill a given space. At that time, installation referred to nothing more than how an exhibition had been hung."(De Oliveiri et al 1994, p.11)

In seeking a definition of Installation, the authors point to the Italian critic Celant, who coined the term 'Arte Povera' (poor art) which was "not because it [the work] was made from inexpensive materials, but because it was empty of specific content. Art which is not about anything can offer no meaning. What it can offer is information of varying kinds, and it is this information circulating in the open field of social relations that in its turn generates possible meanings." (De Oliveiri et al 1994, p.25 & 26)

They conclude: "The demands placed upon the audience by this event are central to an understanding of installation. It is they who, in a very real sense, are left to construct the meaning of what is going on before them. This meaning cannot be read off or recognized because it, insofar as 'it' implies a preconceived, unitary idea that the protagonists are attempting to impart, does not exist."(De Oliveiri et al 1994, p.26)

Installation is concerned, then, with creating a site open for people to enter and experience. What meanings or understandings that are achieved for those participating in the Installation, are the participants' alone.

Michael Rush, in his text 'New Media in Late 20th-Century Art', starts his history of Installation somewhat earlier. "Historical precedents for Installation art can be traced at least as far back as painted triptych in Renaissance churches and the establishment of "museums" in the West in the eighteenth century. While one may not want to call the Eisenheim Alterpiece an installation, its multiple parts placed in a public place of worship are recalled in terms of presentation in the diptychs and triptychs that are found on the walls of video projections. To present day Installation artists, who are intensely conscious of their work as extensions of the self, the physical presentation and surroundings of their art have become part of the art itself." (Rush 1999, p.116)

Guy Debord and 'Situationist international' took a progressive left-wing position to the 'Environment and Happening movement'. This was in line with the Constructivist imperatives around the period of the Soviet revolution of 1918 in which culture was to be the expression of the struggle as well as a measure of the advances made by the working class. It has been claimed that "Debord rejected any idea that art could exist within a realm distinct from that of political revolutionary activity." (De Oliveiri et al 1994, p.27)

Installation gave this assurance, and placed meaning within the participatory experience of the audience. But the next step, I suggest, is to abandon the concept of constructed meaning, and the process of analysis, and instead, surrender oneself to the simple and direct multi-sensory experience that can be had within an installation site. This is not to preclude discussion on the motives and meanings attributable the experience, once outside the event. It does, however, recognize the separation of the experience from its rationalisations. Whatever 'meanings' the experience might invoke or stimulate in the participant will be fragmentary in comparison to the sensation of communal connectivity within and between participants in 'just being there' and 'just sharing' in the experience. The gathering together to define that which is communal, and the 'just being there' experience was the essential impulse and outcome of events like 'Woodstock' in the USA and the 'student-worker' insurrection in Paris in 1968. In this non-prescriptive way, Debord seems to me to be quite right. Experiences that connect communities together are political in so far as they form the context in which individuals align their sense of identity to that of the collective, and so come to yearn for greater expression and experience of the communal embrace.

Howard Fried's assertion that 'art degenerates as it approaches the condition of theatre', suggests that while mass entertainment gathers people together, the gathering is not in itself

central to the experience. This is because whatever the medium, the delivery of the entertainment is to an audience largely in isolation from one another. This is not to deny that audience reaction is not part of the experience, but this camaraderie is not central to the experience of performance and its attentive audience. When you watch a film, and are transported into that film, you are largely unaware of the other people around you in the audience also watching the film. You are an isolated individual responding in mass to a single information source. The performance is for you alone. Film possibly demonstrates the extreme individuation in a collective experience, while some performances, such as the circus, depend greatly of the sense of the audience enjoying self-consciously the role of being the audience.

Clearly a distinction should be drawn between that entertainment which is soporific, as much commercial popular art can seem, and the creation of 'sites of experience' within which participation and collaboration are encouraged.

From the Fluxus movement of the late 1950s and early 1960s, led by George Maciunas, and their Fluxus events of performance, technology and film, came the conviction that every day living was necessarily the heart of cultural experience. The German artist, Wolf Vostell, a member of Fluxus, wrote; "Marcel Duchamp has declared readymade objects as art, and the Futurists declared noises as art – it is an important characteristic of my efforts and those of my colleagues to declare as art the total event, comprising noise/object/movement/colour/ & psychology – a merging of elements, so that life (man) can be art."(Rush 1999, p.117)

Rush excitedly declares that this has led to art practices where, the "artist has now become a facilitator of the art experience with the interactive artwork," (Rush 1999, p.204) and that "Interactivity is a new form of visual experience. In fact, it is a new form of experiencing art that extends beyond the visual to the tactile." (Rush 1999, p.216). Rush concludes: "With the advancements in art and technology by the end of the twentieth century, the "Duchampian revolution", persuasive in all forms of contemporary art, achieves some historical closure. The advent of digital art, an art so beyond materiality that discussions of the 'object', much less the canvas, seem hopelessly dated, inaugurates a new era in which traditional art-historical terms, even Duchampian ones, and methods of evaluation no longer apply. Spaceless, timeless, imageless experiences have entered the domain of art. Interactivity, though still primitive and dependent on photo-based media, might generate art for which no vocabulary yet exists."(Rush 1999, p.217)

Certainly, the bell sculpture installations are part of this movement toward post-Duchampian practice that requires new 'terms of reference'. The idea that the meaning (or perhaps, the non-meaning) of a site might be constituted by the interactions of people within its architecture and with each other seems to describe the bell sculpture installations well. The

artist as a facilitator of public creativity is equally catered for in the bell sculpture installation through it being a public instrument available for anyone to compose for. That the bells are newly invented, and their being in just tuning offers the sort of challenge that encourages musical innovation in those who compose works for this instrument.

In bell sculpture installation sites, and other sites designed 'experientially', I hope an open sensitivity to the magic potentiality of space and the familiarity of place is found by the participant. This was and is the gift that temples, oracles, cathedrals and other sacred sites offer to those who enter them.

The bell sculpture Installation is dependent on very recent technology. As Alan Durant suggests in his text, 'A New Day For Music?', "Musical instruments of all periods and places, for example, show deep interconnections with technology of one kind or another. While the Gamelan is often cited by Western musicians and audiences as a symbol of communal 'naturalness', mechanically it depends on the calculated refinement, over time, of sonorous properties constrained by more general social conditions of production." (Hayward (ed) 1990, p.178) The development of technology has been able to improve the performance of most musical instruments over the history of the instrument. Even as traditional Instruments are preserved to keep their sounds, new instruments, or versions of those instruments evolve, and challenge the traditional sounding instruments.

Durant reviews the development of the MIDI interface between electronic instruments and the computer, and its effect on the 'democratization' of music. The problem, he contends, is not the availability of digital technology, but "the inevitable processes of selection that will determine which musics reach beyond local sub-cultures into the more general public domain." (Hayward (Ed) 1990, p.195)

What is delivered through the mass communication systems seems to be speeding up the imagery and perhaps decreasing the attention span of the public and proliferating the graphic visualism of contemporary culture. This is demonstrated by Commercial advertising and music videos pumped out by our technology-driven culture. Pop culture and its technological delivery systems promote uniform individualism. Our culture celebrates individualism as fame and celebrity, and persuades consumers to mass, uniform consumption. The corporate logo worn on clothes, the 'Nike' tick's exhortation to 'just do it' could be mistaken as the secular society ethos having finally won through. Instead, it is a corporate vision of mass markets, consumers and material aspiration founded on maximizing comfort. It is a vision of society that remains deeply flawed by the cult of the individual and a poor conception of what constitutes the communal good.

Democracy was founded on the difficult notion of plurality. This means that difference can co-exist by agreement to co-exist. Democracy in the 'ideal' secular society should not promote a uniformity of consumer demand. Technology does not have to be a force for uniformity. Technology should be utilized to advance diversity. Democracy has become the political means that sustains political diversity. It is technological wizardry that allows the bell sculpture installation to be both a celebration of the musical richness that is found in timbral diversity. Technology can be a force for diversity, eccentricity, and difference as well as a force for uniformity.

Harry Partch was disillusioned by conventional music in the 1920s, and so made a study of the ancient musical values and scales, and invented new musical instruments on which to compose and play previously unexplored harmonic intervals that offered a music of rich aural pleasure. The principle musical organization that Partch followed was 'Monophony', which he defined as "based upon the faculty of the human ear to perceive all intervals and to deduce all principles of musical relationship as an expansion from unity, as 1 is to 1." (Partch 1974, p.71).

It is worth reading Partch on the anti-pleasure of 'serious' music. He laments the loss of an instinctive response to music and likens its situation to that of the fine arts. He quotes D. H. Lawrence's view upon the viewing of paintings "[we] are only undergoing cerebral excitation... The deeper responses, down in the intuitive and instinctive body, .. are not touched. They cannot be, because they are dead. A dead intuitive body stands there and gazes at the corpse of beauty; and usually it is completely and honestly bored." (Partch 1974, p.54)

We can only really 'be touched' and trust intuition when our entire body becomes involved in the experience. There are new opportunities for multi-sensory experiences that are capable of engaging a person's whole attention.

Technology-driven public works of art, such as computer-controlled water fountains, are currently being installed in cities around the world. These public-space artworks are interactive sites of experience. The artist Garth Paine creates public spaces in which, in one instance, a visitor's movement generates interactive sound and visual expressions, and in another instance, collects weather information which is electronically synthesized as sounds that are projected into a particular site. His work 'Gestation' at RMIT gallery in December 2001, collected information on movement within the gallery space and translated it as a foetal growing image projected on a screen. Watching people respond to responsive installations with excitement and trepidation makes it apparent just how hungry we are for interactive, play-oriented 'sites of experience'.

There are numerous multi-sensory Installations that are accessible to the public, including perhaps sites as diverse as the various interactive computer arcade games, skateboard parks, as well as contemporary art Installations. However, I want to consider a number of specific public space Installations that are centred on the bell. The first is the 'Swan Bell Tower' in Perth, Western Australia. I want to also consider the bell projects of Nigel Helyer, and specifically, the large bell sculptures in Seoul, South Korea. Finally, I want to consider my own interactive Installation the 'Tilly Aston Bell' Installation in the Domain Gardens of Melbourne.

It is worth noting a brief history of the bell in Australia. John Deakin Keating's *Bells in Australia* gives a detailed account of the bell in Australia from the colonial origin. Ship's bells brought the first bells heard on the continent, and were used to regulate time and call to worship in the early colonies. Bells have come to be, as in the European tradition, an important part of the ecclesiastic architectural infrastructure since. The Australian bell market has always been a small but important source of demand for the English bell foundries (principally Gillett & Johnston, Taylors and Whitechapel bell foundries) for the protestant communities and the Irish (Murphys) and French (Paccard) for the Roman Catholic communities. The Lutheran communities purchased bells from German bell foundries such as J.J Raddler of Hannover. Whilst individual bell founders sporadically cast bells in Australia, two foundries gained a reputation for the bells they cast. These were Jonh Danks & Sons in Melbourne and Sydney and John Horwood of Castlemaine. The regard for Dank's bells for their tuning accuracy, cast between the 1890s and the late 1930s is not as high is is the regard for Horwood's bells.. Horwood bought the Albion Foundry in Castlemaine in 1868. Keating writes that "Horwood cliamed to have made, for the Castlemaine post office, the first 'large' bell successfully cast in Victoria. This was in march 1879." (Keating 1979, p. 115) Horwood cast a number of bells still in working order, but was taken over by the Thompson & Co foundry in 1894. Thompsons did not continue bell casting. The Thompson foundry is still operating in Castlemaine.

The most notable Horwood bell for me is the one sounding in the Bendigo Post Office clock ring every day. I smile whenever I hear it chime. It is a great coincident that Australia's only serious, tuned-bell foundry was established in Castlemaine not far from where the largest of our bells are cast today. During the 1920s and 1930s the public enthusiasm for rings of bells and secular municipal clock-tower bell(s) resulted in a large number of bells being imported into Australia. The bell-ringing fraternity now have a number of excellent rings in churches around the country, with more being commissioned or restored every year. The commissioning of the Swan Bells Tower in Perth is, against this history of bells in Australia, an extra-ordinary event. It is also a contemporary bell project of great note.

3. Swan Bells Tower project

Two major bell projects in Australia celebrate the Centenary of Federation in 2001. Both projects have provided quite new, though very different, experiences of bells in Australia. The two projects are the Melbourne International Festival of the Art's 'Federation Bells Carillon' and the 'Swan Bells Tower' in Perth (fig 36, p.109).

Neil McLachlan and I were invited to attend the inaugural ringing of the 'Swan Bells' during Easter 2001, and to be present for the bell-ringers dinner to celebrate the new bell tower. Comparisons between the Federation Bells project and the Swan Bells Tower project are, I think, useful in terms of the experience that these two bell installations offer their communities.

The history of the Swan Bells project began in 1986. The president of the Australian and New Zealand Bellringers Association, (ANZAB) Laith Reynolds, learnt that the bell ringers of St Martins-in-the-Fields Church (the church which faces Trafalgar Square in London) had decided to re-cast the twelve bells in their bell tower with twelve modern-tuned bells from Whitechapel bell foundry.

The usual custom for renewing bells in a tower ring is that the existing set of bells are removed from the tower and broken into scrap to be re-melted and cast into the new set of bells. The existing bells in the tower were cast by the leading bell founder of his time, Abraham Rudhall of Gloucester. George II, Prince of Wales, paid for ten of the bells to be recast in honour of the building of the new church, with two more paid for by a wealthy parishioner, making up the ring of twelve. They were cast in 1725 and 1726, except for the E# as it was recast by Rudhall in 1758. These bells had been cast using the metal of the previous set of bells. A ring of eight existed in the tower by the Reign of Elizabeth 1st that had themselves been cast from the existing set of bells. The metal in the bells hung at the church of St Martin's-in-the-Field therefore goes back to the early medieval period.

The ring of twelve bells was the first diatonic ring of twelve cast in the world. They were cast as a set, rather than accumulated by the usual method of augmentation. The history of St Martin-in-the-Fields chapel begins in the 12th century when it was built for monks returning from Westminster Abbey to their convent gardens (now Convent Garden). In 1543 Henry VIII had a church built on this site to keep the funeral processions away from his residence at Whitehall. A new church was built, to replace the old, in 1720. The ring of twelve bells was not ready for the consecration of the new church in October 1726, and was, instead, installed by May 1727. These were ancient and unique bells, and over the long period that they had hung in the tower of the church in the centre of London, they had been rung at significant

moments in the life of the city. They had mournfully called the passing of Monarchs, rung out in celebration of famous victories in battle and marked the every day lives of countless generations of Londoners.

The thought of these venerable old bells being melted down, at a time when old sets of bells are becoming quite scarce, motivated Mr. Reynolds to try to save them. He put a proposal to have an Australian mining company supply the copper and tin required to cast the new set of bells for the church, if the bells could be gifted to Western Australia, his home state.

Laith Reynolds negotiated the supply of copper and tin to make up the required bell metal from Renison Goldfields Consolidated Ltd. He was able to also arrange the gifting of the bells to both the University of Western Australia for its 75th anniversary, and the State of Western Australia for the Bicentennial year of 1988, from the Corporation of the City of London. Secured from their destruction in Whitechapel's furnaces, the bells arrived in Perth that year, but the state government was unable to find the funds to construct a bell tower to house them and so they were stored in a warehouse until such times as a tower could be built.

Mr Reynold convinced the Court Government to support the building of a tower to house the bells. The Perth-based architecture firm Hames Sharley won the contract to design the new tower to house these ancient and venerable bells. John Holland P/L won the tender to build the tower and complete the landscape works. Six new bells were cast at Whitechapel bell-founders (Rudhall's successors) to augment the peal from twelve to eighteen bells, the largest peal of bells in the world. The largest of the bells, the tenor bell is called "Zachariah" a C# at 1551 kilograms. This was named after Zachariah Pearce, the Vicar of St Martin's-in-the-Fields in 1726.

The design brief required that the tower would allow the bells to be hung in the most modern fitting system. The brief stipulated that the bells themselves could be seen working up close by the visiting public and that the tower would be a museum of bells from around the world, and a home to a dedicated team of bell-ringers found from amongst the people of Perth.

The bells were gifted to the University of Western Australia, who have loaned them in perpetuity to the 'Swan Bells Foundation' a non-profit organization charged with the responsibility to oversee the operation and development of the bell-tower. The mission statement of the foundation says: "The Swan Bells Foundation will promote the Swan Bells as a major tourist destination and be responsible for the preservation, display, and interpretation of the bells of St Martins-in-the-Fields and other objects relating to bells and bell-ringing. It will provide music and performing arts scholarships for young Western Australians and encourage liaison and co-operation between the Foundation and educational institutions, in particular the university of WA, the WA Academy of Performing Arts and other

schools of music and performing arts. The Swan Bells Foundation will report to the Minister for the Arts.” (Printed information on a wall in the Swan Bell Tower)

The Swan Bells were formally opened in November 2000 but the first set of 'touches' rung on the bells took place over Easter 2001. (CD. Track 6.) Eighty bell ringers from across Great Britain and Canada converged on the tower and rung a series of rings such as 10 'Little Bob', 12 'Cambridge S' and 16 'Yorkshire S' and so on, these being names of certain change-ringing patterns the bell ringers play. Following this inauguration of the Swan Bell Tower, the bell ringers then traveled to towers in Adelaide or Melbourne and Sydney to ring at various towers around the country before returning home.

