

The background of the entire cover is a photograph of a beach at sunset. The sky is filled with soft, orange and yellow clouds, transitioning into a deep blue at the top. The ocean is a calm, dark blue, with small white waves breaking near the shore. The wet sand in the foreground reflects the colors of the sky and the water, creating a shimmering effect.

UNESCO Observatory Multi-Disciplinary eJournal in the Arts

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CREATING UTOPIA

Imagining and Making Futures
Art, Architecture and Sustainability

Lorne Sculpture Biennale Inaugural Conference 2018

Editor | Lindy Joubert

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ABOUT THE E-JOURNAL

The UNESCO Observatory refereed e-journal that promotes multidisciplinary research in the Arts and Education and arose out of a recognised need for knowledge sharing in the field. The publication of diverse arts and cultural experiences within a multi-disciplinary context informs the development of future initiatives in this expanding field. There are many instances where the arts work successfully in collaboration with formerly non-traditional partners such as the sciences and health care, and this peer-reviewed journal aims to publish examples of excellence. Valuable contributions from international researchers are providing evidence of the impact of the arts on individuals, groups and organisations across all sectors of society. The UNESCO Observatory refereed e-journal is a clearing house of research which can be used to support advocacy processes; to improve practice; influence policy making, and benefit the integration of the arts in formal and non-formal educational systems across communities, regions and countries.

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COVER IMAGE

Leon Walker
Photography at
The Lorne Sculpture
Biennale 2018

THEME

The inaugural conference, 'Creating Utopia Imagining and Making Futures: Art, Architecture and Sustainability' was held at Qdos Gallery, Lorne in March as part of The Lorne Sculpture Biennale (LSB) for 2018, under the Biennale's curatorial theme of 'Landfall, Nature + Humanity + Art'.

The sixth Lorne Sculpture Biennale was a vibrant festival celebrating the best of Australian and international sculpture. The stunning Lorne foreshore became a picturesque pedestal for a curated landscape of sculptures, presented alongside an exciting program of events devoted to pressing global issues of nature and endangerment, under the distinguished curation and visionary direction of Lara Nicholls, curator at the NGA Canberra.

Accompanying LSB 2018 was the inaugural two-day conference, 'Creating Utopia, Imagining and Making Futures: Art, Architecture and Sustainability'. Keynote and invited speakers – conservationists, visual artists, architects and academics – reflected on issues of environmental degradation, processes of social and environmental transformation and regeneration, from a diverse and thought-provoking range of viewpoints.

"Creating Utopia" examined the green revolution – greater than the industrial revolution and happening faster than the digital revolution. The speakers were introduced by the inimitable Design Professor, Chris Ryan, whose elegant and thoughtful comments to each presenter added a distinctive contribution. Issues relating to climate change; facing uncertain global futures and protecting our planet by taking control, being prepared, and offering solutions for long-term impacts were the topics. The conference heard the voices of experts who offered innovative and well researched future directions to the world's mounting problems.

Invited Speakers included Mona Doctor-Pingel, an architect, based in Auroville, India since 1995. Her keynote address, 'Journeying to Oneness through architecture in Auroville, South India', discussed the natural and built landscapes found in the unique social utopia that is Auroville, with an emphasis on experimental building techniques using local materials and craft principles, inspired by biology.

Esther Charlesworth, Professor in the School of Architecture and Design at RMIT University, the Academic Director of the new RMIT Master of Disaster, Design and Development degree [MoDDD], and the founding Director of Architects without Frontiers (AWF). Since 2002, AWF has undertaken over 42 health, education and social infrastructure projects in 12 countries for vulnerable communities. Esther spoke about the role Architects can play in improving the social and economic capacity of vulnerable people through design.

Janet Laurence is a Sydney-based artist who exhibits nationally and internationally. Her practice examines our relationship to the natural world, and has been exhibited widely, including as an Australian representative for the COP21/FIAC, Artists 4 Paris Climate 2015 exhibition, and an artist in residence at the Australian Museum.

Professor John Fien, based in Architecture and Urban Design at RMIT, spoke about the techniques and strategies for countering human harm of the environment based on design thinking and education for sustainable development.

Professor Ray Green, Landscape Architecture at the University of Melbourne presented his research on 'The Changing character of Australian coastal settlements assessed through the eyes of local: A perceptual modelling approach', exploring how ordinary people living in smaller Australian coastal communities conceptualize the "character" of the places they live and the changes they have noticed. In many such communities the valued 'character' of people's towns and individual neighbourhoods is being lost, often as a result of replacement of older, vernacular forms of architecture with new buildings and changes to the natural landscape that do not fit into the local residents' established images of their towns and neighbourhoods.

This issue, volume 6, issue 1 of the 'UNESCO journal, multi-disciplinary research in the arts' www.unescoejournal.com offers essays from a diverse range of authors and they are as follows:

Gabrielle Bates is a Sydney-based artist and writer exploring the intersections between place, politics and esoteric practice. Gabrielle has undertaken three residencies in Southeast Asia, and her art works have been selected for many competitive award exhibitions. A major survey of her paintings was held at Victoria University and she has produced 11 solo exhibitions.

Dr Greg Burgess, Melbourne-based Principal Designer at Gregory Burgess Architects, discussed architecture as a social, healing and ecological art. Burgess' international reputation has been established through a significant award-winning body of work, which features housing, community, cultural (including Indigenous), educational, health, religious, commercial, exhibition design and urban design projects.

Dr. Alecia Bellgrove is a Senior Lecturer in Marine Biology and Ecology with Deakin's School of Life and Environmental Sciences, and a marine ecologist with botanical and zoological training. Her research focuses on the role of habitat-forming seaweeds in ecological systems, their life history dynamics, and the impacts of anthropogenic disturbances such as sewage effluent and climate change. Her paper focussed on feeding the world with seaweed, without killing the planet. Although seaweed has many negative connotations, it plays a fairly major role in life here on earth - it is the primary producer of oxygen, it serves as the base for food webs and is a habitat provision. Seaweed she assured us can be the solution to many of our problems.

