

**Perception and Representation:
the visual cortex and landscape
art, an investigation**

by Ada Henskens

Diploma Visual Art, RMIT

BFA, Victorian College of Arts

BFA (Hon), Monash University

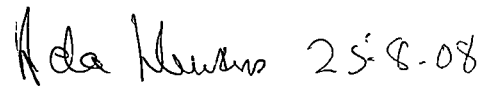
Submitted in fulfilment of the requirements for the degree
of Doctor of Philosophy,

University of Tasmania, August 2008

Signed statement of originality:

This thesis contains no material which has been accepted for a degree or diploma by the University or any other institution.

To the best of my knowledge and belief, it incorporates no material previously published or written by another person except where due acknowledgement is made in the text.

A handwritten signature in black ink, which appears to read 'Ada Henskens', followed by the date '25-8-08'.

Ada Henskens

Signed statement of authority of access to copying:

This thesis may be made available for loan and limited copying in accordance with the Copyright Act 1968.

Ada Henskens 25.8.08

Ada Henskens

Abstract

This project investigates artistic perception and representation of landscape as a means to determine how we construct a concept of what is real. It finds that the visual cortex perceives data in the form of light and that this data is translated by processes throughout the brain to arrive at a concept of reality. It posits these processes as being further influenced by the prevailing culture and technology. The conceptual base is grounded in a combination of present day neuro-physiological studies of the visual cortex, quantum physics and digital technology.

Supporting theoretical material by physicists Paul Davies, Brian Green and various academic papers offer the view that what we experience as reality is determined by what filters through our sensory systems, and that the world is not what we take it to be as revealed by these sensory systems alone. The project takes the position that we tend to think of the world outside the self in terms of classical landscape; terms which are chiefly relevant to a different mindset and earlier stage of industrialised society. These ideas drive the project and are contextualised through the artworks of Georges Seurat, Bridget Riley, Geoff Parr, David Hockney, and Leigh Hobba, who explore self and the world in highly individual ways with a unique attitude to vision. Selected academic writings by Karl Popper, C.H. Waddington and Steven Johnson add strength to questioning orthodox realities and display certain parallels within the disciplines as to the value of apparent paradoxes, (see bibliography).

Through a range of studio works the project pursued a visual exploration of landscape that reflects how we move through the world, scanning as we go, and building up a

composite image from selected fragments. The imagery is based on the structure and action of the visual cortex reacting to natural forms. The processes used imitate viewing processes such as cellular edge-recognition, conveyed, for example, by laying down alternate sharp edges through spray-painting. The outcome is a series of works presented for exhibition on canvas, MDF board, paper and video, which encompass developments encountered in the course of the investigation. These artworks are presented in the thesis exhibition as perceptions of reality still in the process of resolution. The focus on the visual cortex as instrumental in apprehension presents a view of society as being inescapably animal in origin, evolutionary in its physical being, superficially overlaid by a drive to socialisation, and subject to modification.

Acknowledgements:

I wish to thank my supervisors Milan Milojevic and Mary Scott for their advice, support and guidance throughout this research, Leigh Hobba, (Head of Video department), Peter Jarvis, (Reader in Physics and Mathematics at Utas), for their advice and expertise, and Emeritus Professor Geoff Parr for his generosity and patience in supplying images and submitting to interviews. I wish also to acknowledge the unstinting support given to me by my three children, and Dr. David Rankin, who have each in turn been through this process.

I thank technical staff Bill Hammond, John Robinson, Ian Mundy, and Aaron Horsley for their assistance where required, and Philip Blacklow for rescuing a crucial canvas from damage.

I also wish to acknowledge the contribution that Ona Kaukenas made in proof-reading.

Contents:

Title page	i
Statement of originality	ii
Copyright	iii
Abstract	iv
Acknowledgements	vi
Introduction	p.1
Chapter 1- Central Argument	p.2
The Theme	p.2
Earlier Background	p.7
Previous influential work	p.8
Aims of the project	p.11
Research approach	p.14
Theoretical background	p.15
Works comprising the exhibition	p.18
Summary	p.20
Chapter 2 - Context	p.22
Introduction	p.22
Artists and scientific theory	p.23
Scientists, art and theory	p.37
The visual cortex, its relevance	p.41
Discussion of specific works	p.42
Summary	p.57

Chapter 3 - The Studio Work	p.58
Introduction	p.58
Structure of the chapter	p.58
Section 1: the works, background	p.59
Line of MDF boards	p.62
The canvas triads	p.63
Greyscale grid	p.75
Three videos	p.77
Monotone paper stencils	p.82
<i>Focus</i> , a digital image	p.83
Coda of source images	p.83
Supporting works	p.83
Section 2: exhibitions and ideas	p.84
<i>Behind Your Eyes</i>	p.85
Redirection of work	p.87
Resulting new works	p.88
Reappraisal of works/ideas	p.100
 Chapter 4 - Conclusion	 p.105
 Appendices:	
1. The Visual Cortex	p.108
2. Bibliography	p.116
3. List of Works submitted	p.124
4. List of Illustrations	p.126
5. Curriculum Vitae	p.130
6. Dvd and cd of works	back pocket