The Swan Bell Tower, to my eyes, is a wonderfully eccentric work of post-modernist architecture. Its structure is a glass spire with two wings of copper sheeting around its base, very like an abstracted swan in form. To re-enforce this image, a number of life-size 'swan' sculptures in cast bronze are set around the tower which is itself set on a pond, in the manner of a floating swan. One enters the tower across a wharf-like deck. The views of the city from the five levels of the tower are wonderful. The most impressive level is the level where the bells are hung, and one can walk around the bell set. Double-glazing dampens the loudness of the full, 360-degree swung bells, with the sound of the bells baffled by louvers in the copper wings. The opening and closing of the louvers controls the volume of the sound and its direction into the surrounding parkland. A public controversy had raged between the government and local residents near to the Swan Tower with regard to the potential noise nuisance from the bells. This was one issue along with others, such as the call to use public monies instead on hospitals and schools, with which the Court Government grappled.

In the 'Age' newspaper of December 9 2000 there appeared an article concerning the bell tower. "It's been a time of milestones and monuments for Premier Richard Court. Not only has he passed his father Sir Charles Court's seven-year, nine month record as Western Australian Premier this week, but tomorrow he will unveil his beloved taxpayer-funded bell-tower on the Swan River foreshore. Sure, there has been plenty of criticism over the \$7 million price tag for building the world's largest musical instrument, but the initial public outcry started to swing in favour of the belltower as it took shape. Although the 18 bells were donated years ago, they were stored in a warehouse until Premier Court heard about it and committed his government to build the tower as part of an \$88 million plan to revitalise Perth's foreshore. The State Opposition has accused the Premier of building a monument to himself. 'This is a monument to an out-of-touch Premier who somehow thinks that tourists are going to flock to W.A to see a bunch of bells,' Labor tourism spokesman Mark McGowan said."

The Swan Bell Tower is part of the redevelopment of the Barracks precinct of the City of Perth, to which \$24 million was budgeted for the first stage. The cost of the Swan Bell Tower was between five and six million dollars.

A second stage proposed for the tower development includes the casting and hanging of a larger tenor bell (an F# note at six and a half tonnes weight) and the collection of bells from around the world for its museum function. Future plans also include installing two small carillons (one from Australian Bell) on the upper deck of the tower, as part of it becoming a working museum of campanology. Laith Reynolds has donated his considerable library on the arts of the bell to the Swan Bells Foundation for this purpose. The desire to make the bell tower the centre of a new interest in the study of bells and their playing is being re-enforced by an interest in campanology being shown by the music faculty of the University of WA. There are plans for a carillon to be built at the University at some time in the future.

Watching through the darkened glass as the bell ringers, standing in a circle facing one another, work their way through a ring cycle is certainly fascinating. The adage that this is a sport as much as a musical expression is made quite clear in the sweating effort the ringers put into a 'touch', some of which can proceed for four hours non-stop. Full peals on large numbers of bells in a tower can carry on for over 24 hours and more, without ever repeating the same sequence of the bells being rung.

What is absolutely exciting about this project is the serious focus on bells now taking place in Perth, Australia. It does seem like a co-incidence, even given the Centenary of Federation celebrations, that this project should come to fruition at the same time as our project. It promises to be a new age for the bell in contemporary Australian culture.

The Swan Bell tower must be one of the first times an apparently secular bell tower has installed historically important Christian bells. The bells were re-tuned at Whitechapel Bell foundry, and so their original voices have been lost. The bells were not re-tuned to a modern five-partial tuning, but had their fundamental, nominal partial (octave above the fundamental) and tierce put in tune. The new bells cast by Whitechapel to augment the ring were tuned in the same way. This was because it was felt that the eighteen-bell ring should be a more 'modern' ring, without completely sacrificing their original tone colour. This will certainly encourage many bell ringers and bands to come and play on the 'better tuned' bells although it has meant the loss of another original tuned instrument from the historical record.

The architects have taken their cue from the historical nature of the bells contained in the bell tower. While the design of the bell tower is an interesting abstraction of a swan image afloat on water, and is very much sculptural in that aspect, and playful too, the images and symbols of the church predominate within its structure. Above the deck level holding the bells is a

glass spire of great height. Its English steeple imagery is, for me, overlaid with the T.V evangelical 'Crystal Cathedral' in Garden Grove, California, U.S.A.(Fig 34, p.88) This is because they are both glass structures holding bells; the 'prayer Spire' of the Crystal Cathedral houses a 52 bell Royal Eijsbouts Major third carillon.

And yet, the Swan Bells are not consecrated bells and the bell tower is not a holy site. This leaves the experience of the bell Installation, especially during their ringing of traditional peals and touches over the Easter week, quite an odd experience for me; neither church nor state, but caught in the midst of the secularization of the church issue.

Much of this strange tension between the secular and religious experiences offered by the Swan Bell Tower Installation was intimated in a public lecture given by noted bell enthusiast Chris Pickford during that Easter inauguration of the tower. He spoke on the history of change ringing in the U.K. A tension arose between the ecclesiastic uses of the bells and the development of bell ringer societies wanting a more musical and secular function for bell ringing. In his lecture Mr Pickford emphasized the secular aspect of the 'sport' of bell ringing. He shared with his audience amusing anecdotes concerning church-wardens and obdurate members of the bell band as part of the long history of skirmishes over the control of the church bells. This antagonism started when bell ringers began taking beer and money from the public to ring the bells for personal commemorations above and beyond their ecclesiastic duties. Such was the keenness of the ringers to earn their drinking money in this way that bells would be rung at all hours of the day and night outside the necessities of liturgical ritual.

Bell tower associations and societies had formed to develop the skills of change ringing; that is swinging bells a full 360 degrees in strict order. The patterns of the changes in which the bells are rung, called the 'method', grew in number and complexity. Of the many 'bands' formed over the centuries, a number still exist. One is the 'Ancient Society of College Youths', founded in 1637, who normally ring the bells at St Pauls Cathedral and Westminster Abbey. Another is the 'Royal Society of Cumberland Youths' founded in 1747. Bells are rung in order from the highest pitches (treble bells) to the lowest pitch (tenor bell). A 'conductor' calls the changes during a touch or peal.

In the early seventeenth century, Fabian Stedman became absorbed in the mathematical possibilities of these sequences, and found, for example, that the order of ringing three bells could change six times without repeating ($3 \times 2 \times 1$). Ringing four bells gave twenty-four possibilities ($4 \times 3 \times 2 \times 1$), on six bells it was 720 and on 8 bells it became 40,320. John Camp suggests that the "number of changes possible on twelve bells runs into the millions (479,001,600), which means to ring every one of them would take a band of ringers nearly thirty years. " (Camp 1997, p.11) Some of the interesting names given to these cycles of bell ringing include, 'quarter peals', 'peals', 'Grandsire', 'Stedman Doubles' and so on. Camp

writes: "The connection between ringing and religion was becoming more and more tenuous. In the light of this situation it is not surprising that before long a deep rift developed between ringers and clergy, amounting, in some parishes to open hostility. In Devon, for example, the Rector of Morteheo was locked out of the church tower by the ringers, who then changed the lock on the door..." (Camp 1997, p.23)

The idea of bells completely outside any kind of religious context only becomes visible when exclusively musical bells are brought into existence, such as Australian Bell's newly invented bells. Nevertheless, for me, the Swan Bell Tower is a confusing installation as a contemporary work of art. As a repository for magnificently historical bells, however, it remains a site of wonderful bell experiences.

This contradiction between ecclesiastic use and musical uses of the bells became apparent throughout the experience of my week of attending the functions and performances of the Swan Bells. At the Inaugural dinner for the bell-ringers of the Swan Bells, the main address came from the Anglican Prelate of Perth who also recounted the difficulty the church faced with the increasing secularization of their bell towers. The underlying theme was, however, that the better the music, the more perfectly manifest might be the infinite beauty and perfection of the Host. This is the Anglican Church's counter to the Newtonian time/space clockwork I suspect. God is the conductor to each of us playing our small but important part in a great orchestra, unable to know the whole composition, only our particular contribution. And yet, in spending time amongst the ringers as they rang their methods and controlled their bell, I did not observe a prayer uttered. Nor did I see any Christian ritual to mark the actions taken with the tolling bells. Even the Easter staging of the event seemed to me somehow unconnected to this most sacred of Christian festivals.

Having experienced performances from carillonneurs and change-ringing bands, it seems to me that both these uses of the bell say much of the communities who have favoured them. In the Low Countries, the bell as a musical instrument, as a broadcast piano-forte in effect, seems designed to celebrate the individual excellence of the musician. This might be described in terms of it being 'a Lutheran concept' in so far as it celebrates an individual's relationship to God. The individual's virtuosity pays homage to God. The audience that listens to the carillon program freely discusses each musician's gusto and verve in their recital. In change ringing, the ringers stand in a circle facing one another and work in a collective unison to create the thundering sounds from the spinning bells. The physical effort of creating the music, the sweating and heavy breath, seem very 'rugged', in the 'muscular Christian' tradition, to me.

4. Nigel Helyer's bells

Bells and other sounding forms, such as sirens and organ pipes, have been fundamental to Nigel Helyer's installation works. I have not personally experienced either of the Installations I want to discuss here (though I have experienced other of his Installation works).

Nevertheless, I include these works because I think they do make important contributions to the Australian context of the bell as an object, as an idea even, in contemporary Installation work. The Installations that I want to consider are his *'Big Bell Beta'* created at the Perth Institute of Contemporary Arts (PICA) during his Artist-in-Residency there between December 1989 and February 1990, and his installation in Seoul in 1988 of *'Korean Bell, Din; Ding, Dang, Dong'*.

The Big Bell Beta Installation.

Helyer's Artist-in-Residency at PICA in Perth and his Installation which created a relationship between Big Bell a ghost town on the hinterland of the City of Perth, and the City itself through the work, certainly has a strange perspicacity attached to it. The collapse of Bell Resources at about the time of the exhibition of the work, and the mire into which the whole 'W.A Inc' catastrophe drew Perth are hinted at in the theme of the work. That his work was about the inevitable decline of the prosperous, as the once prosperous town of 'Big Bell' had so clearly declined, seemed apropos.

That Laith Reynolds had secured the St Martins-in-the-Field bells at this time enriches my reading of the work. And so too the now existing Swan Bells Tower that has, or is hoped to, become an icon for the City of Perth, whose bells carry the history and voices of another city, far away in some other place and at another time. For me, Helyer's work in Perth, in 1989, strikes at the heart of the city's displaced identity.

Helyer wrote to Noel Sheridan outlining his proposed work for the residency. "In brief" he wrote, "the project considers concepts of what I term the 'Boom Town/Ghost Town' cycle in which architectures, generated within specific socio-economic and historical boundaries, are inscribed with maps of their own redundancy and which inevitably drift toward an entropic zero." (Helyer in Sheridan 1992, p.14) Helyer conceived of two installations connected by a 'sonic text'. One installation was in the PICA space, and the other one sited in the ghost town of Big Bell, which is in the Murchison goldfields. Helyer continues, "For me there is a high level of irony in the idea of linking the two sites – the ghost town and the boom town, - because Big Bell itself was a boom town, then a ghost town and now, once again a (re)version to a boom town with the current reworking of the mine on a massive scale. What I'm pointing to is that every structure, every architecture, every urban fabric has, encoded within it, a trajectory and design for its own decay." (Helyer in Sheridan 1992, p.15)

Helyer's PICA installation was a huge skeletal bell structure 8 metres high and 6 metres in diameter. The sound emanating from the bell, says Sheridan "relays a series of sound texts, punctuated by the ubiquitous voice of a talking clock; counting down time every five seconds." (Sheridan 1992, p. 8) The sound was also projected from the hotel in Big Bell.

Anthony Bond, in considering this and other Helyer works suggests that the "works are primarily experienced at a kinaesthetic level as spatial events plotted within the temporal matrix of sound. ...A complex, total theatre is created where immediate bodily sensations are allowed to conflict with narrative structures. " (Bond in Sheridan 1992, p.50) Use of a bell motive does seem a convincing image in this installation. A great bell booming (you might imagine) the grand tidings of prosperity and success. Except that the sound is synthetic voices, rather than bell rings.

In writing about another of his installations, 'A symphony for other cultures' exhibited at The Performance Space, Sydney in 1987, in which a large dried clay bell, a wind tunnel and a very low frequency (25hz) wooden organ pipe played, Helyer notes that; "As an instrument tuned to a particular architectural envelope the work argued strongly for a sculptural practice that values the experiential mode over the representational mode, engaging the entire gamut of sensory functions....the sonic mode, perhaps more convincingly than the visual, shapes our sense of spatiality." (Helyer in Sheridan 1992, p.22) In the experience of the felt vibrational frequency of the organ pipe, Helyer feels the power of the felt and the experiential in comparison to the visual and conceptual. This is the experience that those of us working on the bell sculpture installations have felt as well. The vibration has a magical power to reach out and connect people.

Korean Bell, Din; Ding, Dang, Dong Installation.

Helyer's other work that I want to consider is his 1988 Bell Installation called, '*Korean Bell, Din; Ding, Dang, Dong*. (fig 37, p.109) This huge work, in the Seoul Olympic Park, consists of four giant steel sculptures that might be part Korean Buddhist bell and part foundry furnace. A triangulated steel space frame over the bell shaped sculptures act as the hanging structure to the bell sculptures. The steel sculpture bells seemingly float just above a 22 square metre granite platform, and are not rung. Four large stainless steel hammers are fixed in position and are unable to strike the bells. This work intrigues me because, having closely researched Korean Buddhist bells, I can see Helyer's Installation registering each of the qualities of the Korean bell, except sound. Bond suggests that the 'planned failure' of sound in the work is "overridden in practice as the wind produces sounds from the structure and picnickers kick and slap the bells, bring the whole work to life in the immediate present when play can overturn the prescriptions of history." (Sheridan 1992, p.46)

This is such a superficial allowance. The Korean bell, in my experience, is the most considered and tuned and so 'musical' of the Asian bells, and seems also the most ritually profound. The bells are hung close to the earth, and often holes are dug beneath the mouth of the bells. The bell connects the living with their ancestors, and this is done through sound and vibration. Vibration into the earth, and vibration through the earth. The religious community, in this way, is bound across the border of death. Ironically, as the Republic of Korea becomes increasingly Christian, the cycles of life and death so fundamental to Buddhism, and to their bell, have become less relevant. Buddhism is here mocked (unintentionally, to be sure) by these silent ersatz bells.

Helyer does, however, understand the bell as sound. "The bell," he wrote, "is an extremely complex acoustic object, with a long history, as device for marking spiritual centres. Their sounds are centripetal in that although physically the sound radiates outward they function to attract people, they beckon, they are call signs." (Helyer in Sheridan 1992, p.26) Feeling the vibrations of the ringing bell through your body as well as in your ears, such as is felt in the presence of a large Buddhist bell 'shivering' with its 'growling voice' is a special experience. Against this ineffable experience, the 'idea of the bell', to which Helyer is obviously drawn, can seem thin.

5. The Tilly Aston Bell Installation

The 'Tilly Aston Bell' Installation (fig 35, p.109) is my first interactive bell sculpture installation. The design of the actual bells for this installation began the collaboration between Neil McLachlan and myself in the design and casting of musical bells. While I had been designing and casting bells for a number of years previously, this installation marked the transition of my sculptured bells into our musical bells. My proposal was submitted to 'The Association For The Blind' (now 'Vision Australia') as an expression of interest proposal to celebrate the centenary of the Association's foundation by the remarkable Matilda Aston in 1896. The brief seemed to present a perfect opportunity to develop a multi-sensory work. The original site proposed for the chosen work was near 'Sinclair's House' in the Fitzroy Gardens. These gardens were first designed by Von Mueller, and are one of the more important gardens outside the Botanical Gardens for the people of Melbourne. The original re-development of the gardens around the Sinclair House precinct, in which the sculpture was to be situated, faced objections from the community, and finally, after three years of controversy, its development was abandoned. The finished sculpture remained in my studio for the three years it took the council to find another site. The original sculpture was to be set in an open grassy area, and I had stipulated that a camomile lawn would be planted around it. People drawn toward the sculpture by its ringing bells (set off by movement sensors at the base of the sculpture) would be enveloped in the fruity scents of the plant as it was crushed underfoot. On one of the three bells was cast relief images from imagined moments from the

life of Tilly Aston, along with her quote: "Poor eyes limit your sight, poor vision limits your deeds". A second bell was lined along its rim with the same message in Braille. The third bell had hand prints impressed into the surface of the bell. These were left by sight impaired users of the Association's facilities who visited my studio and laid their hands on a clay stage of the bell.

The celebratory nature of this Installation demanded a multi-sensory proposal, I thought, with a strongly interactive element to enrich the experience of the bells for those who came into contact with the sculpture. When finally the City of Melbourne located a place for the work in the Domain Gardens next to the 'Pioneer Women's Garden' and close to the Sidney Myer Music Bowl, every part of the sensory regime was satisfied except the camomile lawn. The council would not position the work on grassland, and insisted it be set in a widened gravel pathway.