Dr. Ching-Yeh Hsu, Professor at the Department of Visual Arts, University of Taipei spoke about the role of visual art in creating utopia. Deeply rooting your art in nature creates a greater rapport and appreciation for nature itself, she maintains, while the use of abandoned material and junk for the creation of art is also a powerful way to express ideas for mutualism with the environment.

Jane and Peter Dyer, urban beekeepers based in middle-ring suburban Melbourne. Their apiary, Backyard Honey Pty Ltd, was seeded a decade ago with the idea of creating a micro-business that would work towards shifting negative perceptions about bees and help shape a sustainable future. Their paper provided an advocacy opportunity to actively explore the intersection of bees with art, architecture and landscape in a sustainable future.

Their presentation, A BeeC's – changing our thinking to changing the world, was developed to highlight the following aspects: Why do we need bees? What do healthy bees need? They provided an overview of built environments that actively promote bees through art, landscape and architecture.

Adjunct Professor Anton Hassel from RMIT claims non-indigenous people living in Australia find themselves on an ancient land mass that is nearly, but not quite, familiar. It is a landscape with unique archetypal cadences, an ambient pulse that unsettles us, and against which our imported familiar architectures and garden-planting schemes act as a bulwark to its strangeness, keeping us émigrés to country.

Professor David Jones and his team, Mandy Nicholson, Glenn Romanis, Isobel Paton, Kate Gerritsen and Gareth Powell wrote 'Putting Wadawurrung meaning into the North Gardens Landscape of Ballarat'. The paper discusses creating the first Indigenous-inspired sculpture landscape in Australia. This paper, prepared by the Indigenous-rich consultant team in conjunction with the Wadawurrung (Wathaurung Aboriginal Corporation) and City of Ballarat, reviews the aspirations of the project together with these narratives and relationships in etching a design and master plan on the canvas.

Paula Llull spoke of Nature as being at the core of artistic creation. The inclusion in art of ideas like ecosystems, natural environment or extinction requires a medium that minimises the distance between the artwork and the spectator. She spoke of the work of Janet Laurence as one of the most remarkable contributions to this current. In particular, her installation Deep Breathing. Resuscitation for the Reef illustrates the commitment of the artist in communicating with feeling the threats such as global warming and its resulting acidification of oceans on particular natural environments.

Phillip B. Roös, Anne S. Wilson, and David S. Jones presented their research on 'The Biophilic Effect: Hidden living patterns within the dance of light'.

They challenged the notion of 'Healthy cities' and 'well-being' as being the most topical and misused words in our global society. They see them being used in discourses about new strategies and policies to create urban environments often masking a failing 'healthy economy'. This discourse, they claim, is the result of our human-made environments as a consequence of our Western quest for 'development', having 'economic renewal' as part of our global urbanisation. This quest appears to be casting aside our primal knowledge of living structures and systems, our important spiritual and innate affiliations to the natural world that we are part of, and thereby loss of biophilia.

Dr. Shoso Shimbo is a garden designer from the esteemed Japan Horticultural Society, specialising in Japanese gardens. He is a director of the International Society of Ikebana. His work in this field, and that as an environmental artist seeks to harness the life force of nature. His sculptural works have featured in some of the nation's major contemporary art exhibitions, and a new work 'Sea Snakes: Trash Vortexes' was a feature of LSB 2018.

Marcus Tatton's sculpture practice is an example of using recycled, natural materials. He works as a sculptor for over of thirty years in Tasmania, Marcus acknowledges that the purpose of his sculpture making is seeking enlightenment. Marcus lives in line with the Asian proverb "to seek enlightenment is to chop wood".

Dr. Rose Woodcock, from Deakin University, presented her research and investigations into a practice-led project 'Merri Creek to the MCG', featuring broken glass sourced from along the Merri Creek in Melbourne's north. The status and function of the glass is ambiguous but rich in possibilities, with the glass fragments connecting her practice with issues of soil sustainability. Rose drew upon aspects of Parmenides' poem on the nature of 'what is' to explore the workings of language, in particular how poetic language can open up otherwise tightly construed discourses.

In conclusion, the conference was a wonderful success in a beautiful setting amidst the gum trees and birds surrounding the atmospheric Qdos Gallery. All the papers were inspirational and left an indelible mark on the audience. Sincere thanks to all who attended, the excellent list of speakers, the team - Graeme Wilkie OAM for his overall, tireless support; Lara Nicholls the LSB curator for her helpful ideas and professionalism; Gillian Oliver for the superb food; Laurel Guymer, the behind the scenes angel of 'La Perouse' at Lorne who managed the bookings and accommodation and our diligent rapporteur, Jeremy Laing. The excellent Deakin University intern student managed all computer glitches, problems and presentation hurdles.

Sincere thanks goes to Evelyn Firstenberg who generously and professionally edited all the conference papers. These people and others, the LSB committee and particularly Deakin University who gave generously for the LSB Education Program, enabled the 'Creating Utopia' conference to make a significant contribution to issues relating to climate change, environmen-

Lindy Joubert
Editor-in-chief

The Biophilic Effect: Hidden living patterns within the dance of light

Dr. David S. Jones
Deakin University

Dr. Anne S. Wilson
Deakin University

Dr. Phillip B. Roös
Deakin University

ABSTRACT

'Healthy cities' and 'well-being' are currently the most topical and misused words in our global society. We see them being used in discourses about new strategies and policies to create urban environments often masking a failing 'healthy economy'. This discourse is the result of our human-made environments as a consequence of our Western quest for 'development', having 'economic renewal' as part of our global urbanisation. This quest appears to be casting aside our primal knowledge of living structures and systems, our important spiritual and innate affiliations to the natural world that we are part of, and thereby loss of biophilia.