Nevertheless, I think the work has a wonderful feel, standing quietly aside until someone approaches it. It begins ringing, and I have often watched people's reactions to the work. At first surprised, most are then delighted by the bells. As a 10 second delay was built into the electronics setting off the bells, it is difficult for those engaging the work to establish which movements ring which bell. By dancing around the work and damping particular bells with your hands you can generate unusual combinations of the bells ringing against one another. The design of the three bells, with consonant overtones between each, ensures that whatever combination of bells are chimed, they resonate in quite satisfying harmony.

After this collaboration we began our journey into bells, their history and traditions, their design and casting and the possibilities of developing other bell sculpture installation sites. As humble as it may seem in contrast to the Federation Bells Carillon or the Victoria Police Memorial, this interactive bell sculpture installation also conveys the sense of joyous experience that is central to the intended outcome of my work generally.

6. Conclusion.

The multi-sensory experiential nature of Installation art is so attractive to our contemporary mind because we seek something more than mere entertainment or education. We seek an intuitive trust in the 'felt' and 'vivid' experiences of our lives and the natural world about us. The bell has a special power in that so many communities from the historical past have utilized it as an active agent in their important sites of experience and revelation. The bell has an exciting place in contemporary art and design as well. With recent developments in computer technology the incorporation of the bell in public-space multi-sensory experiences seems to grow evermore promising.



Figure 35 Tilly Aston Bell in the Domain Gardens, Melbourne



Figure 36 Swan Bell Tower, Perth

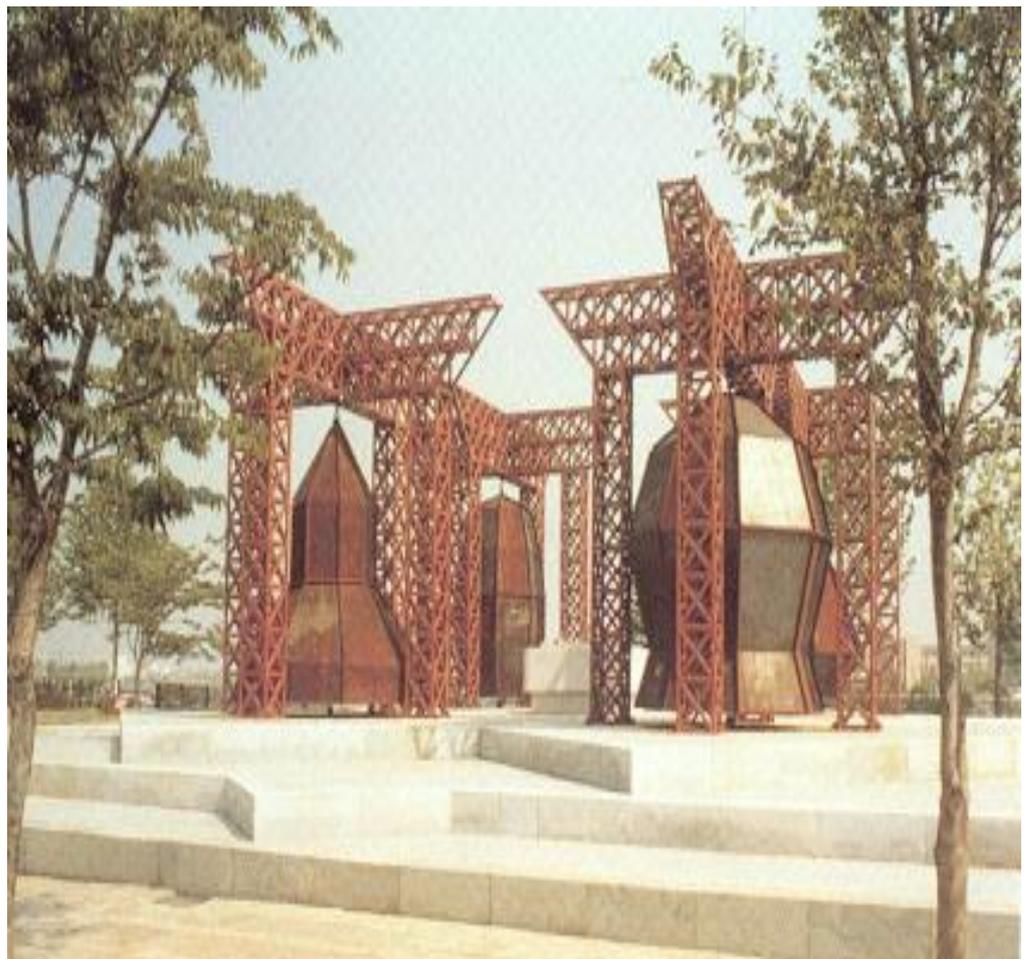


Figure 37 'Din: Ding Dang Dong' by Nigel Helyer, South Korea, 1988 (Bandt, 2001)

Chapter 6 THE CENTENARY OF FEDERATION BELL PROJECTS.

"Bells and carillons sound the way we hear them, time and again they will express our feelings, in sorrow and in joy. The French writer Chateaubriand expressed it as follows: *When we are celebrating, the carillons and the noisy voices of the bells seem to add to the general happiness. Joy it is, expressed on an immense scale of sounds. When great calamities occur, however, their noise becomes terrible.* Indeed, bells belong to human beings and they are understood by those who care to listen. May it always be so!"

(Lehr, 1991 p. 307)

1. Federation Bells Installation
2. The 2001 Handbell project
3. The Orchestral Chimes project
4. The collaboration between Hasell & McLachlan
5. Conclusion

1. Federation Bells Installation.

In January 1998 Neil McLachlan and myself were invited by Jonathan Mills and Ian Roberts from Melbourne Festival to estimate the cost of designing and casting bells for three projects. These projects were proposals being considered for the Melbourne International Festival of the Arts Centenary of Federation Festival planned for May 2001.

The three projects were, in the order they are discussed here, the Federation Bells Carillon, the 2001 Handbell project, and the MSO Orchestral Bells project. Information on these projects as well as on Australian Bell more generally can be found on our web site, ausbell.com.

This invitation from Jonathan Mills, the newly appointed Artistic Director of the 2000 and 2001 Melbourne International Festival of the Arts, and Artistic Director of the Centenary of Federation Festival celebration for May 2001 was wonderful. He was aware of our desire to design and cast a bell sculpture installation, and wanted to include a handbell project and an orchestral bell project in the program. It came at the end of a three-year period of personally-funded research and attempts by Neil McLachlan and myself to find other funding sources to carry on the research we began in 1995 on the design, casting and tuning of new musical bells.

In this chapter I will discuss the projects and their achievements. This discussion will be in terms of the four central themes or goals that I consider underpin the design philosophy of the bell projects. The areas I wish to discuss are in the following order:

- a. Project description
- b. The invention of contemporary expressions of the bell as a public space multi-sensory installation.
- c. The secularization of the bell.
- d. The creation of new musical experiences for bells.
- e. The opportunities for public access and participation in bell installations and experiences.

1. Federation Bells Installation

- a. Description of Federation Bell Carillon at Birrarung Marr Park (fig 43, p.129)(CD. Track 4.)

The Federation Bells Carillon is made up of 39 bells consisting of three distinct bell types. A set of 23 bells or more is normally called a carillon, while bell sets with fewer than 23 bells are called chimes. The Federation Bells Carillon has 32 harmonic bells from 73 hz, or D2 to 1173 hz at D6. The five lowest pitch harmonic bells have convex parabolic curved walls, and the remaining harmonic bells are conic in form.

There are six polytonal bells that produce a harmonic series of overtones as well as a second pitch percept to their fundamental pitch at 293 hz (D). Amongst these bells is a traditional European bell with its minor third second pitch percept, at a $6/5$ ratio to the fundamental. The other bells in this group have other second pitch percepts at just ratio intervals of $8/5$ (the just 'minor sixth'), $9/5$ (the large just 'minor seventh'), $7/5$ (the septimal 'tritones'), $5/4$ (the just 'major third') and $7/4$ (the septimal 'minor seventh'). Just intervals are explained later in this chapter. The traditional names for the intervals that these ratios represent are in parenthesis next to each one. These polytonal bells, like the European bell, share a fundamental pitch of D.

In the installation there is a polytonal bell that has three pitch perceptions in its overall sound. Its fundamental is also a D, the same as the other polytonal bells, but it also has partial pitch percepts at the just intervals of $4/3$ (the just 'perfect fourth') and $5/3$ (the just 'major sixth').

These seven polytonal bells offer composers who are familiar with computer-aided music, where sounds can be synthetically constructed, the chance to play with complex timbral relationships in actual sounding forms (bells). They can compose with the single pitch clarity of the harmonic bells, and add interesting timbral effects and tone colour using the polytonal bells with their common fundamental pitch at D.

The physical layout (fig found p.126) of this 'field of bells' consists of a grid of 26 six metre high posts with bells on top and 13 stainless steel stands spread arbitrarily between these poles supporting the larger bells. The bells are set to four height levels across the field, with the larger bells being closer to the ground. (fig drawing p.127) The largest bell can be touched, but the other bells are out of reach. The bells are fairly densely contained in an area of about 20 metres square, and located on the edge of a concrete slab platform that services the bridge that runs across this section of Birrarung Marr park. The bells stand at one of the major access points to this bridge.

b. Federation Bells Carillon as contemporary public space installation art.

The bell as a public space installation in Europe has a long history that is heavily circumscribed by the influence of the church. As outlined in chapter 4, the increasing interest by bell players and ringers to provide evermore complex and musically satisfying performances began to generate a separate imagination of the bell as a musical instrument in the community that contrasted its origins in religious mysticism. As a broadcast signal for the church, the bell holds a central place in the aural experience of public space in villages and cities across Europe.

The single Buddhist bell is also the prime aural phenomenon in public space experience for communities throughout Asia. The use of the bell in temples as well as at crossroads, such as the Chong-ro bell in central Seoul ensures that the sounds of bells mark out daily ritual for people in these communities.

In both Europe and Asia the bell sounded in ritual performance is a central experience for the community. Communal space and communal time is marked by the sound of bells in their towers or bell-housing structures.

The invention of our first bells for the Tilly Aston Bell sculpture as discussed in Chapter 5 demonstrated that a potential for new bell music in a contemporary sculptural context existed. Our investigations into the technology of bell design, and our growing data collection of the sounds and forms of European and Asian bells from around Australia convinced us that the bell, as a new sonic, visual and physical experience, could become a re-vitalized element in contemporary public-space design.

Our collaborative work up to the invitation from Melbourne Festival had invested most of its energy toward developing proposals for public-space uses of bells. These were either speculatively advanced to appropriate authorities, such as our proposal to build a track of bells along the Sandridge Bridge crossing the Yarra river, or crafted in response to publicly

advertised commissions. Our proposal for the Migration Museum's forecourt, the 'Sonorous Garden', is an example of this second approach.

Our proposal, 'Sonorous Garden', developed the notion of twelve bells, each designed to reference bell traditions from the home countries of Australia's migrant communities. Together, the bells would be in harmonious accord between themselves, such that they could be electronically played together in musical compositions. Finding a harmony between individual bells and differing bell traditions using the most recent computer technology seemed to us to underscore the multi-culturalism so successfully has embraced in Australia.

Through the process of writing many bell proposals for particular public space sculpture commissions, a vision gradually emerged for newly invented bells. It became evident that the bell needed to be experienced by the public both as a sculptural and as a musical instrument. Just as the form of the bell created its sound and vice versa, these musical and sculptural functions could not and should not be separated from one another.

When we traveled to both Asian and European sites of bells, bell foundries and met bell enthusiasts, we could see that neither of these two ancient bell traditions had been brought together. Also, neither tradition had resolved the bell as both public sculpture and as a public musical instrument. This is not to deny those places, such as Westminster's 'Big Ben' or the bell at Chong-ro's central intersection in Seoul, where the physical site and its aural sensation seem to have become one in the public's imagination.

However, the European inclination to house groups of bells in high church towers limits people's access to the powerful physicality of the bell as a vibrating sculptural object. A tower also compresses, intentionally, the sounds of each individual bell into a controlled sound of massed bells emanating from the belfry. Indeed, there is a lively literature from the past and the present amongst bell enthusiasts as to the relative values of belfry openings and the preferred mixing of the sounds of the individual bells. Some prefer a more open belfry that encourages the listener to aurally distinguish the position of individual bells in the bell-frame to improve the spatial quality to the bell music. Others prefer smaller openings in the masonry to reduce this spatial effect and create a sound mix of a more homogenous kind.

Naturally, not every church has a great tower in which their bells are hung. Some churches have a few bells that are placed in external frames that allow the bells to be seen. Often this chance to blend the physical, spatial and musical experience of the bell is diminished by setting the bells at a great height to enhance their 'broadcast' sound coverage. The European tradition tends to keep the bell, as an object, distant from its audience.

The experience of bells in Asia, which are, in contrast to European traditions, accessible to people as they are hung close to the ground, show just how exciting it can be to be standing in the vibrational field of a rung bell. While this opportunity to touch the ringing bell, to feel its vibration and to enjoy it in an intimate way is wonderful, the Asian tendency to hang bells singularly in a bell-house minimises the spatial and musical experience provided by several bells hung together.

Between these two traditions there stands a desire to bring together the separate experiences of the bell in the East and the bell in the West as the one indivisible, multi-sensory, spatial and exciting experience. The European style bell is the only familiar bell that can be heard and seen in the Federation Bells Installation. All the rest have shapes and sounds that suggest, at most, Asian and European bell traditions. None of the bells are 'ear-splittingly' loud; even our European bell does not have the usual sharpness in tone as it is cast in a bronze alloy consisting of 95 percent copper, and so is much less brightly sounding than the traditional copper-tin alloyed European bell.

The layout of the bell installation underwent numerous changes as ideas developed. It was important that the spatial quality of the bell sounds could be felt across the site. Every new composition would change the pattern of sound across the space in which the bells were installed, so we ensured that bells likely to be played in sequence would not be bunched together. We wanted to keep the 'sound-scape' as 'open' as possible. Working with the architectural firm Swaney Draper was a fruitful collaboration. They designed the grid layout amongst which we almost randomly placed the bells that were on the stainless steel plinths. Swaney Draper had wanted these plinths to be in glass, but insurance was unobtainable for this most elegant and startling option.

The bells were installed upside down. As the sound of a bell radiates laterally from the vibrating wall of the bell, it makes little difference whether the bell is hung the traditional way or stood on its head. In fact, the conical wall of the bells, particularly the harmonic bells, radiate from their high position on posts and poles back down into the installation and so their inversion improves their sound reception. I like the association of the bells with radar dishes and satellite communication equipment. Rather than being hung close to the ground to radiate vibrations to our ancestors, these bells, I imagine, radiate out into the cosmos in a search for intelligent life responses.

These are bells that cannot be approached with any sense of the conventional expectation about bells and bell music. The usual habits of looking at a group of bells and listening to compositions will not suffice here. We expected, and have found that people do thrill to their new sounds and are surprised at the new compositions that they play. Many people have told us they feel inspired and refreshed at having experienced the installation. In short, the

bells, inverted, can be recognized as the sculptural forms that they are, and the musical structure of the installation, being unfamiliar, freshens the listening experience of those who participate in the multi-sensory installation.

This Installation shows that the different voices of the musician and the sculptor can find inventions that remake old experience anew. From our visits into the small global world of bell enthusiasts, we know that this carillon-like installation will be a very big surprise. We hope the surprise leads to a joy in seeing campanology brought into contemporary cultural life.

c. Secularization of the bell

The religious and magical uses of the bell are discussed in chapters 3 and 4. Both bell traditions began with bells viewed as magical objects. Chinese Shang dynasty bronze founders cast bells covered in the same *t' aot 'ieh* monster mask iconography as are their ritual bowls. The *Nau* became a set of bells, the *pein chung*, with developed musical uses until displaced by the Buddhist bell arriving in China with Buddhism at a time of great political upheaval. The secularization of the bell in Europe is the reverse of the history of the bell in Asia. The bell in Europe developed as a Christian artifact from its earlier use as a magical power to scare away evil spirits. Only when European wealth from a growing market economy allowed the installation of multiple bells in a church tower did the musical possibilities of the bell become apparent. Since the Middle Ages bell founders and bell ringers have attempted to improve the musical performance of the bell by tuning. That is, by tuning the bell within itself and tuning bells in a bell-set to one another. Where ever there is the unique identifiable sound of a bell, as celebrated by the 'Orange and Lemons say the bells of St Clements' rhyme, there is room for the feeling that in a bell sound there is something of the 'voice' of God.

Much of the music written for carillon playing comes from the musical traditions of the church. This is quite natural as most carillons are installed in church towers and have evangelical roles in the rituals of the church. Of course in the Low Countries many municipal buildings also have carillons, and carilloneurs play compositions derived from folk songs and non-religious tunes as well. However, the general spirit of Christianity underpins these communities, and the majesty of the carillon never escapes the sense of this being, like the organ within the church, an instrument for the celebration of divine providence.

Our work on the harmonic bell is recounted in Chapter 4. The polytone of the European bell has now been reduced to the single note of the Australian harmonic bell. The bell, in so far as it has come under control of its designers and founders, loses the magical aspects that, arguably, tied it to its traditional religious functions.

We do not ascribe divine qualities to the piano, instead we think of it simply as a 'musical instrument'. The new harmonic bell and bell groups should be experienced as a musical instrument, like the piano.