Drawing from the authors' previous work and extensive research in biophilia, Indigenous knowledge systems, and design and art practice, and guided by a recent applied research project, this paper investigates Biophilia Pattern # 6 'Dynamic and Diffuse Light' in relation to the 15 Biophilic Patterns now internationally advocated. The project, and Pattern referred to, is a consequence of applied research that has charted the integrated ecological design and holistic health philosophy for the Melbourne Metro underground station design as set out in *Creating Healthy Places* (Downton, et al, 2017).

We know that movement through underground station complexes invokes sensory experience, demonstrating the importance of artificial and natural light in affecting our physiological and psychological well-being. We argue that hidden patterns within light, activated by design and participation, can enhance user arrival/navigation/exit experiences. We will demonstrate our findings through engaging site-responsive processes by testing immersive experiences within a built structure, as well as a comparative sensory participation in the Otway Ranges. Utilising artistic practice, we identify our innate dance with light, information that can be applied to design. Furthermore, these findings raise the potency of incorporating Indigenous Dreamtime and spiritual values to their deep connections to Country.

The paper's narrative concludes with recent findings as to the potential of the biophilic effect to improving human well-being in our urbanised world.

KEYWORDS

Biophilia | Health and Well-being | Dance | Light | Patterns |
Indigenous Knowledge

ACKNOWLEDGMENT OF COUNTRY

We wish to acknowledge and pay respect to the Elders, families and forebears of the Gadubanud peoples, the Traditional Custodians of the lands and waters upon which this research has been conducted, to all Aboriginal Elders of Country, as well as Aboriginal and Torres Strait Islander peoples of the Australian continent, islands and adjacent seas, who remain the spiritual and cultural custodians of their lands and waters and who continue to practise their values, languages, beliefs and customs.

Maeewan Nyanbo Meerree

"Long time before today ...

The sky covered the earth making everyone crawl around in the dark.

The Magpies, being proud and industrious, gathered and worked to raise the sky so everyone could move about freely.

They gathered some long sticks and fighting hard they lifted the sky up.

They placed the long sticks on small and big rocks, they fought to lift the sky even higher.

The sky split open, showing the beauty of the first sunrise.

They were so overjoyed to see the light and feel the warmth of the sun's heat, they burst into song.

As they sang, the blanket of darkness broke and drifted away like clouds.

Story translated and re-told by Elder [Uncle] Tandop David
Tournier (2014: 48-49).

Tandop David's story of the Magpie tells of a beginning of time, historically, but also now and into the future. It tells of the need to respect the Magpie (*Gymnorhina tibicen*), and its activities, the role of trees in holding up the sky canvas, but also to celebrate sunrise. It tells that it is a new day, to cast aside yesterday's problems, and to partake of the new day in the new light with cultural respect. A thread in Tandop David's story is that light, and the arrival of sunrise, is thus something to be culturally respected, celebrated, enjoyed, but not undervalued nor taken for granted but also to respect trees and the Magpie because of his/her role in society. It is but one story, Tandop David's story, but it has common threads as a consistent story across the Kulin, Mara and Wotjobaluk Aboriginal nations of Victoria.

From the beginning of human history, stories were told about the creation of light and dark. The separation of light and dark came up in the myths of creation, and were described in cosmogony—from cosmos, meaning 'order', and genesis, meaning 'birth'.

A cosmogony or cosmic creation story is also a metaphor for not just cosmic birth but individual birth and the birth of individual consciousness and identity. Light, in its forms of phenomena, be they dynamic or diffused, visionary described or spiritual inspired, is core to our human existence, history, cultures and beliefs.



Figure 1: Emu in the sky (Source: Nightskysecrets, 2014)

From the collective to the individual level, light and darkness impact directly on our physiological and psychological well-being. In this paper, we investigate the phenomena of dynamic and diffused light, and how this has an impact on our sensory experiences, charting an argument that as part of 'biophilia', humans need to have a deeper connection to nature.

Background & Context

'Healthy cities' and 'well-being' are currently the most topical and mis-used words in our global society. We see them being used in discourses about new strategies and policies to create urban environments, often masking a failing 'healthy economy'. This discourse is the result of our human-made environments as a consequence of our Western quest for 'development', having 'economic renewal' as part of our global urbanisation. This quest appears to be casting aside our primal knowledge of living structures and systems, our important spiritual and innate affiliations to the natural world that we are part of, and thereby loss of biophilia.

Global Issue

One of our world's biggest issues is the trend of rapid urbanisation. Today, 54% of the world's population lives in urban areas, a proportion that is expected to increase to more than 70% by 2050. In numbers, this means that the world population will be around 9.7 billion by 2050, and that about 6.7 billion will live in cities.

It is said that cities with their bright lights provide for all our needs as a human species. However, 1 billion people live in slums, about 6th of the world's population, and that number can double by 2030 (UN, 2003).

The tendency towards high-density city development creates high-rise buildings with deep floor plates (no access to daylight), narrow streets and dark alleys, non-porous concrete and hard surfaces that dominate, and very few open spaces with green vegetated areas. The result is a 'concrete jungle' with no or very few 'living spaces' that supports our much needed healthy sensory stimulation for physiological and psychological well-being. What is evident is that the way we have designed, planned and built our cities during the preceding twenty and twenty first centuries is absolutely bad, and unacceptable (Roös, 2017). Additional consequences, beyond human impacts, are environmental and wildlife impacts, an unprecedented climate change (IPCC, 2014) and increasing shifts towards novel ecosystems (Hobbs, et al., 2013). The question is, then, what are we doing wrong? Is it that we totally forgot and ignored our direct link and connection to the living dynamics of nature? Is it perhaps that we need to acknowledge that we are part of nature, part of this earth, and not above it?

Biophilia

In a new world-view, we acknowledge our need for 'living structures' and a deeper affiliation with the natural world. In The Biophilia Hypothesis (1984;1993), Edward O. Wilson noted that humans needed daily contact with nature to be healthy and gain longevity. He reasoned that humans have co-evolved with nature and are part of nature and he noted that biophilia is "the innately emotional affiliation of human beings to other living organisms. Innate means hereditary, and hence, part of ultimate human nature" (Kellert & Wilson, 1993). Biophilia supports the proposition that our environments around humans need to include the essentials of nature for providing us with psychological and physiological health:

"Over thousands of generations the mind evolved within a ripening culture, creating itself out of symbols and tools, and genetic advantage accrued from planned modifications of the environment. The unique operations of the brain are the result of natural selection operating through the filter of culture. They have suspended us between the two antipodal ideas of nature and machine, forest and city, the natural and artifactual, relentlessly seeking, in the words of the geographer Yi-Fu Tuan, an equilibrium not of this world"

(Wilson, 1984: 12).

This affiliation with nature continues to be critical in the modern day human health and well-being literature and practice (Kellert 1997; 2012), and has been strongly identified as a valid concern by the health sciences. In the research area of human health and well-being, a growing body of research reveals that exposure to nature continues to result in positive health benefits in a wide range of sectors: at work, home, recreation, community areas and even within the urban environments where people work and live (Kellert, 2012; Browning, et al., 2014).

Even though Edward O. Wilson described biophilia as our innate connection to living things and the natural world, this is not new knowledge, it is just that as a modern Western society we have ignored it. Our first peoples across the world know this importance of a deeper connection to something bigger than we are part of, this immersive interconnection to the earth. According to Australian Aboriginal belief, this is the deeper multi-dimensional connection to Country (Brown, 2018; Powell & Jones, 2018; Rose, 1996).

Multidimensional Relationship to Place

Aboriginal culture resides in its four-dimensional relationship to place. Place is Country, and within Country is the self and being of an Aboriginal individual, their clan and their community. Self exists and is dependent upon Country, and Country explains the existence and responsibilities of the individual. Country is explained and told in story, song, place name/nomenclature, and language, all of which are intertwined. Country cannot be separated from language, of which story, song and place name are subsets of language. Law, and the protocols of Aboriginal society and self, are embodied in language.

We would like to make an observation and add that biophilia is this language of 'existence' for many thousands of years, it is the language of our deeper submersion into all things living and not living.

Biophilia into Practice

By nature, human beings are subconscious, constantly engaging with patterns of biophilia that are in existence in the surrounding environment. This could be in a place in the built environment with a lack of natural elements, or in spaces located within nature. Many patterns of biophilia are available to trigger and work with our senses. In this way, it is possible to create places that connect us with these patterns.

While biophilia is the theory, biophilic design as advocated by Kellert, et al. (2008) and Beatley (2010) internationally, involves a process that offers a design strategy that incorporates reconnecting people with the natural environment. Beatley has evidenced the validity of this approach in *Biophilic Cities* (2010) by pointing to numerous exemplars and precedents that can enable the successful implementation of this process. He has advocated putting the biophilia hypothesis into practice at an urban scale, proposing the essential elements of a biophilic city, and tabling examples and stories about cities that have successfully integrated biophilic elements.

On health and well-being, Ryan, et al. (2014) have validated the relevance of biophilic design to humans whereby research in the neurosciences, endocrinology and other fields have scientifically validated the positive psychophysiological and cognitive benefits afforded by biophilia in design interventions. In the built environment sector, Söderlund and Newman (2015) have proposed a new set of design principles and practices where nature needs to play a bigger part called 'biophilic architecture', asserting that humans have an innate connection with nature that can assist to make buildings and cities more effective human abodes.

Söderlund and Newman (2015) has also concluded that biophilic design is emerging as a social movement.

In *Creating Healthy Places* (2017), authors Downton, Jones, Zeunert and Roös (2017) have sought to apply biophilic design patterns as design and performance parameters in the new underground railway system in Melbourne.

Roös and Jones (2017) argued that the research findings in *Creating Healthy Spaces* (2017) indicate that the findings could potentially support the measurable, positive impacts of biophilic design on human health, strengthening the empirical evidence for the human - nature connection and raising its priority level within both design research and design practice. Kellert (et al., 2008, 14) proposes that combining “the biophilic desire to harmonise with nature” together with the design of the built environment, results in “some degree of deliberate refashioning of nature to satisfy human needs, but in ways that celebrate the integrity and utility of the natural world”. Accordingly, biophilic design has the potential to enrich nature and humanity.

To implement biophilic design, Browning, et al. (2014) have proposed ‘14 Patterns of Biophilic Design’ (Table 1) within a framework for relating human biological science and nature to the design of the built environment offering tools for understanding design opportunities, and avenues for design applications as a way to effectively enhance health and well-being for individuals and society.

Context	14 Patterns
NATURE IN THE SPACE	1 Visual Connection with Nature
	2 Non-Visual Connection with nature
	3 Non-Rhythmic Sensory Stimuli
	4 Thermal and Airflow Variability
	5 Presence of Water
	6 Dynamic and Diffuse Light
	7 Connection with Natural Systems
NATURAL ANALOGUES	8 Biomorphic Forms and Patterns
	9 Material Connection with Nature
	10 Complexity and Order
NATURE OF THE SPACE	11 Prospect
	12 Refuge
	13 Mystery
	14 Risk / Peril

Table 1- Browning et al. (2014) 14 Patterns of Biophilic Design

For this research, the authors have focused on 'Biophilic Pattern #6: Dynamic and Diffuse Light', documenting the experiences in the context of self-reflective practice and first-person action research. The aim is to identify the sensory experiences relating to human - nature connections, within the practice of biophilic design.