So, if now we have secular bells, so what? Secular society needs 'sites of experience' just as religious communities have temples as multi-sensory places in which members of the community can directly and emphatically experience the commonality that binds them together. The musical bell contributes to the multi-sensory experience available to participants in a secular site of experience.

d. New musical experience for the carillon bells

This is a physical instrument inviting and encouraging new musical composition. It is especially attractive, given its just tuning, to composers familiar with digital technology and contemporary musical theory. It stands quite apart from the traditional European carillon. Seven compositions have been, at this time, written for the instrument. Neil McLachlan's composition explores the spatial experience of the bell installation by keeping an elastic beat that opens up space for bells across the installation site to be introduced into the composition throughout its duration. The composition by Terry McDermott has been adapted from one of his works for the Gamelan, and has quite a rousing energy and rhythm to it. Brenton Broadstock's composition is full of passages leading to rousing crescendos in which most of the bells are rung rapidly in unison. The diversity already apparent in the existing compositions is fantastic and augers very well for the rich compositional possibilities our public instrument could perform. Once the web page is up on the world wide web, with a curator appointed to oversee the programming, it will be tremendous to see and listen to the uses the bells will be put to as they ring out over the parkland.

Our newly invented bells do mark a divide with the European bell in some profound ways. The harmonic bell is now able to take its place amongst the other harmonic instruments of the orchestra, and become a full member of musical ensembles. Thus, composers will find a new musical resource available to them.

Many contemporary composers seek new musical experiences. Many of these composers are venturing into computer technology pathways where they can synthesize new sounds. While the use of software to invent new sounds from recordings of actual sounds is certainly exciting, these synthetic sounds are disembodied from the concrete world. How much more exciting is the designing of new sounds using computer technology which are then incorporated in actual instruments making concrete, not synthetic sound. The resulting sounds would then embody the rich complexity and timbral authenticity of the actual world. It

is important to us that the object and its sound should remain a whole experience. That is why we think that bells need to be physically accessible to the public and not hidden away in a stone or brick tower.

Just as the 1920s and 1930s was a period of renewed excitement and curiosity, especially in the United States of America, for the newly tuned carillon, so we hope our harmonic bell will again renew a wider enthusiasm for bell music playing and bell music composition. The decision to tune the carillon to 'just' ratios rather than the more conventional equal temperament scale came from the desire to freshen the hearing of these newly invented bells and for the highest possible consonance to be achieved in each bell. The harmonic bell has achieved the clearest sense of pitch yet in a bell, and to combine this achievement with a tuning system which most exactly finds pitch intervals that are consonant made perfect sense.

There are many possible arrangements of pitch intervals across an octave and the development of equal temperament in the 17th century, where an octave is divided into twelve tones, seven full and five half tones has become the universal model to which most instruments are tuned today. While this equal tempered scale has the advantage of modulation of a melody through key changes, because every octave has the same pitch ratio structure, the disadvantage is that every pitch in the octave is a little flat or sharp of its most consonant frequency. When Harry Partch sought the naturally occurring moments of pitch consonance in an octave he discovered a possible 43 ratios, or pitch intervals.

"Just tuning", writes Neil McLachlan, "is a musical tuning system that uses interger frequency ratios of harmonic sounds to maximise consonance. Harry Partch (see 'Genesis of a Music') describes a tuning system that uses all possible ratios of integers up to 13. Most musical systems that use instruments producing harmonic sounds have evolved theory using integer ratio tuning".(Hasell & McLachlan 2001, www.ausbell.com). Harry Partch defines just tuning as a "system in which interval - and scale - building is based on the criterion of the ear and consequently a system and procedure limited to small-number ratios; the initial interval in Just Intonation is 2/1, and stemming from this are the wealth of musical intervals inherent in small-number tonal relationships." (Partch 1974, p. 71)

The tuning structure Neil McLachlan designed for the Federation Bells uses all possible ratios of integers up to 5. He writes about the just tuning used in the Federation Bells Carillon. "Since Western music was based on similar consonant intervals many of these ratios are close to the notes of the chromatic scale. However because they are not equally spaced only a limited modulation of melodies and chords can be achieved." (Hasell & McLachlan 2001, www.ausbell.com)

So with our newly invented musical bells tuned to just interval ratios we believe that this instrument will demand both the composer's attention and magnify the listener's response to bell music.

e. Public access and participation in bell installation

A fundamental desire in our work on bells is that their experience be as accessible to people as it may be possible to arrange. We encourage people to participate in performances of bell music, to collaborate in the creation of such experiences and, whenever possible, to make music with the bells we have designed, cast and tuned for such purposes.

Because the bells are rung electronically, people around the world will be able to write music for this carillon. Either through ausbell.com or the Federation Bells web page (which is in the process of being posted) the sound file of every bell can be downloaded along with software required to compose with. Once a work is composed it can be emailed to the curator who will determine which compositions are sent to the installation for playing. The instrument will play various compositions at daily set times (set by Melbourne City Parks) but we intend it should also play on special occasions such as a festivals, or in conjunction with musical and dance ensemble works. A keyboard can be patched into the MIDI control and the bells can be played directly.

In its everyday mode, the Installation is a delightful and exhilarating experience for those who wander through, or sit and enjoy the performance. Currently it plays the seven compositions in three playing times throughout each day. The sounds waft up toward the city and down along the river's banks.

As this is an instrument accessible to musicians through the Internet, we are excited to see what use is made of it by innovative and energetic world musicians. It is our desire that a number of important musicians are invited to compose for the instrument and their works played in a musical festival for an audience at the bell installation. Naturally, we hope to be invited to design and cast other bell sculpture Installations for other cities around the world. New musical and sculptural possibilities would be explored in these public instruments. So too are we looking forward to exploring further the kinesthetic, aural and physical potential in other multi-sensory installations. The Federation Bells Carillon was opened with a public performance of the seven Melbourne Festival commissioned compositions on Australia Day, 26th January 2002.

2. The 2001 Handbell project

a. Description of the hand-bell project (fig 46, p.129)

The handbell project was devised by Jonathon Mills as a work to mark the finale to the May 2001 Centenary of Federation Festival. Brenton Broadstock was commissioned by the Melbourne Festival to compose a new work for massed brass bands and 2001 handbells. Australian Bell was invited to design and cast 2001 tuned handbells for the project. Due to unforeseen events, the performance took place as part of the October 2001 Melbourne Festival, and was staged at the recently refurbished Sidney Myer Music Bowl on the 3rd of November. (CD. Track 12.) The performance of this work was an amazing and moving experience for the audience, the amateur bell ringers, the professional percussionists, the 100 brass band members, and for all those involved in the project at Melbourne Festival.

Michael Shmith of 'The Age' reports Jonathan Mills as saying, "The most chilling sound I've ever heard in Melbourne was at the state funeral of Weary Dunlop, who was a close family friend....There was a slight wind that carried the very gentle sound of the clinking of medals... It gave me the idea to have this large orchestra of tuned bells you could play very softly." (Shmith The Age 23 May 2001) This is the origin of the 2001 handbell project.

The handbells are tuned in a two octave chromatic scale of 24 bells, from E to D#, and they are stored, transported and can be played in a group of 4 boxes that make up the set. The boxes can be arranged so that major and minor keys are set out and played in sequence (as they are arranged on a piano). We have supplied 80 sets of the handbells. In all 2100 bells were machined, with some rejected for casting porosity problems, as well as a quarter tone set made for Constantine Koukias' concert. The bells are chimed with a 30cm long 20mm diameter wooden dowel.

Billmans foundry in Castlemaine began the job of production line casting the 2100 bronze bell lugs. Porosity in the first four hundred, which only showed up when the bells were being machined at Harrops Engineering, meant that Billmans had to recast these and research its moulding, sprue and casting systems. Bell blanks were shipped to Sydney for X-ray testing. They re-melted these first bell blank castings, and modified the moulding boxes and again started the production line casting of bell lugs.

When we were designing the overall project we settled on casting in silicon bronze rather than more traditional bell metals, because of its excellent casting properties, and its tendency to bend rather than to crack. Harrops Engineering in Bell St Preston have the most up-to-date CNC lathes (computer controlled lathes). (fig 38, p.127) Here they first machine, to very

high tolerances, the outsides of each bell in a production run, and then cut the inner profile of each bell. About 65% of the bells came off the lathe in tune. The others were affected by porosity, much of which could not be seen by looking at the bells. These less than perfectly tuned bells were then transported to 'North Central Engineering' in Castlemaine where they were fine tuned on a lathe.

Any handbells requiring more extensive tuning than this were tuned by hand on a small lathe at the 'Australian Bell' foundry in Mia Mia. Removing metal from the waist of the bell flattened the bell's pitch, while cutting metal from the lip of the bell, that is, shortening the bell, raised the pitch of the bell. This work was carried out by Neil McLachlan, Alex Day and myself.

b. Opportunity to advance the use of the bell in contemporary works of art.

Having experienced Brenton Broadstock's brilliant composition and performance of 'Gates of Day' in November 2001, and the beautiful and moving work of Constantine Koukias in May 2001, I am convinced that other composers will avail themselves of this opportunity to create new and innovative musical works that incorporate these bells.

Constantine Koukias' composition is titled 'Pentekostarian – Prayer Bells for Federation', and was performed during the Centenary of Federation Festival on May 27 2001. The work consisted of three male chanters from the Russian, Hebrew and Greek traditions singing sacred texts with a chorus of male singers ringing 66 specially tuned (quarter tone interval) handbells. A loop reel to reel tape played back the sounds on delay to create a remarkable and powerful performance on the night. The bells were bowed as well as rung and rubbed to create quite mysterious sounds. Jeff Pressing's review in 'The Age' newspaper captured the audience excitement with this performance. "Only in the final brief section was an attempt made for the traditions to interact," he wrote, "Given their geographical proximity, such processes might have gone deeper. The appreciative audience didn't seem to share my doubts." (Jeff Pressing The Age 29 May 2001) I found the performance moving and the combination of the chanting bass voices and bells a profoundly religious experience quite unexpected (by me at least) for these most secular of bells.

Brenton Broadstock's 'Gates of Day' had a build up of over three months with regional brass bands and bell ringers practicing the piece. After a number of regional concerts the 100 piece brass band and 400 amateur bellringers and 50 trained percussionists (VCA and Melbourne University students) gathered together for a rehearsal at the Robert Blackwood hall at Monash University the weekend before the November 3 performance. It was at this rehearsal that Brenton could finally see the project working, he told me. At the Myer Music Bowl on the following Saturday, after a number of brass band compositions by the conductor Squadron Leader Graeme Lloyd had been performed, the band struck up 'Gates of Day'. It was simply

amazing! The 2001 handbells were banked up on the stage and extended out along the edge of the bowl into the audience. At one point the bellringers formed a huge circle that included a large part of the audience, and at another point a Navy marching band, played as they marched across the front of the bowl and through the audience. This was the most dynamic, complex and spatial musical experience I had ever experienced. At the end of the piece everyone spontaneously stood and applauded the musicians and composer.

Joel Crotty, 'The Age' newspaper music critic, shared his similar experience with his readership. "*The Gates of Day*," he wrote, "is an excellent example of a new score, written in a non-patronising manner, which is firmly planted within the capabilities of community musicians rather than in the intellectual headspace of the contemporary music fraternity. This massive work was performed on the last afternoon of the Melbourne Festival in the newly renovated Myer Music Bowl. The Footscray-Yarraville, Hawthorn, Kew, and Moreland-Brunswick brass bands along with some of the bellringers were stationed on the stage while others with bells in hand gathered up the sides of the arena. Subtle nuance was disregarded in favour of rhythmic buoyancy and loud, sometimes familiar, tunes. Coupled with this was the Charles Ives-effect of having a military band march playing through the arena while the others were still in full swing. This chaotic parade brought home not only the sense of occasion but also a sense of fun. When the composer moved on to the stage after the performance, many in the audience were on their feet, and hopefully a myth was dispelled that good composers were dead composers. And it also demonstrated that with good planning, communities in regional Victoria are able and willing participants (as bellringers in the Broadstock score) in these large-scale events." (Crotty, J. *The Age*, December 31 2001)

These bells, with their harmonic tuning, invite new musical experiences. The 80 sets are stored at the Melbourne Museum and are available for interested parties, such as schools or community groups to take on loan, and represent a new musical resource for Victorians who seek new musical experiences.

The performance of Brenton Broadstock's Centenary of Federation composition 'The Gates of Day' was a magnificent experience of contemporary art in Melbourne.

The creation of the harmonic handbell early in our undertaking of the three projects was important for the success of the design of the orchestral bells and the bells in the carillon. The particular shape of the handbell was arrived at through my choosing a polystyrene coffee cup as the bell model for Josef Tomas from Advea Engineering to attempt to optimise a harmonic bell set of partials. This shape, a frustum of the cone, happened serendipitously to be the correct one for finding the harmonic array of partials for the handbells. Further work was undertaken by Neil McLachlan and Behezad Keramati Nigjeh to discover the conic angle needed to achieve a harmonic bell to seven partial frequencies.

c. Secular uses of the handbell

The handbell has a very long association with religious ritual, the priest's bell being an object of sacred purpose and power. In both the East (called *ghanta*) and Western (called *clogga*) faiths the passage of every sacred ceremony is articulated with the ringing of the handbell. The development of untuned handbells such as school bells and the playing of tuned handbell sets to practice the ringing of larger bells or as bell music in its own right has brought the handbell some distance from its mystical origins. As a bell reduces in size it produces fewer sounding overtones, and a small handbell, if the profile remains true, will sound only a single pitch. Conversely, as the handbell becomes larger, more overtones in its pitch can be heard.

The development of the harmonic bell as a handbell means that handbells of any scale will produce a single clear pitch to the ear, and this means that they can be used in orchestral compositions without the danger of discordant overtones disturbing the other instruments in the performance.

This is a new musical instrument resource available to the general community of Victoria. Such a public store of available handbells chromatically tuned for musical performance contrasts sharply with the ancient mystical attributes ascribed to the handbell. "The *clogga*," writes Price, "served the missionary monk as an instrument of signal, a talisman, and a weapon. It was rung to attract a gathering much as the Salvation Army uses handbells today. It kept away evil spirits. It made curses stick." (Price 1983 p 83) Our contemporary musical handbells are available to all and only await their use in whatever creative musical composition and performance people might devise for them.

c. New musical experiences for the bell

The harmonic handbells, like the other harmonic bells, are available to composers who may find new musical opportunities using them.

e. Public access and participation in bell performance

One of the most impressive aspects of the handbell project has been the inclusiveness of the program. Under the guidance of Regional Arts Victoria, communities across the state called for interested people to become bellringers. They collected bell-ringer groups across regional centres such as Geelong, Portland and Bendigo where they committed to a three-month program of learning to perform the composition under the tutelage of Graeme Leake and Patrick Cronin, the project leader. As explained elsewhere in this thesis, I experienced the

first meeting of the Bendigo group, and the experience was surprisingly wonderful with a refreshing spirit of fun and excitement shared amongst those present. Squadron Leader Lloyd conducted the final performance of 'Gates of Day'. He stood on the stage in front of the professional musicians. However, the amateur regional bell ringers were conducted, from amongst the audience, by Mr Leake using signals and signs they had devised between themselves.

Participation indeed became collaboration for those interested citizens who committed themselves to learning to use the handbells and to learning the composition, and the effect of this commitment on the performance contributed, in my mind, much to the ecstatic experience we all felt together in this most special of events. At the end, all of us, from Melbourne Festival personnel to the people involved in the creation of the bells, were crying tears of joy.

3. Orchestral Chimes

a. Description of the Orchestral chimes project. (fig 42, p.128 & fig 45, p.129)

While this project, of the three completed for Melbourne Festival, has little direct bearing on the research into sites of experience that is the subject of this thesis, I would like to summarize this work to complete the reader's understanding of the bell commission.

Melbourne Festival invited us to design and cast an even-tempered, chromatically scaled set of bells for the Melbourne Symphony Orchestra. This was expected to be a two-octave bell set. The Orchestra has a set of tubular bells, that is thin brass tubing cut to tuned lengths, and a number of European bells they use for sound colour where a piece calls for the use of bells. The Orchestra would, on the surface, seem to be well endowed with bells already. The problem, however, with tubular bells, is that they do not have harmonic overtones. They can be tuned to a pitch, but their partials are inharmonic, and as all of the other instruments in an orchestra have harmonic overtone, from vibrating strings or columns of air, the discordant tubular bell partials reduce the sonority of a performance in which they are included.

Our harmonic orchestral chimes provide the Melbourne Symphony Orchestra a unique set of musical bells whose harmonic overtones fit with the harmonic overtones of the wind and string sections of the orchestra. They are the first of the 'Idiophonic' group of musical percussion instruments to be fully integrated. (CD. Track 17)

The stands for the bells supplied for the original performance was replaced with a curvilinear frame designed to house all of the orchestral bells. The orange colour chosen was an Oriental hue, in homage to the Chinese *pian chung* tradition to which this set of orchestral chimes makes direct reference. The 24 bells start at G and go to F#.

Ross Edwards composed a Centenary of Federation Symphony, 'Symphony No 3', which included our harmonic orchestral bells.(Fig 42, p.128) The MSO recorded the composition at the Blackwood Hall at Monash University and later performed it, in May 2001, at the Melbourne City Council along with Philip Glass's composition using the newly restored city organ and didgeridoo. We supplied the eleven orchestral bells required for this performance and a number of handbells that the general members of the orchestra played during a section of the work. Ross Edwards wrote of the work: "This Symphony combines Australian birdsong and rhythms from the natural world, with plainsong, Aboriginal chants, and references to the musical cultures of our near neighbours in South-East Asia. At the end of the work the orchestral chimes and bells will ring out jubilantly in celebration of the centenary of federation, the new millennium, and as an expression of hope for the future as Australia enters a critical new phase." (Melbourne Festival Press release)

4. The collaboration between Hasell & McLachlan

In 1990 'Gonghouse' invited me to work with them in the casting of 30 gamalan bronze gongs at the Victorian College of the Arts where I lectured in sculpture. Gonghouse was a percussion/dance ensemble group interested in developing new musical forms by tuning bells and gongs from recycled waste materials such as gas bottles and motor car hubcaps. They explored Western and Eastern musical traditions in their work and shared a love of the Indonesian percussion ensemble, the Gamelan, which inspired their work.

My sculpture had developed from the image of an island rising from the sea, such as the 'Raincatcher. (fig 40, p.127) into cast bronze bells along the same theme. (fig 39, p.127)

In 1995 I won a commission for 'Vision Australia' for the celebration of the centenary of the foundation of the Association for the Blind. This project is discussed in chapter 5.

Neil McLachlan made contact with me and I told him about my bell commission. As it turned out, Neville Fletcher, editor of '*Acoustics Australia*', had suggested to Neil that the tuning of gongs might be aided by exploring the F.E.A. method used by Lehr to design a major third bell, whose findings were published in the spring edition of *Music Perception* magazine, 1987.

Melbourne University had F.E.A. software Neil was able to access, and using this software he devised three bell forms for the Tilly Aston Bell Installation whose overtone, or partial pitch ratios were tuned to one another. Using fairly crude translation processes to achieve the outside profile of each bell, we turned up (strickled) three clay patterns, one for each bell. These clay shapes were moulded in plaster, and from these moulds a wax of each was

taken, with care to ensure the computer predictions for metal thickness across the profile of each bell was achieved, plus a percentage for metal shrinkage.

The three bells were cast in my studio in Mia Mia in the summer of 1995. Each bell has a different shape, and we very loosely thought of them as European, Asian, and a between bell in form. In this way we posited the idea of designing bells which referenced both the long European bell tradition and the even more ancient Asian bell tradition, with entirely new bells, the Australian Bells.

The cast bells were analysed and found not to be completely accurate to the partial tones predicted, but amazingly close, given the obviously crude methodology we had necessarily used to design and cast the bells. These bells demonstrated to us that it was possible to design new musical bells. We shared an interest in sound sculpture and of working in community arts. Our journey, over the past seven years, of learning about the design and casting of bells has been, and continues to be, a very interesting learning curve for us both.

5. Conclusion

The Federation Bells Carillon at Birrarung Marr Park in Melbourne, Australia is like no other in the world. As a musical instrument it explores musical possibilities of the bell so far in advance of current world practice that we expect a certain resistance from the traditional bell community as they digest the advance this bell design has made. Our bells are not only tuned within themselves and to each other in the set, but the tuning is extraordinarily inventive and new and accurate. Neil McLachlan and I, as co-inventors, have patents under review in the USA and Europe on the harmonic bell design. The harmonic bell has the highest pitch salience to be found in any bell yet, and represents, I have suggested, the climax of the European bell's development toward a serious instrument for musical purposes. Our polytonal bells, including the three-tone bell, demonstrate that bells can be cast with a complex musical character previously unsuspected. Naturally we hope that our work is taken up, both as musical instrument, (as in harmonic bell carillons and orchestral chimes and handbell sets), and as bell sculpture installations. If our work is accepted, then campanology surely will take its place as a renewed artform in contemporary cultural practice.

The relationship between science, technology and music has been one that Harry Partch spent a lifetime trying to develop by designing and building unique instruments. "The science of sound should be of inestimable benefit in the design and construction of musical instruments," he wrote in the 1950s, "and yet with the exception of the important but small work of Boehm in connection with the flute, science has not been extensively employed in the design of any instrument." (Partch 1974, p. 96) Naturally, in the years since much has been achieved in instrument making and design from the application of scientific theory and

research. The great and rich possibility of applying science to the musical arts was very clear to Partch. "When the artist," he wrote, "the artisan, and the scientist shall all work together in unity of purposes and resources, then unsuspected developments and perfections will be realized." (Partch 1974, p. 96)

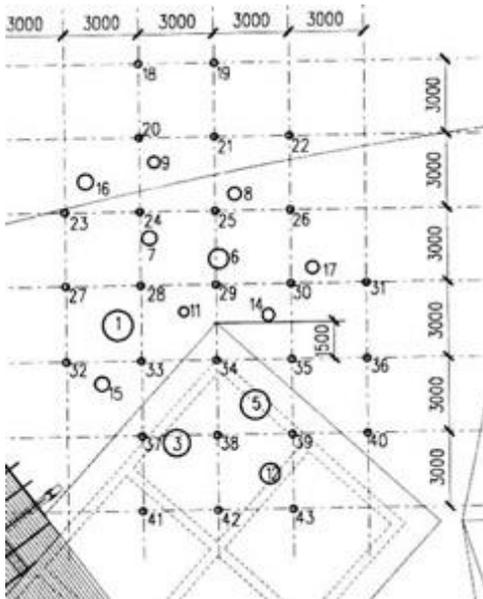
The brave and supportive work of the Melbourne International Festival team, and Jonathan Mills especially, has allowed the resourcing, and the bringing together of aspects of the 'artist, artisan and scientist' in all, (the great many clever individuals), who have collaborated on these projects. The result, just as Partch predicted for this amalgamation of talent and effort, is a remarkable advancement in campanology, and its contribution to contemporary cultural practices.



Figure 38 'Handbells from the CNC lathe



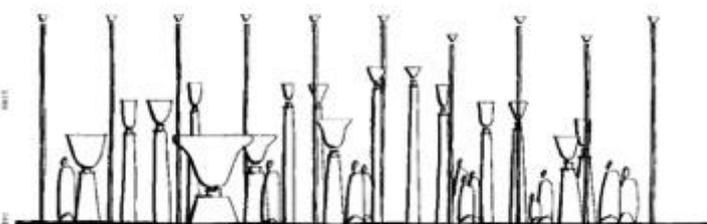
Figure 39 'Armageddon Bell



Site plan of Federation Bells Installation



Figure 40 'Raincatcher' water sculpture
Installed Gisbourne NZ.



Elevation drawing for
bells by Swaney Draper

Installation bell profiles profiles

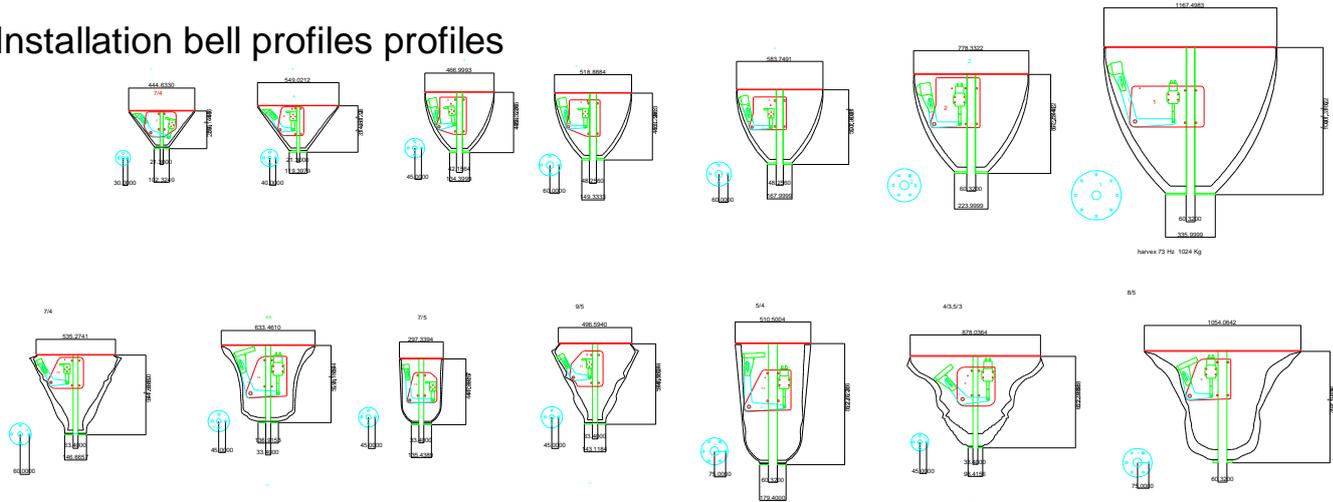


Figure 41 'Federation Bells in Birrarung Marr Park



Figure 42 'Orchestral bells' as used by the MSO



Federation bells installation at night

Figure 43 Federation Bell Installation



Figure 44 Recording of Edwards composition by MSO



Figure 45 Testing MSO harmonic chimes with percussionists from the Orchestra



Figure 46 Photos from the Broadstock composition 'Gates of Day'.



Chapter 7 THE VICTORIA POLICE MEMORIAL INSTALLATION.

“Sculpture, as we have already noted, is closely allied with architecture. I think it is open to doubt whether the sculptural dissociated from the architectural ever will reach great esthetic heights. It is difficult not to feel something incongruous in the single and isolated statue in the public square or park. Surely statues are most successful when they are massive, monumental, and have something approaching an architectural context, even though it be but an expansive bench.” (Dewey 1934, p. 232)

1. The Tilted Arc controversy
2. The Victoria Police Memorial
3. Shrines of Remembrance
4. Conclusion

1. The Tilted Arc controversy

The controversy surrounding Richard Serra's installation, 'Tilted Arc', in the Federal Plaza in downtown Manhattan in 1981 has become the classic example of artwork imposed on the community, and the community organising to have it removed from their public space. After being involved in wrangling with the National Trust, the Australian Garden History Society and the RSL (returned Servicemen's League) over the aesthetic amenity of the Victoria Police Memorial, I feel that I have a better grip on these issues in public space art.

The dispute raised by the National Trust and allied organisations seems to revolve exactly about the confusions between what might be considered sculpture and what is considered to be architecture. The National Trust were expecting a 'sculpture', in the style of Peter Corlett's 'Weary Dunlop' statue (fig 47, p.148) for the Victoria Police Memorial in the King's Domain Park, and instead found 'a piece of architecture' had been commissioned for the site. While Dewey, in the quote above, has no doubt that the relationship between sculpture and architecture is an inseparable one, the general citizen has a strong sense of the distinctions to be drawn. I will expand upon the controversy concerning Serra's 'Tilted Arc', and then the history of controversy surrounding the collaborative design Marcus Ward and myself entered for the Police Memorial design competition, and won.

Serra's installation, a 120 foot long wall of welded steel, 12 feet high and weighing 73 tons won the commission set by the General Services Administration, which is part of the Government's 'art-in-architecture' program, for an artwork to grace the Federal Plaza site. (fig 50, p.147) Serra's wall curved across the site, and leaned inwards, presenting a threatening form to passing citizens. This threatening aspect of large, seemingly dangerously balanced

plates of steel is a common motif of a Richard Serra work. Gablik quotes the art critic, Barbara Rose's writing for *Vogue* magazine; "Serra demands absolute autonomy for his art; his works are intentionally self-sufficient. They stand upright and alone, isolated in positions of heroic rectitude, as if the very posture of standing without support, of solitary rootedness, is an expression of resistance to external pressures." (Gablik 1998, p.63)

The work became unpopular with the office workers who found it blocking their path across the plaza. Gablik includes a quote from an employee of the U.S. Department of Education: "It has dampened our spirits every day. It has turned into a hulk of rusty steel and clearly, at least to us, it doesn't have any appeal. It might have artistic value but just not here...and for those of us at the plaza I would like to say, please do us a favor and take it away." (Gablik 1998, p.64) A petition for its removal, signed by thirteen hundred employees, led to public hearings in March 1985. Serra sued the government for thirty million dollars because, he claimed, it had "deliberately induced" public hostility to the Installation. The action was structured in the following way; ten million dollars for his loss of sales, ten million dollars for harm to his artistic reputation and ten million dollars in punitive damages for violating his rights.

In July 1987, the Federal District Court ruled against Serra. On Saturday, March 11, 1989, the sculpture was removed after the U.S. Court of Appeals also found against Serra. Gablik quotes Serra's comments to the New York Times: "This government is savage. It is eating its culture. I don't think this country has ever destroyed a major work of art before. Every work out there is in jeopardy, at the government's whim....They say their property rights grant them power over my moral rights. This is not true in every *civilised* Western country." (Gablik 1998, p.65) "What the Tilted Arc controversy forces us to consider," writes Gablik, "is whether art that is based on notions of pure freedom and radical autonomy – without regard for the relations we have to other people, the community, or any other consideration except the pursuit of art – can contribute to a sense of the common good." (Gablik 1998, p.66) Gablik contrasts the Serra installation with the work of a performance artist Mierle Laderman Ukeles who, in one work, became an unsalaried artist-in-residence at the New York City Department of Sanitation. One of her projects was called 'Touch Sanitation', in which, over eleven months, she personally shook hands with every one of the 8500 employees in the department, and thanked each for their personal contribution to the livability of New York City. This is public art, says Gablik, which is 'relational' and community affirming, rather than divisive as was the Serra work.

2. The Victoria Police Memorial.

The Victoria Police Memorial has taken one year, since the installation was selected from the short-listed five proposals, to get a permit, and another five months to begin construction. Melbourne City Council has found great difficulty in making the necessary arrangements for the project to begin. This is in part due to the planning objection taken out by the National Trust of Victoria, and in part, I think, to the confusion in the various departments of Parks and Gardens, City Planning and City Projects in distinguishing the nature of the proposal. Was it sculpture or architecture, and, if architecture, should the scale of monuments be checked in the Kings Domain parkland, designated as a place for community monuments and memorials? The worry for the city, as well as for Marcus Ward and myself is, will our Memorial, with its difficult birth, share the fate of 'Tilted Arc' and more locally, Ron Robertson Swann's 'Vaults' (fig 52, p.147) of being removed prematurely from its installed site? Each of these works was designed as site specific. Both of those unpopular public-space sculptures quickly developed nicknames that denigrated them. Serra's Installation became popularly known as 'the Berlin wall' and Swann's was called 'the yellow peril'.

The origin of the project for a memorial to Police killed whilst on duty came from the tragic murder of two police members. A public call was made in an Editorial of the 'Herald Sun' newspaper, after the killing of Sgt Gary Silk and Sen-Constable Rodney Miller in August 1998, for a competition to design a Police Memorial to all police officers who were killed on duty. The newspaper's earlier call for a monument to 'Weary Dunlop' at his death had succeeded in galvanising public opinion and had resulted in a public space sculpture competition, and finally in Peter Corlett's wonderful statue of Weary Dunlop in the King's Domain Parklands on St Kilda Road. (Fig 47, p.146)

The siting of this memorial sculpture in the King's Domain Parkland fitted the City's King's Domain Parklands Masterplan that had been completed in April 1997. In the Masterplan "King's Domain" document, a portion of the park close to Shrine Reserve had "become repositories for monuments associated with the war memorial as the commemoration of individuals is not permitted within the Shrine Reserve." (King's Domain Masterplan. City of Melbourne, p. 26)

The commission was advertised in February 2000. Marcus Ward and I submitted our expression of interest in April 2000, and were notified, in June, that our proposal had been short-listed. We attended a briefing with the other five short-listed design teams, and were advised that our stage two submissions, with budgets and maquettes, would be required in July, and that we would attend an afternoon when each team would present their proposal in turn. While we understood that the preferred proposal would be announced that day, it was in fact announced on the 29th of September, 'Blue Ribbon Day'. Blue Ribbon Day has been set

aside for remembrance of police killed in the performance of their work. The day was declared after the murders of Sgt Gary Silk and Sen-Constable Rodney Miller.

On the morning of the 29th we were informed that our proposal had been selected for construction. (fig 51, p.147) We were not required to be at the Police Academy for the public announcement that afternoon. In the following months we were asked to provide more detailed drawings of the proposal, and for reasons not fully clear to us, the project was stalled. The notice for a planning permit was finally brought before the council in February 2001. The original completion date had been March 2001, but by March, the National Trust had stated its objection to the project on very unclear grounds, but including cost, size of the proposal, inappropriateness of the design on aesthetic grounds and most of all, location. The main objection seemed to be that this was the wrong monument, ('surely a "sculpture" would be better') in the wrong place. Their representative, with whom we, along with all the stakeholders in the project, had a number of meetings, also objected to our proposal's "cutting into and blocking off public gardens" and also to it being sited too close to the Weary Dunlop statue.

The Australian Garden History Society joined in the objection. Our meetings with those who objected to our proposal made little headway. We seriously amended our design to accommodate those of their criticisms that related to the design's impact on the garden environment. The length of the wall was contracted from 18 to 16 metres, its height lowered from 3.6 to 3 metres and the bluestone seating reduced from four tiers, back to a step and single wall that could be sat upon. The aim was to reduce the sense of massive masonry and allow more greenery to show through the openings from the front. The president of the National Trust attended the last meeting we had with them and would not be persuaded to confirm either the proposal or their official objection, but said that the council and the Trust "would have to agree to disagree" on the matter.