Our World: A Sensory Phenomenon

When we engage with nature, distinct natural attraction senses and sensitivities are triggered. Nature is multi-sensory, informed by our conscious and unconscious innate connection to it. One thing we often overlook is that the natural world is a non-verbal community. In nature, the desire to breathe has no name. However, we have the sense that air exists and we feel our desire to breathe. This is a source to keep us alive, and our 'inner child' or 'inner nature' knows it too (Cohen, 2013). Similarly, humans are attracted to natural light, and subconsciously we know that light from the sun is the source of all life on earth. Without this light, the earth will be enclosed in darkness and our existence will be absolute. The change in light, the movement of light, and dynamic characteristics of light, positively impact circadian system functioning (Figueiro, et al., 2011; Beckett & Roden, 2009) and increase visual comfort (Elyezadi, 2012; Kim & Kim, 2007).

The 'sense of light' is listed as number 1 of the 54 Natural Senses (Cohen, 2013). The 'Sense of light and sight, including polarised light' is core to the inherent natural attraction to the webstring of life, a genetically rooted web-of-life strand that helps to hold the human - nature existence together in this universe (Cohen, 2013: 170). Considering the stories of cosmogony or cosmic creation across many cultures, including the creation story of the Magpie by Tandop David as an Aboriginal Elder, is it possible that the 'sense of light' is the webstring that connects us all together?

Immersive Experiences: Dance of Light

To understand the effect of Dynamic and Diffused Light - Biophilic Pattern #6, the authors Roös and Wilson conducted self-experimentation in the natural settings of the Otway Forests, comparing sensory experiences outside in the open forest, and inside the camera obscura. The research is subjective, not through objective observation, but involves subjective or immersive experimentation academically accepted in self-reflective practice or research (Marshall & Mead, 2005). This experimental nature of the inquiry is founded on the method of Action Research (AR). The AR approach is deemed as appropriate due to the active engagement of the researcher in the research by acting, observing and reflecting on the findings. This self-reflection and evaluation result in the understanding and adding of new knowledge in the specific field of practice (Blumberg, et al., 2005).

Experience of the Natural Senses

During the years 1961–1978, researcher Guy Murchie made an exhaustive inquiry into the multi-sensory experiences that connect us to nature, which we can observe as humans (Murchie, 1978). He condensed together over 80 different biological sensitivities that pervade the natural world, into a group of 31 senses. From these senses, Cohen identified, documented and included 54 natural senses that connect us to nature, in the practice of ecopsychology (Cohen, 2013: 169).

The effect of biophilia patterns as a result of many multi-sensory phenomena when experienced first-hand is difficult to describe in words. However, the authors will attempt to describe the occurrences as best possible. The following is an account of their observations.

Sensory Experiences: Phillip B. Roös

This section is a reflection of my subjective experience conducting a sensory experiment testing the effect of Biophilic Pattern #6: Dynamic and Diffuse Light outside in the forest, as well as inside a camera obscura, located in the Otway Forests (Figure 2).



Figure 2 (*Top*):
Otway Forest Experiment
(Source: Roös, 2018)

Figure 3 (*Bottom*):
Multisensory observation in the
Otway Forest
(Source: Roös, 2018)



On arrival in the forest, in the first instance I requested consent from nature to visit and interact. Instantly I sensed a welcoming feeling.

The first part of the experiment was to spend some quiet time in the forest. I lay down on the grass behind the waterhole at the site, starting to observe the environment around me. With a purpose to identify the patterns of dynamic and diffuse light, I immediately recognised the many intensities of light and sunrays filtering through the forest trees and other vegetation. It was as if the light had its own character, a personality, dancing within the forest in harmony with the sounds of birds, insects, and wind in the leaves. My senses registered patterns, shapes, colours, feelings, aromas, sensations, moods and thoughts (Figure 3). I felt an inner calmness. It was as if I was part of everything around me, as if I was an extension of the natural world. The more I focused on the dancing light, the more aware I became of the many different colours, at first not obvious, but later identifiable within the many textures and spaces in the forest, surfaces of tree trunks, bark, leaves, grass, flowers, the ground and the sky.

In the camera obscura, I instantly became overwhelmed by the blackness, the absence of colour, and the absence of light. However, after a certain period of time (that felt like an eternity), the intensity of the light beam shining through the hole in the camera obscura exploded into a very bright spot on the forest floor, emerging into a pool of colours and reflecting the outside. On the back wall of the camera obscura an upside-down image of the outside world was clearly visible, with the play of light and movements reflected. The phenomenon of observing moving objects from the outside was like watching a movie on a screen, just upside down. What is more fascinating is that there is no technology involved that needs electrical power to create this image, just a simple hole in the fabric of a black box.

Figure 4:
Sensory experience -
'The dance of light',
Otway Forest
(Source: Roös, 2018)



The light spot on the ground looked 'alive', as if it was glowing. During the observation, with the sensory experience of the concentration of light and the upside down reflection of the trees and the sky, I saw a face looking back at me, a reflection similar to that of looking at a steamed-up mirror. Rational thought let me question what I saw. Was this my imagination? Or is this the paradox where self meets self?

In front of me was a display of 'the dance of light', or was this my imagination? (Figure 4). The effect of this motion triggered an observation of heightened hearing. I experienced amplified sounds from the outside. The sounds of the forest and people talking nearby (that I later found out were more than 200 metres away), were clear and crisp. Focusing on the beam of light, I saw blotches of red, orange, brown, blue, green, purple, pink, yellow, white, grey and black. It felt like time was standing still, as if I was locked into a space of merely 'being'. I had the urge to 'climb into the light'.

After a while I eventually became aware of the black space that I was in. I wanted to escape this black void and move back into the open air and the forest.

Rule of Reciprocity: Anne S. Wilson

In this paper, I am exploring how artistic, practice-led research¹ sustained over a 7 year period can attest the claim that Biophilic Pattern #6: Dynamic and Diffuse Light, creates a sense of well-being. Claims of well-being in this paper are about affect, tested out through subjective responses to a set of rules imposed while exploring methods to make an artwork following a line of enquiry about the body and existence

While not searching for sensations of well-being per se, I encountered emotionally charged responses using a primitive photographic method to understand its rule of reciprocity, of which light itself is foundational. Reciprocity describes the relationship between light, the aperture or hole through which light travels, the sensitivity of the surface it hits, the time it takes to travel, and the focal length or space between the surface and the hole behind or in front of it. Each of these elements is measured reciprocally in photography: for example, if the hole is bigger, the length of time it needs to create an exposed image is lessened because more light is hitting the surface than with a smaller hole.

To make a well-exposed image, i.e. an image with contrast and details in highlights and shadows, light hits a photo-sensitive surface. Its strength and speed, measured in relation to each other, combine with the sensitivity of the surface to form a set of rules commonly thought of in terms of numbers in traditional photographic methods. Each part of the rule relies on the other. For example, light's strength is affected by the speed it travels, which is in turn affected by the size of the hole it travels through – a larger hole causes more light to travel through it, which reduces the amount of time needed to create an image. I needed to know this in practice rather than theory alone, to understand it in relation to my existing enquiry.

The rule itself mimics the mechanics of light in how we 'see', as well as in a digital single reflex camera, an iPhone or an analogue camera.

Photography 'captures' an image, and has been described as a 'certificate of time' (Barthes, 2010). The philosophy of photography contains many examples of poetic observations reflecting on the simplicity of light traveling through a hole to form an image. How we 'read' or 'interpret' images in everyday experience is complex. Beyond the materiality of the image, the meaning it conveys is both subjective and contextual. In this paper, I look at the role light plays in forming an image and do not think of the figure or image itself. The 'rules' can be thought of metaphysically, but, in my practice I needed a physical understanding first.

It has been theorised that classical paintings, such as the portrait of Arnolfini and his Wife by Jan van Eyck, 1434 (Williams et al., 2009), were made using a camera lucida/obscura, and the painting renders light in great detail. Euclidian perspectives created through a camera place the viewer in a static position and demonstrate a depth of field that is similar to how we see distance depending on light conditions. Cameras used in medicine, military operations and space programs, by contrast, are superior in how they interpret light, revealing more than the human eye can see. However the eye processes light like the camera and the camera is designed on the mechanics of the eye.

In my practice I uncovered aspects of light I had not anticipated, such as described in the famous quantum physics 'Schrödinger's cat experiment' (Ionicioiu, 2017), which showed that light at an atomic level, when observed, behaves differently than when not observed, meaning it could be thought of as responsive to human and other interaction. In layman terms, the experiment shows light can be both a particle and a wave, and can mutate between both states at the same time. This is a conundrum, and for scientists it removes the ability to objectively analyse light, however either the particle or the wave can be isolated and studied but not at the same time.

The effect of the 'rule' and its relationship to light, used in painting or photography, has been described as 'magic'. Well-being may be an understatement when compared with many accounts of light in photographic or painting histories. The camera obscura, camera lucida, and eventually the view camera, came into popular use in the 1800s once a surface could 'fix' light. In my experiments I wasn't trying to 'fix' an image as much as I was trying to physically play with time through light in movement using a camera I made and using it as if it were another eye in my body.

Through practice, I have discovered light as a physical entity that is both a medium and 'interactive', creating a sense of well-being when it is intensely observed. In using an embodied approach to photography and to recount how well-being may occur, I need to speak in the first person as the effects of light are both subjective and empirical. Therefore, I want to start with recounting the idea that we learn to move and see through our musculoskeletal system as much as through the mind. It is outside the scope of this paper to go into detail, however I draw from knowledge bases of kinesiology and the anatomy of movement analysed through dance. My knowledge of movement is intricately connected with that of sight and/or seeing. From childhood, I trained as a dancer, working professionally by the age of 15 years – a career of 30 years, which explains why learning photography was a physical endeavour.

I set up conditions that use extreme light dynamics to teach myself how photography works. I will include these studio tests to align seven years art practice, alongside additional tests in the Otways with Roös, that help to unpack biophilic claims.

A physical awakening occurred over time when I started to learn about light and its effects. Trying and failing, I built a human-size camera I could step inside, and observe what light was doing momentarily. Until I learnt physically about how cameras work I did not think of light being everywhere at once or how it enables sight. Light was literally a 'blind spot' in my thinking. These are the steps I took to find out how to take a properly exposed photograph:

1. Build a 2 x 1 metre square camera obscura and observe how light creates an image and how it changes momentarily based on light conditions of the sun and sky
2. Translate this knowledge in the 'rule of reciprocity as it applies to photographic practice and mechanics
3. Push the rule to 'see' and experience light consciously

Photography's rule of reciprocity invokes a collaborative relationship between the camera and light. I built a light-safe container that has a small hole on one side facing (in the first iteration) an urban street and the sky above. In the photography discipline, 'reciprocity' refers to the relationship whereby the total light energy – the product of the light intensity and exposure time respectively controlled by aperture and shutter speed, proportional to the total exposure, determines the effect of the light on the film.

Known as a camera obscura, the scale of the interior space is critical to the time it takes for the senses to acclimatise to darkness and sounds that filter through its material and shape. Inside, light forms dynamic and diffuse patterns while its walls restrict sound altering auditory balance – on the inside, breath and movement sounds dominate. It can take a while to notice a singular dynamic light beam hitting the surface of the floor, like light through a magnifying glass. Then, as if by magic, the entire interior surface becomes a cinematic mirror of the outside world upside down.

I have taken the camera obscura to schools and shown 'digital natives', asking them to trace the outside world in a drawing. Anecdotally their responses are initially shock – to connect the iPhone camera to such a simple and analogue construction seems incongruous.

As sunlight waxes and wanes, light's characteristics begin to push and pull Euclidian perspectives beyond the magical effects of a real-time formation of an image, drawing attention to light's otherwise ubiquitous nature.