But on the last day objections to the planning permit could be submitted, the National Trust with the RSL officially objected to the issuing of a planning permit for the project. The Herald Sun editorial of Thursday 5th of April, headlined with "Misguided trust" saying: "The Victorian National Trust must rethink its continued objections to the memorial to police killed in the line of duty. The monument has already been modified to satisfy the Trust. Trust Chairman Randall Bell still insists that the St Kilda Rd memorial would be "massively oversized", would dominate the Weary Dunlop memorial and become an embarrassment to the city. But the Trust's aesthetic nit-picking over a memorial to the 136 officers who gave their lives to protect Victoria's citizens is far more embarrassing." (Editorial, Herald Sun, 5th April 2001)

A flurry of debate took place in the newspapers. Reporters Andrea Carson and Padraic Murphy of 'The Age', wrote on April 21: "The National Trust and the RSL have joined forces

to oppose a police memorial planned near the Weary Dunlop statue on the edge of the city's King Domain gardens. The National Trust lodged its appeal against the 18-metre-long and three-metre-high memorial in the Victorian Civil and Administrative Tribunal yesterday. The appeal application could jeopardise the memorial's deadline, Blue Ribbon Day, on September 29, the day that commemorates police who have lost their lives while on duty. RSL state president Bruce Ruxton said last night he would back the National Trust because the proposed memorial was too big and too close to the statue of Weary Dunlop. "I fully support a memorial to the police who have been killed," he said "However, I don't think it is right that it should go being the size it is next to Weary Dunlop. With all the gardens we have got, there is plenty of space. Why would they put it there for?" Trust chairman Randall Bell said that MCC guidelines for public memorials were too "vague and uncertain" and did not stipulate details such as size and height. "In such a prominent position you should not have a monument like this, which is just far too big," he said. "It dominates the location and dwarfs Weary Dunlop." He said the memorial also set a precedent that allowed other deserving community workers, such as the fire-fighters, coast guards or perhaps nurses, to demand a monument to commemorate their members who had lost their lives on the job. In a brief statement Victoria Police assistant commissioner Bill Severino said he was bitterly disappointed by the decision. "Victoria Police has done everything right to get this community memorial built." He said. The police association also condemned the decision, and expressed fears the memorial might miss Blue Ribbon Day completion date in September. "This kind of memorial is entirely appropriate" said the association's assistant secretary, Graham Kent. "It is disappointing that it will be held up in this kind of bureaucracy. In our view the memorial is not too big, but these matters could have been resolved without going to VCAT." (Murphy, The Age, 21 April 2001)

Nothing more happened while we waited for the proposal to pass through the Victorian Civil and Administrative Tribunal, at an unspecified date in the future. We considered and planned how we would argue, at the Tribunal, the aesthetic contribution this proposal would make to the built environment of the city. Here was my chance, in court, to put my theory of public-space as 'sites of experience'. In May 2001 however, the council persuaded the RSL to remove its support of the objection. It did this by taking the RSL president to the site and showing him just how unaffected the Weary Dunlop statue would be by the proposed memorial. Soon after, the National Trust withdrew its objection. The retraction was reported in 'The Age' June 1st 2001 in the following way: "The controversial police memorial planned for St Kilda Road will go ahead after the National Trust yesterday withdrew its appeal to the Victorian Civil and Administrative Tribunal. The trust claimed the cost of fighting the memorial would be too expensive and against the community's wishes. A meeting of the National Trust, Melbourne City Council, Victoria Police and the RSL on Wednesday gave the memorial the go ahead. "We met....in the hope of avoiding the cost and trouble of a VCAT hearing" said trust chairman Randall Bell. "The parties failed to reach agreement. [but] rather

than have controversy overshadow this sensitive memorial the trust has decided to withdraw its appeal." Victoria Police had already agreed to make the memorial smaller and to discourage skateboarders by surrounding it with gravel. Police Assistant Commissioner Bill Kelly said: "The force is delighted the community memorial will now be built. It's unfortunate there has been an unnecessary delay." (The Age, 1 June 2001)

A contract for the Installation was stalled as more drawings and construction details were sought by the council to describe the project to the finest detail possible. The council feared that construction overruns would blow out its budget for the project, and that the controversy would increase the public scrutiny of the Installation. The quality of the workmanship had to be at the highest level, and the budget for the project must not be breached, at all. The city wanted Kane Constructions, the company nominated by us to build the work, to place an unusually high 4 metre hoarding around the project to keep the concern of the public to a minimum during the construction phase.

The overwhelming problem for the council and for the National Trust, has been the illusion of what constitutes a work of sculpture. The statue of Weary Dunlop has guided their conception of what might constitute a suitable police memorial. The park has a number of nineteenth century public-space works of art, such as royalty on horseback, and 'Blamey on his Jeep door' sculpture. These heroic bronze sculptures fuelled this confusion. For the National Trust, our proposal was not a 'sculptural' memorial. The police, on the other hand, clearly had a utilitarian set of functions that the memorial needed to serve, including services and the trooping of the police colours, which inferred an architectural solution to the brief. All of the short-listed proposals, except perhaps one, were clear examples of architecture rather than a sculptural object, even though the commission had been advertised in 'The Age, Extra', the usual place to notify visual artists and sculptors of calls for expressions of interest for public space artwork.

For the council this confusion expressed itself in their wavering over the kind of contract that was needed. I understand that their initial expectation was that this would be an 'artist type' contract, where the work would essentially be fabricated off-site and installed in the park at completion. The Architectural aspect of the project necessitated a 'design and construct contract', with the regular bonds and insurance conditions, as if this was an office block construction in the city centre. Marcus and I were unable to offer the city the sorts of financial assurances they required for this type of contract, and our construction company undertook the contract with the city. We became subcontract artist/designers to KANE for the project. None of this was easily arrived at, with the council being mostly reluctant to enter this type of arrangement. In this mode, of regular meetings and contacts between the artists, KANE Construction's project manager and MCC, months slipped by, with weekly meetings in the city but without a contract surfacing. Finally, at the end of August, everyone was agreed on

the format of the construction and the project, finally, gained some momentum. The project was officially opened on the 26 September with the turning of the first sod in front of the media. Work on the site began in February 2002 and was completed on the 27th June 2002 and opened on the 5th of July.

The other finalist designs were also architectural in their format because the brief made it clear that the memorial space was to be used not only as a place of quiet reflection, but also as a site where the police would gather and hold ceremonies. This functional aspect of the memorial made the design of the space a critical aspect of whatever one proposed. People would mass, and move through the site. Ritual ceremony would be staged. The site needed entry and exit points, and stations within the site at which moments of significance and emotion would be enacted. This was not to be a 'symbolic' site but, rather, this was to be an operating temple for the police and community. Marcus and I considered the experience within and across the installation. We brought together the often-separated sensibilities of sculpture as an object in space with the architectural sensibility of space as temporal experience. You travel, it is supposed, through architectural space, and around sculptural form. As a multi-sensory installation, however, the experience of the site does not need to be dissected into the various practices of architecture, landscape architecture and sculpture. Our collaboration has been a very natural and enjoyable experience shared.

Marcus Ward is an architect whose practice is largely concerned with the design of housing using natural materials and sustainable environmental principles. He is a strongly committed advocate for our community's ecological values. We have submitted a number of collaborative proposals for public-space commissions over the past ten years. That our proposal has been selected for the Victoria Police Memorial has been very exciting for both of us. This is a major public-space project, and, from its conception, it has been designed from the perspective of the 'experiential' and natural materialism that is fundamental to both of our respective practices in architecture and sculpture.

Like the Federation Bells Installation, this memorial is based upon the design of multi-sensory public space as outlined in this thesis. Such public spaces are designed from the perspective of the individual who enters and moves through the installation. Both are 'spaces' that convert to 'places' as the visitor converts to 'participator'. Once inside the installation, a person responds to the sensory stimulation of the installation, and participates in the intuitive and felt resonance that the organization of the space and its elements intend to generate.

We have very consciously played with simple elements in the design to find wall opening shapes, wall shapes and scale (though, as explained, this has been somewhat modified by our dispute with the National Trust) to intrigue and then 'include' those who enter the space.

The question we returned to again and again was this: If we changed this or that, what effect would the change have on the feelings experienced within the Installation? What would it feel like? In such leaps of intuition and imagination, we set our hearts on certain material sequences, formal shapes, views from certain angles across the site and all the other attachments that congealed into the final proposal.

Importantly, our collaboration is based on a close and long relationship founded in the practical arts of architecture and house building. Although we were friends when we taught together in High Schools during the 1970s, Marcus Ward went on to study architecture as I went on to study sculpture. We worked together in the design of the stone house which my partner and I built and continue to live in (and continue to build). He periodically joined with us in the physical labour of cutting and laying stone for it, as well as helping with knowledge and labour in other building processes. I have also, at times, worked with him on his home building projects.

This history of house design and physical construction between us has deeply coloured our perception of designing for living spaces. A house, if it is to be a place of sublime meaning and endless pleasure, must be built around the sensitivities and aesthetics of those who are to inhabit and use it. A generic building can be an abode only for those who pass through it. It is the same for public-space artwork. It must be a place rich with the living experience of those who use it. It must be useful and used.

Jonathan Hale's 'The Old Way of Seeing: How architecture lost its magic (and how to get it back)' laments the loss of a previous sensibility in architecture where, he suggests, rules of proportion and natural harmonies in design were normal. He wonders at the loss of confidence so evident in awkward and ill-proportioned contemporary architecture. This loss of confidence in intuitive and playful design began, by his reckoning in North America in the 1830's with the classical revival style. This lost confidence in intuitive designing has led to imitative fashion in the designing of buildings. Hale calls for architects to trust their own instincts and to disown fashionable and shallow ideals, in favour of creating spaces as natural and unforced as the work of Frank Lloyd Wright. He calls for an architecture that is composed with the kind of eternal harmony we often suggest is the property of music. "What I call magic in architecture is not prestidigitation at supernatural emanations, but music. But the kind of power you can get in music is lost in architecture if you leave out the harmonic relationships only proportioning systems can provide. Proportion is the nature of architecture." (Hale 1994, p. 58) Such proportion and pattern features in sacred buildings, and in architecture that we treasure from our past. Hale says: "Today, most buildings are not patterns in light and shade but images attached to functions." (Hale 1994, p. 32) If the plastic artists trusted their intuition in design, they would not simply follow given formulaic principles of proportion but find natural patterns and delicious proportions that contribute to our

knowledge of satisfying form. Such discovered form might find accord to the felt viscosity of the three-dimensional space through which we, as individual three-dimensional objects, orbit.

Neil Leach, in his text 'The Anaesthetics of Architecture' suggests that both fashion and visual patterning can blind an artform like architecture to its social responsibilities. "Good design obviously depends upon a strong sense of visual awareness," writes Leach, "but this emphasis on the image has certain negative consequences; and it is in a discipline like architecture, which is so directly involved with social concerns, that these negative consequences are likely to be most keenly experienced." He continues: "The seduction of the image works against any underlying sense of social commitment." (Leach 1999, p. 45) Leach sums this tendency by architects to "fetishize the ephemeral image, the surface membrane" in the following way. "In the intoxicating world of the image," he writes, "the aesthetics of architecture threaten to become the *anaesthetics* of architecture." (Leach 1999, p. 45)

Leach finds the direction of philosophy and the arts similarly unable to escape the ephemeral image: "in a world where the imaginary becomes the "real," there is no longer a place for the real. In the perfect crime of the twentieth century, reality itself has been stolen." (Leach 1999, p. 3) He concludes his polemic essay: "More especially, within an architectural culture of depthless, seductive images and shimmering effects, philosophy always threatens to be appropriated as an intellectual veneer, a surface gloss. In such a context, what is philosophy but a mere fashion accessory?" (Leach 1999, p. 88)

Marcus Ward and I agreed early in the design stage of the commission that we wanted the memorial to offer particular sets of physical and emotional experiences. We wanted a place of reality rather than imagery. The materiality and the form of this 'site of experience' needed to touch people's intuitive sensibilities rather than flatter their aesthetic expectations.

Social responsiveness and social reality can still find expression in contemporary public space. In our memorial space there needed to be space to honour a vision of the police endeavour, in which the public ceremonies could make sense. And, too, there needed to be space to cry, in which private reflection could be intimate and true.

We tried to imagine what it would feel like to be in the various site spaces and in various times of the day and night. What shapes and materials, textures and colours would enhance these two separate uses or experiences of the space? What sounds should we encourage across the site, and what sounds should the site deflect. Our discussions about the project were never based on the look of the work from outside it, believing that the arrangement of the working space would flow naturally into a suitable appearance to those passing by. Function arranges form. For example, the elliptical stage (platform) was elliptical because a circular stage would feel too open for the intimate feeling we needed for those who wished to

quietly reflect on the death of a loved one. A circular platform also weakened the 'cupped hands' shape we envisaged for excavating the earth, so that the earth itself cupped and held close to itself those who entered this shrine. A circular stage stopped movement across the site. It would fix parts rigidly to the center. An elliptical stage 'flowed' people through it. The 'centre' (if we can speak of such a thing) of an ellipse seems to travel as you move along a peripheral arc. The original size and scale of the wall was determined by our wanting to hold onto that feeling of being embraced. Even as the 3.6m height and 18 m length of the bluestone wall was imposing, it was also designed to be incredibly porous, having four strong unusually shaped doorways. The wall was designed to be large enough to feel enclosed but open enough to not feel claustrophobic or contained, or captured.

Naturally, a bluestone wall throws up images of the 'thin blue line', and perhaps also, an echo of 'Pentridge', a former Melbourne prison built in bluestone. A shrine must resonate the spirit of the memory it honours, and since the police, as part of the judicial system, deny freedom to those who deny freedom to others, we have tried to be playful with the equation between containment and flight.

The difficulty that this brief threw up for most artists, perhaps more so to those used to images and gestures, is that this memorial was to be used. That is, this was to be architecture, a building, to perform the functions its design called for. We kept the uses of the memorial at the very front of our mind in the design process. There is a natural relationship between functionality and the experience of form. The 'form follows function' dictum carries as much truth in it as the economic conditions allow. In our case, economic efficiency needed to be part of the experience of the site. An ostentatious and decorative memorial would carry the feelings of tyranny and injustice within the form itself. A memorial in the barest materiality would pose the question, why bother with a memorial at all?

I certainly feel that most of the other proposals were also grappling with these very difficult issues thrown up by the design brief. Because this Memorial was an important commission for the city, most of the other designers and artists seemed, to my mind, to be too conscious of making an 'important' contribution to the constructed topography of Melbourne's cityscape. From this perspective, they designed for the look of the memorial to the detriment of the functions it was to perform. Of course each design team formulated the regime and ceremonial processes they expected for the memorial. The police walk up this path, line up here, mill around here, and so on, but mainly, at the centre of each memorial, except ours and one other, was the memorial itself. Whatever functions may have been carried out on the site would have to be around the memorial, not within it. On the other hand we left space at the centre of our design, to which the various elements that made up the memorial referred. The space itself is the memorial and so it is within this space that the experience of the site takes place.

One of the other competing designs was titled, 'The Police: watched & watching', and featured glass and reflective water elements. This proposal dealt with the Police loss of life as an essay on the image and idea of the role of policing in our society. Not a moment, I thought, had been spent imagining what they would want if their brother or sister had been one of the police killed on duty. So self-conscious was the proposal that the presentation was made with large graphic imagery spread out on the floor, far too large to hang on any wall in that room in which the proposals were examined.

So much of design, it seems to me, has degenerated to this level of 'presentation' to the bedevilment of the fabric of our social spaces. So 'designed' have our social spaces become, that the materials, treatments and graphic imaging on the walls that front those spaces are tending toward commercial bill-boards, and too often, are indistinguishable between such commercial readings and other possible readings. I am thinking of the Tullamarine tollway, with the bridges as billboards and naturally, the Crown Casino precinct of flashing lights with gaudy signage everywhere.

While these sites intend their commercial imagery, there is a more subtle expression in the 'corporatised' marketing imagery that every new building seems to feel the need to express. The new Melbourne Aquarium building has a facade of designer fish imagery. The new Melbourne Museum (children's section), a rubric's cube motive (popular intelligence?) at one end, and a vast wind-swept and desolate grey (red!) square (imperial intelligence?) at the other, the new Melbourne City Square, 'dressed up' as an innocuous forecourt to the hotel which now dominates it.

In such a context of city surfaces furiously selling themselves to a consumer public, we wanted a memorial whose materiality was reassuringly itself. We have used stone as stone, and grass as grass. We have kept the design as simple as we possibly could partly because it is our way of satisfying the complex design brief, partly because the three simple elements clarified the experience it would offer those who used the Installation.

Jonathan Hale described this approach well when he wrote: "Novelty, expressionism, bizarrerie can be quite wonderful, but is it possible to design buildings that look like buildings, that express how they are used and how the materials are put together and that at the same time embody the inner vision. Vision doesn't have to be sweeping. The biggest mistake designers make in our time is to think that design is outside of everyday, normal life. Even greatness is not outside of daily life." (Hale 1994, p. 4)

The placement of the Memorial on the street level was carefully thought through. The work of the police is on the street, and people's access should, we thought, be as direct as possible. We wanted the street noises to intrude into the Amphitheatre. As Bandt writes: "Designing acoustic spaces is an ancient practice, as the amphitheatres of Delphi, Olympia and Athens testify. The size, shape and height of an acoustic form, and the choice of materials for its construction, have been designed to reflect and carry sound from performer to audience for thousands of years. In Australia, there are many examples of outdoor amphitheatres, both public (as seen at LaTrobe University, Melbourne, and Mildura) and private (as say Leura in New South Wales and the Montessori School in Plenty Valley, Victoria)." (Bandt 2001, p. 22) The staging of memorial services and processions suggested an amphitheatre form for such works of theatre by the police, but the notion of the street sights and smells and sounds pervading the memorial was most important to us. The police work the streets and their memorial should, we felt strongly, not become removed from the 'place of action' in some vain attempt at idolatry.