I began to realise how camera design mimics the mechanics of the human eye, with an image in a camera obscura forming in the same way it happens inside the eye socket; and light, through a small hole, the pupil, acting as an aperture; and the eye socket acting as a camera body. In humans, the optical nerve reverses the image so that what we see is 'upright'. Diffuse and dynamic light are active in our body all the time, yet it has taken a sustained period of observation and internalisation to feel its effect of well-being consciously.

In photographic terms, an exposure is attained in milliseconds – the strength of light determines whether a slither of time will cause details to appear in light or dark areas of a photo-sensitive surface. I practised a clairvoyant game while inside the camera, trying to predict what light will do in the next moment, measuring my success or failure through tonal range in exposures processed in the darkroom. As I exposed photosensitive paper to light, I learnt to see physically (through my body rather than my eyes only) by increasing sensory awareness of momentary changes of the sun's movement and diffuse effects of a cloud's movement felt simultaneously inside. Photography's rule of reciprocity establishes light as if it was a player in a sport like surfing, as if it was a primal force of nature like the ocean's uncontrollable and volatile changes that provoke and demand a real time response from the surfer in anticipation of the subsequent moment. Science, too, has a way of demonstrating the impossibility of predicting how natural forces will move.

Figure 5 (Left):
The camera obscura experiment
in the Otway Forest
(Source: Roös, 2018)

Figure 6 (Right):
Inside the camera obscura
in the Otway Forest
(Source: Wilson, 2018)



A quantum physics experiment, 'Schrödinger's cat' showed that at a nanoscale light travels in unpredictable ways. Additionally it is comprised of particles and waves that can co-exist or exist separately and mutate, thereby demonstrating that light can be in many places at once (Aharonov, et al. 2017):

"When a quantum 'observer' is watching, Quantum mechanics states that particles can also behave as waves. This can be true for electrons at the submicron level, i.e., at distances measuring less than one micron, or one thousandth of a millimeter. When behaving as waves, they can simultaneously pass through several openings in a barrier and then meet again at the other side of the barrier. This 'meeting' is known as interference"

(Piazza et al., 2015).

This means that when observed light behaves differently. In my practice 'reciprocity' can be understood as physical – I observe it and its behaviour changes – to and fro we exchange movements and time-frames in an anticipatory game of chance.

"Strange as it may sound, interference can only occur when no one is watching. Once an observer begins to watch the particles going through the openings, the picture changes dramatically: if a particle can be seen going through one opening, then it's clear it didn't go through another. In other words, when under observation, electrons are being 'forced' to behave like particles and not like waves. Thus the mere act of observation affects the experimental findings"

(Piazza et al., 2015).

The camera obscura intensifies light's characteristics, emphasising and mirroring what happens in the human eye. A person behind a camera intensely observes light. In my case I relied not so much on human measurements, on f-stops and aperture sizes, but on my intuitive response to light in a moment, learnt as if a complex set of steps – like a dance to music. Once I took this embodied knowledge into the field using a bespoke pinhole camera, I played at guessing imperceptible speeds and time frames as I moved from one reflective surface to another making decisions of when and where to stop and for how long, while interpreting the sky and sun's effect on exposure.

By comparison, a conventional camera 'clicks' at 1/25 of a second or less, the sound and feel of the button signifying a time frame contrasting the click. It is an intuitive finish - a decision to stop light, and start it again, knowing the right time to process an image. The process of making images in this way raises further questions that become pertinent through repeated practice: could intense interactivity change our physiology and biology? Could it change something vital in us?

After gaining a physical understanding of the mechanics of the camera (and the rule), I took my knowledge into the field. I literally went into the landscape to test what happens if I rely totally on embodied knowledge of light to make images rather than on numbers and dials in a camera. If I use my camera like a prosthetic eye – removed from my body's trunk and attached to my limbs - what intuitions and embodied knowledge would be activated? I take out the lens of a conventional DSLR camera, and replace it with a cap that has an engineered hole made by a jeweller's tool equivalent in photographic terms to an F164 size aperture. On a conventional camera, the smallest size is f/22. By reducing the size of the hole that light travels through, I can increase the odds of reciprocal play.

When I first showed these works, I counted the process as much a part of the art as the artefact/print. Exhibited in a commercial gallery, my artist statement emphasises the shoot itself as the art. The process is somatic, improvisational and performative, a witnessing, a trace or map of movement like a choreographic annotation. I wrote in the catalogue about the unexpected effect I experienced:

The 13 images in Fly Rhythm were shot in the Dandenongs, Altona, Victoria and Bruny Island, Tasmania created through exercising embodied procedural memory of light, air and motion. With camera in hand away from my eyes I travel through a landscape as light fluctuates - the air and geography trigger a kind of fluid performance - a still image of motion remembered - a satisfying past time².

Obscured memories emerge during and after the shoots, sensations of my body (though not objective) soaking up the sun and learning to walk in colour saturated tropical landscapes. I 're membered' laying on a blanket under the sun as a baby. I took from this experience a sense that time is elastic and as more submerged corporeal memories surfaced I reconnected to the beginning of my life. Roland Barthes (2010), a French philosopher has analysed how a photograph is a 'certificate of time' and the latency in film (before it is developed) or photo sensitive surface analogous to another reality or 'the other' of one in a state of becoming, not grasped directly. Likewise, light thought of as active and its 'operator' (camera person) cannot be scrutinised.

The 'punctum' refers to a piercing that occurs in experiencing a photograph beyond its semiotics of formal composition – it is the moment that meaning is conveyed to the viewer. I liken the effect of light as that of a camera operator, that is, to be latent, emerging after capturing images.

I shoot images with light, and it shoots me like a punctum in the moment. Subjective narratives are particularly salient when experiences of 'well-being' are physically encountered (Salingaros, 2015) as "... human sensory organs and systems evolved to respond to ... colors, fractals, scaling, and complex symmetry" (Salingaros, 2015). Dance training comes to mind. Within a broader enquiry of time and embodiment, complex symmetries communicate well-being – feelings of 'rightness', balance while moving in rhythm.

In my experience of light, narratives emerge of dance as a language.

Subjectivities are not considered reliable scientific measurements or evidence of anything – they cannot be proven or be put under scrutiny – so they are often ignored in scientific journals and fall into the realm of the imaginary. Yet my experiences are emotionally charged as a result of an interchange/play with light using a bespoke camera. It's more than 'something happening to me'. I am an active participant with light performing a pas de deux. Following Fly Rhythm (2013), I created a solo exhibition titled Inside the Matrix, a tango with light (2016), comparing my method to a dance that is a game of submission and domination of pushing and pulling – a dynamic action between bodies of light.

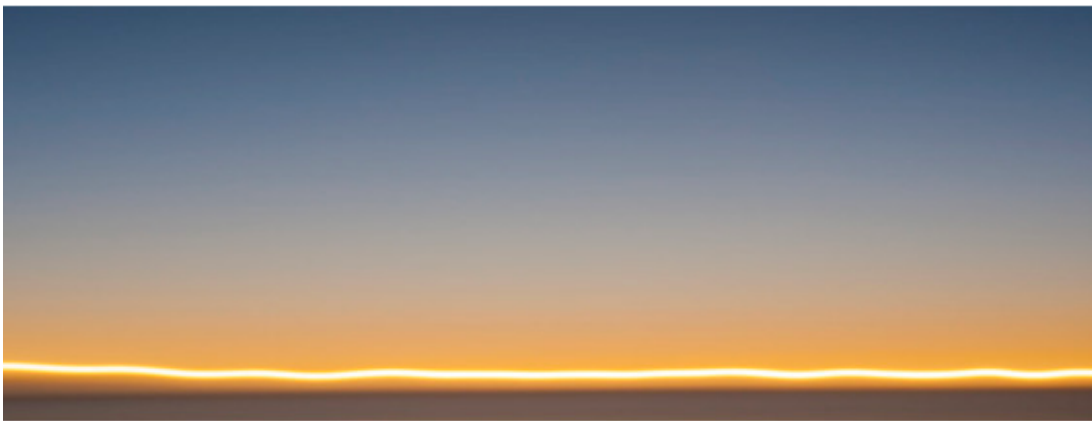


Figure 7:
The end is the
beginning
(160 x 65 cms Museo
portfolio rag)
(Source: Wilson, 2017)

The Otway Experiment

While teaching and making photographs, I have been touched by the unique quality of light offered while inside a camera obscura. It is like stepping inside a human eyeball, and after long periods of demonstrating camera optics and mechanics with students, the Otway experiment shows similar results, albeit slightly differently, as experience is affected by natural surrounds. Initially, I constructed the camera in an inner city university, with the aperture looking onto a busy street with trams and lots of foot traffic. By contrast, the Otway camera was set up surrounded by tall trees, a lake and some picnic facilities. Deep into the ranges, the location offered acoustic sensations that the city does not. In urban situations, a ray of light inside feels like a video projection resonating with 21st century technology. By comparison, the Otway's ambient surrounds act to create a more multi-sensory experience, in my opinion. Sounds, smells are different. Changes in light, clouds covering the sun create immediate sensations of the moment making a more temporal experience or a heightened awareness of time and space. While city lights and built up areas cause alternative sensory responses, the experiment magnifies how light is ubiquitously sensed everywhere at once in the Otways, and it is also somewhat of a blind spot in a city context. The Otway experiment revealed that an effect a sense of well-being is multi-dimensional. Space and time feel expansive in a country situation while urban landscapes are an analog reminder of how light is functioning in the technology. Both situations are effective in changing sensory experience in physical and holistic ways.

Conclusion

This paper charts the importance of biophilia, how we need to consider the elements of biophilic design, and how the understanding of sensory experiences could potentially help bring together the realms of the built environment and nature so that we as humans can experience the well-being benefits of biophilia.

In the Creating Healthy Places (2017) study we identified that movement through underground station complexes invokes sensory experience, demonstrating the importance of artificial and natural light in affecting our physiological and psychological well-being. We argue that hidden patterns within light activated by design and participation can enhance user arrival/navigation/exit experiences.

Through engaging in a site-specific responsive process by testing immersive experiences within the natural settings of the Otway Forests, comparing sensory experiences outside in the open forest, and inside the camera obscura, the authors' findings indicated that the dance of light triggers sensory experiences of well-being. Furthermore, these findings raise the potency of direct innate human - nature connections incorporating Indigenous Dreamtime and spiritual values, reflecting their deep connections to Country.

Further, the findings of the testing the effect of Dynamic and Diffused Light - Biophilic Pattern #6, by the authors Roös and Wilson demonstrates that changes in light create immediate sensations of the moment, making a more temporal experience or a heightened awareness of time and space. The sense of well-being was paramount. Undoubtedly, light and other natural phenomena have an impact on our sensory experiences, charting an argument that as part of 'biophilia', humans need to have a deeper connection to nature.

NOTES

1 See Situating Creative Arts Research As 'Successor Science', Estelle Barrett, 2014, in *Doctoral writing in the creative and performing arts*. Editors: Ravelli L, Paltridge B, Starfield S. (1) 51-66. Libri Publishing, Oxfordshire, U. K. 2014 demonstrates the specificity of artistic research as an emerging and valid research paradigm- as a 'successor science'. And the precursor to this paper, Barrett, E. & Bolt, B. A. (Professor of Art). (2007). *Practice as research : approaches to creative arts enquiry*. London ; New York : I.B. Tauris & Co Ltd, 2007. Of specific interest is 'The magic is in the handling' Chapter 2 by Barbara Bolt where she demonstrates how new knowledge emerges by an artist's choices and application of materials, citing Hockney's processes.

2 'Fly Rhythm' catalogue accompanying the exhibition of the same name at Arc One Gallery Melbourne, 2013 essays by Melissa Amore and Will Johncock

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