The sacred importance of civic duty and the weight of the price it can exact, are found in shrines of remembrance for those who served, and those who were killed in war. Every regional city has its war memorial, often the lone soldier in carved marble on a plinth; very much in the 19th century style of monumental sculpture. The most important shrines, I think, abandon the heroic figure and attempt to create an architectural space into which people can enter. In the case of Christianity, for example, there are many fine examples of sculptures of Christ on the cross, some, like a carved wooden one I once visited above a salt mine near Salzburg, are so beautiful as to bring tears to your eyes. Yet, it is within the multi-sensory cathedral space that you can experience the revelatory epiphany that is the mark of religiosity.

3. Shrines of Remembrance

The obvious other shrine to the dead is the nearby Melbourne Memorial Shrine. It is also a space you enter, and in which ritual takes place. Other shrines to those killed in the two great wars that I will mention are the Loughborough War Memorial Carillon in the U.K and the New Zealand National War Memorial in Wellington. Both of these Memorials are campaniles that hold carillons, and draw people into themselves; to a chapel at the base of the Wellington shrine and a war museum at the base of the Loughborough shrine.

Naturally, 'bell' based memorials make it obvious to us that these present forms of secular communal remembrance are derived from pre-secular religious communal formats. Both the radiating sound of the bells and the shrine format of the memorial hark back to an earlier,

more confident conception of the community's pervasive influence. To my mind they make a clear reference to pre-secular, religious communities. Sacred sites of communal memory and feeling, such as the civic shrine and the war memorial are very much the contemporary secular replacement for the cathedral and the temple. They remain non-denominational and above the direct functioning of a religious perspective. In this, they must be fair indicators of the sort of secular sites of cultural exchange that I am suggesting artists must create for their secular societies. In a time of a waning interest in the formal religious institutions, such secular temples are needed. The co-existing religious structures look to being a diminishing influence on the daily lives of citizens in society.

Yi-Fu Tuan, in his book, 'Space and Place' writes that "Place is security, Space is freedom: we are attached to one and long for the other." (Yi-Fu Tuan 1997, p. 3) In this context, he makes some interesting observations on experience that I think well describe the emotional and heightened sensitive experience one has in a shrine of remembrance. "Experience," he writes, "is compounded by feeling and thought. Human feeling is not a succession of discrete sensations; rather memory and anticipation are able to wield sensory impacts into a shifting stream of experience so that we may speak of a life of feeling as we do a life of thought." (Yi-Fu Tuan 1997, p. 10)

Having experienced the Loughborough Carillon Memorial and the New Zealand National Memorial, and believing them to be sites within the stream of our 'life of feeling', as Yi-Fu Tuan suggests, I want to consider them more closely. I think that they can usefully make clear some of the issues facing the memorial site and its relevance to installation sites of cultural experience.

The Loughborough Memorial Carillon (fig 48, p.146) is quite a high tower in a park near the center of the city. It can be seen from a fair distance away, as well as, of course, being heard across the city centre when it is played. At the base of the tower is a small museum of articles and artifacts from both wars. People can enter the memorial and be lifted, if they wish, to the bells in the campanile belfry and on those days of special significance, such as Armistice Day, listen to a carillonneur play the bells. The bells in the carillon are cast by Taylors Bell foundry, whose works are not far from the memorial. Interestingly, whilst Taylors have cast and hung many carillons, the carillon remains a distinctly Continental European instrument. A British carillon to commemorate fallen soldiers from the First World War does seem strange: the carillon is such a European instrument.

The Carillon National Memorial in Wellington (fig 49, p.148) doesn't suggest the same strangeness to me. We in the Antipodes follow the fashion of Europe and the United States of America, and the carillon format for bell ringing was very popular in America during the 1920's and 1930's. The New Zealand thinking about what would be a suitable National

Memorial after the Great War canvassed a range of possibilities. Chris Maclean, in his book *For whom the Bells Toll, a History of the National War Memorial* lists some of the proposals. "The Minister of Defence, Sir James Allen," he wrote, "argued that it should be symbolic: 'It should not be utilitarian but should embody the great virtues of courage, self-sacrifice, endurance and loyalty to the country'... Others, however, thought that the National War Memorial should be useful as well as symbolic. Sir Robert Stout suggested a road around Wellington Harbour, to be called 'Anzac Marine Parade'; Professor H.B. Kirk of Victoria University College proposed an extension of Tongariro National Park; The Reverend C.F. Askew, a Wellington Vicar, drew up plans for an elaborate memorial cathedral." (Maclean 1998, p. 8) Maclean goes on to list many other proposals. Those that favoured a carillon "recognized," writes Maclean, "that a carillon tower, or campanile, would be a splendid symbolic monument; its bells would unite the living in contemplation of the dead. The carillon would 'link' the whole community with these bells of remembrance', and 'give fitting music for occasions of sadness in memory of the dead and gladness and thanksgiving for victory'." (Maclean 1998, p. 8) While the ringing bells can be heard in the chapel, they do sound quite muffled, but in the district around the very high bell tower the bell music can be heard for quite some distance. I found that the playing of the carillon had quite an affecting impact on my mood.

As excited as I was to visit the bells and listen to the music played by the carillonneur, Timothy Hurd, the great grey lump of masonry brought on a sombre disposition to my afternoon. (CD. Track 5.) Yi-Fu Tuan's definition of space and place seemed to find form in this memorial. Those thousands of soldiers who traveled to the European Theatre of the Great War travelled to fight for the concept of freedom. They travelled from their homes, their places, into another world, another space offering freedom. In Wellington now stands a magnificent campanile daily sounding a siren's song that echoes off the surrounding hills, the call of home, the place left behind and, for many, a place to which they never returned.

The National War Memorial has a chapel at its base, and is the third largest set of bells in the world. The English bell-founders Gillett and Johnston cast and hung the bells. In recent years the carillonneur, Timothy Hurd, after the closure of Gillett and Johnston in 1956, designed, and had cast in Europe the remaining four largest bells in the style of the existing bells to complete the carillon as it had originally been intended.

Our design for the Police Memorial followed this notion of the shrine as a site, a place, to be entered, and to be departed from. Within, like every other important shrine we could think of, the experience was to be tempered by a full sensory contact with the physical and actual materiality of the Installation. Within, people connect with people across the knowing that allowed them to share emotional feelings, which in this case are sourced in unspeakable tragedy.

4. Conclusion

Stone, 'the bone of the earth', seemed inevitable for the material of our proposal, as it does for most memorials to the dead. We both love the resonance of stone work, from the way stone abuts through the skin of the earth, and the ancient standing stones and, too, the other constructions in this material. We can't imagine another material for the Victoria Police Memorial, particularly bluestone, the public stone of Victoria.

The one aim Marcus Ward and I resisted was to make the memorial heroic, or in any sense a celebration of the coherence ('brotherhood') of the police force through the tragedy of death. This is the pathway that separates the police from the community they serve. This needed to be a place of simple accessibility to whoever wished to enter. Not some guarded monumental masonry on a hill, but a simple place in which people could mourn the particular waste and incredible sadness of a life lost in service to the social good. We see the Police Memorial as a democratic place, coming from a design that was not 'willed' into existence from an individual imagination, but which manifested itself through dialogue between us, without ego.

Hale evokes this design process, which, while particularly apt as a process in a collaborative event, describes, for him, the process used by Frank Lloyd Wright. Hale suggests that Wright's design philosophy paid homage to the democratic urges of Emerson. Hale writes "Emerson had said buildings must express democracy in a concrete way, not through symbolic eagles or Greek columns; there was to be no *telling* about democracy; architecture must be *visually* democratic." (Hale 1994, p.174) He added: "Wright's architecture was the old way of seeing. But he opened new territory; he brought the play of space and geometry into the every-day house. He designed hundreds. In those houses he put the ordinary in touch with the old magic. Unlike the International style masters, Wright joined the sublime to the everyday." (Hale 1994, p.189) It is our hope that the Victoria Police Memorial makes a similar connection for the people of Victoria between their every day living and the profound gift of life some police make for their community.

Certainly, the relationships between public-space art and memorial sites becomes less contested when multi-sensory installation in public-space seek to be places of emotional experience very much in the tradition of the memorial experience. The emotional experience can traverse both joy and sadness in the celebration of the audacity of human endeavour.

The Memorial was opened on July the 5th 2002. It was opened with a solemn memorial service that brought tears to many of us that were present at the great loss of young life. The service was quite intimate. Family members of killed police laid wreaths, and a rose for every

lost member was laid by long queues of police parading to the police badge in coloured granite in the middle of the installation. I have to say that the installation perfectly served this memorial service, and all the police we spoke to were very please with the memorial installation.

The differences between the Federation Bells Carillon and the Victoria Police Memorial are less startling, I think, than the many ways they are similar. Both seek to be 'sites of experience' into which everyone is invited to enter and to participate in the recognition of others within the experience as members of the one community. I believe that the contrast of these quite separate projects will emphasize the great similarity of their purpose. These are places in our secular society where the flow of feeling is a natural and shared experience for community participants.



Figure 47 'Weary Dunlop' Memorial by Peter Corlett



Figure 48 Loughborough War Memorial Carillon, England

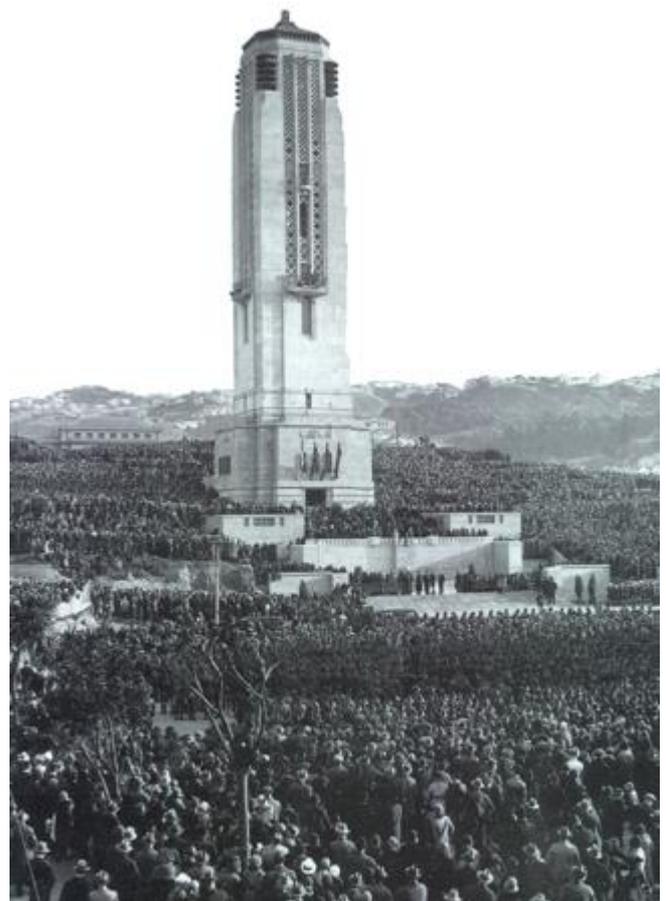


Figure 49 Wellington War Memorial, New Zealand



Construction of the Victoria Police Memorial between March and June 2002



The service to Open the Memorial on July 5 2002



CONCLUSION

“A work of art elicits and accentuates this quality of a whole and belonging to the larger, all-inclusive, whole which is the universe in which we live. This fact, I think, is the explanation of that feeling of exquisite intelligibility and clarity that we have in the presence of an object that is experienced with esthetic intensity. It explains also the religious feeling that accompanies intense esthetic perception. We are, as it were, introduced into a world beyond this world which is nevertheless the deeper reality of the world in which we live in our ordinary experiences. We are carried out beyond ourselves to find ourselves...Where egotism is not made the measure of reality and value, we are citizens of this vast world beyond ourselves, and any intense realization of its presence with and in us brings a peculiarly satisfying sense of unity in itself and with ourselves.” (Dewey 1934, p. 195)

Hall's claim that mankind has “favoured sight over smell”, and that “If we had have maintained our sense of smell we would be subject forever to emotional shifts as we could smell people's emotions and past presences would be current so long as the scent remained,”(Hall 1969, p.40) provides us with a long view of our history. This view of our destiny keeps us at a remove from the 'emotional' links which connection us, in favour of the distancing perceptions that underwrite self-interest. In part this describes our source of the idea of the individual, as alert and on the 'look-out' for our own best interest.

Hall further suggests that while our “ability to plan has been made possible because the eye takes in a larger sweep; it codes vastly more complex data and thus encourages thinking in the abstract. Smell, on the other hand, while deeply emotional and sensually satisfying, pushes man in just the opposite direction,” (Hall 1969, p.40) In this he has distinguished between our rational and emotional responses to events in our world. Cultural expression seems to be endlessly grappling with this dichotomy.

Our urgent desire to grasp knowledge and to plan our futures has fuelled the ocularcentrism that is party to the information-overloaded societies in which we, particularly in the West, live. This information is overwhelmingly textual and graphic in format. There has been a consequential underdevelopment of the other significant aspect of Western societies. That is the celebration of the sensual and emotional experiences that strongly bind communities together. In societies more closely tied to agrarian subsistence and the vicissitudes of nature a better balance between intellectual and emotional perspectives is often found in cultural experience, most noticeably in tribal communities.

Sculpture, one of the few remaining forms of cultural expression that can, through its celebration of the material, generate powerful emotional connections with touch, smell, sound as well as sight, has in the West, steadily become a more exclusively visual medium over the past one hundred years and more. The sensual overlay of an experience dissipates as its parts are separated out. Within the experience itself there is no rationalization or categorization of the experience. Thinking about the experience closes off one's connection within it. Categorization of experience, by Emmaneul Kant as well as other philosophers, are constructed beyond the experience, and attempt to fit experience in a world bound by reason and context. It is not true that the best outcome for a visitor to a painting exhibition is their *simultaneous* experiencing of the work and reflection upon the work, as the director of the Ian Potter Gallery recently claimed in an radio interview I listened to. (Dr Chris McAuliffe, 774 ABC Radio Sunday morning arts program, 21 July 02) This is a repetition of the Herbert Read proposition that art transmits 'understanding', not feeling. Whilst political allegiances may be constructed on understandings, social communities are founded in the sharing of feelings and emotion.

Now is the time when 'sites of cultural experience' need to be created as places that rejoin all our sensory perceptions to the one experience. Now is the time to recreate the pleasure parks of old, the Luna parks and the other places of physical experience that our contemporary societies are in danger of forgetting about. Rather than add another smart piazza cafe space into the urban social fabric, now is truly the time when we should create 'sites of experience' in which people can discover one another. Not places for the amusement and entertainment of the masses, like computer games arcades, but places in which wonderment and beauty and community sharing are encouraged. Rush has suggested that participation will be fundamental to this shift from the graphic to the sensual when he writes that "Interactivity is a new form of visual experience. In fact, it is a new form of experiencing art that extends beyond the visual to the tactile." (Rush 1999, p.216). The ultimate expression of an open, sharing and rich culture will be when 'sites of cultural experience' are not to be distinguished from the complex pleasures of our everyday living, however utopian this might seem.

Gablik has called for a 're-constructed' and 're-enchanted' cultural experience in which everyone can participate, and Donoghue warns us of the 'managed' cultural sector's tendency to prescribe cultural expression from which all mystery and magic has been sifted. I have sadly suggested that we lack sufficient faith in an 'experience' alone, but prefer to rely upon an 'experience' verified by its translation into text, into language or into image. We much prefer a self-conscious culture to our simple and direct actions of living together and enacting the rituals that celebrate our shared life. We seem to favour our extensive library of knowledge over our intuitive 'knowing' freely shared between us, moment by moment each and every day.

In this thesis I have tried to show that the Bell sculpture installations, as well as my other public space works, are an answer to Gablik's challenge, and a contribution to the 'reenchantment' of cultural expression and cultural experience. The key to finding these "new Forms emphasizing our essential interconnectedness rather than our separateness" (Gablik 1998, p. 5) is to be found, I believe, by focussing on the 'experience' cultural expression offers all of us when we participate in that experience. Sharing experiences has to be the fundamental parameter of social relations.

As I have suggested, the very idea of a society is doubted by ex British Prime Minister, Margaret Thatcher. For her, individualism is the highest expression to which civilization might aspire. The once basic social unit of the family has dissolved into its individual constituent parts. Mass market analysis separates us as 'generation X' and 'baby boomers', and to a hundred other statistical strata identities. The old social networks like family, ethnic grouping, and religion are increasingly disregarded by our marketing industry in its advertising strategy to influence generational and aspirational segments to consume more and more.

Ayn Rand, in her novel *The Fountain-Head* tells the story of the individualist architect Howard Roark and his stand against collectivism. Roark summed up his vision in a speech to the court trying him for blowing up a housing project whose design (his) had been tampered with by a committee of mediocre architects. He powerfully states the case of the creative spirit, the artist, against the 'second-handers', those whose work and ideas imitate the work and ideas of individuals that had come before them. The second-handers preach altruism and collaboration and became dependant upon each other for their self esteem. They resented the original voice of the ego-driven individual and set upon that voice to tear it down.

"Man," Rand writes, "cannot survive except through his mind. He comes on earth unarmed. His brain is his only weapon. ..from this simplest necessity to the highest religious abstraction, from the wheel to the skyscraper, everything we are and everything we have comes from a single attribute of man – the function of his reasoning mind. But the mind is an attribute of the individual. There is no such thing as a collective brain. There is no such thing as collective thought. An agreement reached by a group of men is only a compromise or an average drawn upon many individual thoughts. ...[the] creative facility cannot be given or received, shared or borrowed. It belongs to single, individual men." (Rand 1947, p.665) Rand describes a society in which self-serving individuals, in their struggle to create their own visions, improve, without any particular intention, the circumstances of those around them, while those who endeavour to work selflessly for others collapse society into the squalor of mediocrity. Howard Roark designed low cost housing for the poor of New York simply because he was attracted to the abstract task of solving the problem of maximizing decently housed people at the lower costs that new materials and new architectural forms made

possible. What Rand doesn't accommodate in her novel is the more likely possibility of a vision like Roark's being directed to the creation of exclusive palaces with the most extravagant materials and forms. She begs the question as to why Roark's selfishness had altruistic outcomes after all.

In an age of celebrated individualism, the artist is invited by communities to create works that bind the community together, or at least begin such a community ethos-building process. This is at the heart of the contradiction facing the contemporary artist, be they sculptors, performance artists or architects. In a society seemingly going in one direction, artists are being asked to pull in the opposite direction.

I suggested in the introduction of this thesis that in my experience, few works of art in public space countervail this divisible trend. More often than not, works of public art add just another individual voice into the social clamour and noise that already constitutes the usual geographic boundary of the 'under-construction' secular society. Against my very best intentions, some of my own works have fallen into this category of being just another object the crowds have to navigate themselves around. This is so regardless of the visionary poetry of communalism I might have loaded the sculptures up with.

It is from these failures that I have slowly, over many years, become convinced of the utmost importance of 'direct experience'. For example, I teach my students that they are creators, not critics to their work, and they must still their self-critical mind. This is quite against the modernist trend in schools for artists. Self-criticism, I suggest to them, is rather like working in the third person, that is, watching oneself at work, and imagining how others might perceive the work being created. An artist must try to work from the 'first person perspective'. They must protect their own vision and trust absolutely in the integrity of its outcome. Attention to their intuitive imagination is their only responsibility. Like Howard Roark, I believe that an artist must take responsibility for their work, but unlike Roark, I am convinced that through one's work, and in the collaborative sharing of work with others, a spirit of the community becomes manifest.

As my thoughts have clarified on these issues I have been surprised at the number of authors I have discovered whose writing echos similar concerns to my own.

I have quoted from these authors throughout this thesis where it seemed appropriate, and tried to draw the reader's attention to the central problems I believe need solutions. I have suggested the bell sculpture installations are excellent examples of possible secular temples and shrines in which, with the coming together of people, a communal spirit might be promoted.

I have been extraordinarily lucky to be commissioned, in collaboration with other artists, to create two significant public-space works for the City of Melbourne. Both of these Installations were designed from the perspective of public-space Installation as 'sites of experience', and as places of emotion and feeling. Both are sites wherein the people of Melbourne can become aware of themselves as parts of a community that shares their aspirations and dreams.

The temple has functioned in exactly this way for communities of people from time immemorial. We need them now, in our fragmenting societies. Society as conglomerate individualism promises, to my mind, a bleak and totalitarian future, in the manner of Orwell's '1984'. When we are divided into our units of self, we are absolutely bereft of any identity except that which is delivered through the sophisticated electronic delivery systems already in place. The identity 'consumer', fills me with dread.

Curiously, interest in cultural events has never been so widespread in Western societies. Galleries put on well attended 'block-buster' exhibitions, and the performance of music, film and theatre events meet a growing public appetite. Public-space artwork is proliferating in all available spots, and architectural design gets more stylishly adventurous by the moment. Surely our society is switching on to the arts, and the employment in the sector, and the money transacted for cultural events, rivals that of 'sport' in this country. Working within this 'industry sector', however, one cannot fail to see how culture has been bent to the 'entertainment industry' format. As with other forms of entertainment, such as public sport, audiences remain increasingly isolated from the action. We are largely spectators, whose experience needs to be 'managed'. Culture, our birthright and that mirror through which we see and know ourselves as excitable, passionate and vision-driven animals, is marketed to us in portions designed to quell those very passions and visionary insights that might otherwise threaten a dull-imagined social good.

Confronted with this situation, contemporary artists, as artists before them, are seeking a more experiential expression of their imaginings. Contemporary artists are drawn to technology, to multi-media and interactive formats which have yet to be fully colonised by the cultural caretakers. Among the more fecund, in my view, of these developments are the site-specific and interactive installation works of public space art because it is pointless to attempt to explain, or mimic, or describe such particular experiences. As you simply must go and enter Chartres Cathedral, or the Jikko-in Temple to experience these magical places, so you will just have to enter the Victoria Police Memorial if you want to know how it feels for you.

Both Feld and Gablik call for such places in which experience itself is celebrated. Feld gives us to wonder what a "multi-sensory conceptualization of place" (Feld 1995, p.4) may be like. Gablik calls for a new aesthetic theory and practice in the name of protecting our endangered

ecology. She writes', "I see the task of this book as encouraging the emergence of a more participatory, socially interactive framework for art, and supporting the transition from the art-for-art's sake assumptions of late Modernism, which kept art as a specialized pursuit devoid of practical aims and goals. " (Gablik 1998, p.7) The collaborative projects I have worked on are answers to these calls for a more responsible cultural community experience.

Like altruistic friendships, and like intimate love, a community that embraces the people in it is founded on sensual and natural responses to the experience of being alive. If you have loved another in a way where it is impossible to distinguish which arm is yours, which leg is theirs, then you know it is possible to love others with greater conviction than you love yourself. In this sublime state of grace, individual identity is unselfconscious.

Artists should create places where people can discover their playfulness, their pleasures and their unselfconscious participation in being collectively human. In their different ways I believe the Victoria Police Memorial Installation and the Bell Sculpture Installation to be such places.

The support of Melbourne Festival and the State Government for the Federation Bells projects and the Victoria Police Memorial has allowed my research to proceed well beyond what would otherwise have been the case. I have visited many campanological sites of significance, and experienced temples, shrines, cathedrals and public space artworks around the world. I am grateful for the enormous support these projects have given me in my research for this thesis.

"In the end," wrote Dewey (to quote once more), "works of art are the only media of complete and unhindered communication between man and man that can occur in a world full of gulfs and walls that limit community of experience." (Dewey 1934, p.105) It remains my hope that these major projects of public-space art that I have undertaken contribute to the dismantling of those walls that too easily separate each of us from the other.

GLOSSARY OF TECHNICAL TERMS

Frequency : Term in acoustics for the number of complete vibrations undergone by an air-column or a resonating body in one second. As frequency increases, the pitch of the note sounded is raised, so pitch can be defined by frequency : by international agreement, 1939, the A commonly used for tuning (i.e. that above middle C) is fixed at a frequency of 440. (Jacobs 1965, p.134)

Harmonic Series : The set of tones (called *harmonic tones* or simply *harmonics*) produced by a vibrating string or air-column, according to whether this is vibrating as a unit through its whole length or in aliquot parts ($\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, etc.). Vibration of the whole length gives the lowest ('fundamental') tone, or 'first harmonic'. The other tones, or 'upper partials', i.e. the second, third, fourth, and higher harmonics, are at fixed intervals above the fundamental – and octave above it, then a perfect fifth above that, and so on, decreasingly, ad infinitum. (Jacobs 1965, p.160)

Just Intonation : The adoption in performance of the 'natural' non-tempered scale. (Jacobs 1965, p.190)

Partial : Name given to each of the notes of the HARMONIC SERIES, the lowest or 'fundamental' being the *first partial* and the others (numbered upwards consecutively) *upper partials*.(Jacobs 1965, p.275)

Pitch : The property according to which notes appear to be (in the conventional phrase) 'high' or 'low' in relation to each other – a property scientifically determined by the frequency of vibrations of the sound producing agent. (Jacobs 1965, p.286)

Polytonal : The simultaneous use of more than one key. (Jacobs 1965, p.290)

Temperament : The 'tempering' (i.e. slight lessening or enlarging) of musical intervals away from the 'natural' scale (that deductible by physical laws), in order to fit them for practicable performance. In particular the piano, the modern organ, and other fixed-pitch modern instruments are tuned to *equal temperament*, meaning that each semitone is made an equal interval. In this way the notes D# and Eb are made identical, and other pairs similarly (through by physical laws they differ slightly); it is therefore equally easy to play in any key or, having started in one key, to modulate to any other. (Jacobs 1965, p.372)

Timbre : Same as Tone-Colour, the quality which distinguishes a note as performed on one instrument from the same note as performed on other instruments (or voices). (Jacobs 1965, p.379)

Taken from **Arthur Jacobs** 1965, *A New Dictionary of Music*, Penguin Reference Books, London.

References:

Introduction

Jay, M. 1994 *Downcast Eyes: the denigration of vision in twentieth-century French thought*, University of California Press, London.

Chapter 1

Backhouse, M. 2001, *The Age*, Review p7, 6th June 2001, an article on the Venice Biennale and Australia's 2001 representing artist Lyndal Jones.

Butler, W. 2000, *Musical Handbells: A Comprehensive History of the Bells and their Founders*. Phillimore & Co, Chichester, West Sussex.

De Oliveira, Oxley and Petry. 2000, *Installation Art*, Thames & Hudson, UK.

Dewey, J. 1934, *Art as Experience*, Minton, Balch & Company, New York.

Donoghue, D. 1983, *The Arts Without Mystery*, his 1982 Reith lectures in expanded form, BBC, London.

Fauchereau, S. (Ed) 1988, *Moscow 1900 – 1930*, Rizzoli, New York.

Feld, S. 1995, 'Waterfalls of song: An Acoustemology of place resounding in Bosavi, Papua New Guinea', in *Senses of Place*, S. Feld & K. Buiso, (eds) SAR press.

Gablik, S. 1998 *The Re-enchantment of Art*, Thames and Hudson, London.

Green, C. 2001, *The Third Hand [collaboration in Art from Conceptualism to Post-Modernism]*, University of NSW Press, Sydney.

Greenberg, C. 1965, *Art & Culture: Critical Essays* Beacon Press, Boston.

Hall, E.T. 1969 *The Hidden Dimension*, Doubleday Anchor, NY.

Henri, A. 1974 *Environments and Happenings*, Thames and Hudson, UK.

Kitto, H.D.F. 1957 *The Greeks*, Penguin, UK.

Magolin, V. 1997, *The struggle for Utopia Rodchenko, lissitzky, Maholy-Nagy 1917-1946*, University of Chicago Press, NY.

Marx, K. 1973, *Grundrisse, Introduction to the Critique of Political Economy*, Pelican Marx Library, UK.

Rapoport, A. (Ed) 1972, *Australia as Human Setting*, Angus and Robertson education, Melbourne.

Tacitus. 1964 *On Britain and Germany*, Penguin Classics, UK.

Chapter 2

Breckon, C.J. Jones, L.J. & Moorhouse, C.E. 1986 *Visual Messages*, Pitman, Melbourne.

Dewey, J. 1934 *Art as Experience* Minton, Balch & Company, New York.

Donoghue, D. 1983 *The Arts Without Mystery* (his 1982 Reith lectures in expanded form) BBC, London.

Gablik, S. 1998 *The Re-enchantment of Art*, Thames and Hudson, London.

Hale, J. 1994 *The Old Ways Of Seeing: How Architecture lost its magic (and how to get it back)* Houghton Mifflin, NY.

Jay, M. 1994 *Downcast Eyes: the denigration of vision in twentieth-century French thought* University of California Press, London.

Kline, M. 1972 *Mathematics in Western Culture*, Penguin, UK.

Read, H. 1954 *The Meaning of Art*, Penguin, UK.

Rollo, J. 1999 *Contemporary Melbourne Architecture* UNSW Press, Sydney.

Russell, B. 1978 *Wisdom of The West*, Crescent Books, Yugoslavia.

Packard, V. 1963 *The hidden persuaders*, Pelican, UK.

Tucker, W. 1977 *The Language of Sculpture*, Thames and Hudson, London.

Chapter 3

Cram, R. A. 1966 *Impressions of Japanese Architecture and the allied arts*, Dover Publications, N Y.

Hetl-Kuntze, H. 1969 *Far Eastern Art*, Thames and Hudson, London.

Lehr, A. 1991 *The Art Of The Carillon In The Low Countries*, Iannoo Press, Netherlands.

Malm, W.P. 1974 *Japanese Music and Musical Instruments*, Charles E. Tuttle Co, Tokyo.

Ministry of Culture and Information, Korea. 1974 *The Arts of Ancient Korea*, Kwang Myong Publishing, Seoul, Korea.

Mosher, G. 1964 *Kyoto: A Contemplative Guide*, Japan.

Price, P. 1983 *Bells and Man*, Oxford University Press, UK.

Ridley, M. 1972 *Far Eastern Antiquities*, Henry Regnery Company, Chicago.

Swann, P. 1963 *Art of China, Korea and Japan'*, Thames & Hudson, London.

Sullivan, M. 1973 *Chinese art: recent discoveries*, Thames and Hudson, London.

Wang-go Weng & Yang Boda. 1982. *The Palace Museum: Peking. Treasures of the forbidden city*, Harry N. Abrams, NY.

Chapter 4

Fletcher, N.H & Rossing, T.D 1991 *The Physics of Musical Instruments*, Springer-Verlag, New York.

Graves, R. 1983 *The Greek Myths:1*, Penguin books, UK.

Jennings, T. S. *Master Of My Art: The Taylors Bellfoundries 1784-1987*, John Taylor Press, Loughborough, UK.

Lehr, A. 1991 *The Art Of The Carillon In The Low Countries*, Iannoo Press, Netherlands.

Orwell, G. 1987 *Nineteen Eighty-four*, Penguin, UK.

Simpson, A.B. 1895 *Pall Mall Magazine*, 'On bell tones' October edition, UK.

Rayleigh, R.S. 1890 *The London, 'Edinburgh, and Dublin Philosophical Magazine and Journal of Science*, On Bells, January edition, UK.

Price, P. 1983 *Bells and Man*, Oxford University Press, UK.

Chapter 5

Bandt, R. 2001 *Sound Sculpture (intersections in sound and sculpture in Australian Artworks)* Craftsman House, Sydney.

Camp, J. 1997 *Discovering Bells and Bellringing*, Shire Press, UK.

De Oliveiri, Oxley and Petry, 1994 *Installation Art*, Thames & Hudson, London.

Hall, E.T. 1969 *The Hidden Dimension*, Doubleday Anchor, NY.

Hayward, P. (Ed) 1990 *Culture Technology & creativity in the late twentieth century*, John Libbey, London.

Keating, J.D. 1979 *Bells in Australia*, Melbourne University Press, Melbourne.

Partch, H. 1974 *Genesis of a Music*, A Dacapo Paperback, NY.

Rush, M. 1999 *New Media in Late 20th-Century Art*, Thames & Hudson, London.

Sheridan, N. (Ed) 1992 *Big Bell Beta*, PICA Press, Perth.

Chapter 6

Jacobs, A. 1965 *A New Dictionary of Music*, Penguin Reference Books, London.

Lehr, A. 1991 *The Art Of The Carillon In The Low Countries*, Iannoo Press, Netherlands.

McLachlan, N & Hasell, A. 2001 www.ausbell.com, Australian Bell's homepage.

Partch, H. 1974 *Genesis of a Music*, Da capo Press, NY.

Price, P. 1983 *Bells and Man*, Oxford University Press, UK.

Chapter 7

Bandt, R. 2001 *Sound Sculpture (intersections in sound and sculpture in Australian Artworks)*
Craftsman House, Sydney.

Dewey, J. 1934 *The Experience of Art*, Minton, Balch & Co, NY.

Gablik, S. 1998 *The Re-enchantment of Art*, Thames and Hudson, London.

Hale, J. 1994 *The Old Way Of Seeing, How Architecture Lost Its Magic (And How To Get It Back)*, Houghton Mifflin Co, NY.

Leach, N. 1999 *The Anaesthetics of Architecture* The MIT Press, Cambridge
Massachusetts, London.

Maclean, C. 1998 *For Whom The Bells Toll (A History of the National War Memorial)*,
Published by Heritage Group, Department of Internal affairs, Wellington.

Yi-Fu Tuan 1997 *Space and Place, the Perspective of Experience*, University of Minnesota
Press, Minneapolis, London.

Conclusion

Dewey, J. 1934 *Art as Experience*, Minton, Balch & Company, New York.

Donoghue, D. 1983 *The Arts Without Mystery*, His 1982 Reith lectures in expanded form,
BBC, London.

Hall, E.T. 1969 *The Hidden Dimension*, Doubleday Anchor, NY.

Gablik, S. 1998 *The Re-enchantment of Art*, Thames and Hudson, London.

Orwell, G. 1987 *Nineteen Eightyfour*, Penguin, UK.

Rand, A. 1947 *The Fountain-Head*, Grafton Books, Collins Publishing, London.