Perception and Representation: the visual cortex and landscape art, an investigation

Introduction

Research aims:

- The central aim of the project was to examine what we believe to be real in the world outside the self, and how we might arrive at that concept. As the project takes place in a visual arts context, vision and landscape were chosen as the vehicles to carry the investigation.
- Light was chosen to convey data flow to the brain.
- Processes needed to be devised to suggest this interactive two-way data flow.
- Both the processes used and the resulting imagery needed to convey the influences prevailing in present day society so as to be contemporaneous with that society.
- It was thought desirable to have the viewer complete the work by their personal experience of it.
- This was seen as to be achieved by creating an awareness of standing in a physical and psychological space.
- Methods needed to be devised to suggest this.
- At no time was the project envisaged as being about 'immersion'.
- Apart from this decision, no firm conditions were set, rather an attitude of exploration through materials was adopted, bearing in mind the first two points.

The exegesis is divided into three chapters and a conclusion.

Chapter 1 presents an overview of the research topic, which explores concepts of reality expressed as the visual cortex in action while viewing landscape. The overview cites associated fields in contemporary art practice, scientific research and technology, all in broad relation to the aims, research approach and background material. These issues are discussed in greater detail in Chapter 2 - Context, and Chapter 3 - Studio Work. Chapter 3 also lists the works comprising the exhibition plus relevant supporting work that is attached to the exhibition. Following this, a summary redefines the parameters of the project at outset. Chapter 4 - Conclusion encapsulates how the studio work and literary research have intertwined to produce the exhibition works, resulting in a new contribution to the field.

There have been considerable financial and physical constraints affecting the research, though curiously enough, these have resulted in a closer, more intense focus on the issues with less outside influence, and a personal touch to the finish.

Chapter 1- Overview and Central Argument

The theme

Perception and representation are investigated within contemporary culture in the context of neuro-physiological studies of the visual cortex, digital technology and aspects of quantum mechanics¹. Examples of these that are relevant to contemporary technology and structures of the physical world would be lasers, fibre optics, micro-chips, Decoherence Theory, Entanglement Theory and The Heisenberg Uncertainty Principle². Aspects of these topics are traced to form a common structure within which to posit a mode of viewing the world and translating this view into a visual art form. This necessitates the development of an artistic language within these parameters. Landscape and vision are chosen as being suitable vehicles to examine what might be 'real' in a way that reflects present day life. Because the project takes place within a visual arts context, it is essentially artworks rather than diagrams that are made to convey theory. Landscape has a tradition of representing the external world; vision is the main means of perception, and vision has been subject to extensive

¹ Taken from <http://www.jracademy.com/~jtucek/science/what.html> - *What is Quantum Physics?* viewed 08/09/2005

Quantum mechanics is a fundamental branch of physics with wide applications in experimental physics and theoretical physics that replaces classical mechanics and classical electromagnetism at the atomic and subatomic levels. Quantum mechanics is a more fundamental theory than Newtonian mechanics and classical electromagnetism, in the sense that it provides accurate and precise descriptions for many phenomena that these "classical" theories simply cannot explain on the atomic and subatomic level.

² see Chapter 2 - Context, Theoretical background to the Research Approach, p. 39, fn.37.

scrutiny in certain contemporary sciences such as neuro-physiology. Traditional (Classical) landscape³ is used in contrast to contemporary culture, as expressive of a different mindset pertaining to an earlier stage of industrialised society; (see Aims of the Project, p.12. for images representing Classical landscape as used in this project).

Present knowledge builds on past experience. In acknowledgment of this, traditional art methods are allied to current technologies throughout this project. In particular, drawing, painting, and printmaking are allied to spraypainting (commonly used in graffiti and therefore significant as 'everydayness'), digital video and photographic imagery. Images are processed using film editing software, photocopying and image projection. Expressive of the stated aims, the works have a theme on the flux between light-flow and how the brain interprets this data in the light of evolutionary physiology, cultural influences and personal experience. Hence, the works are metaphors for perceived phenomena, membranes involved in the reception and modification of phenomena, and the firing of cells in the visual cortex. As such, they portray a reassessment of viewing the natural

³ References to this term as used in the project relate to the following: de la Croix, Horst, Tansey, Richard, (1964), *Gardner's Art Through the Ages*, Harcourt Brace Jovanovich, New York, U.S.A., pp. 527 and 642

The careful observation of the optical world made by Renaissance artists and the integration of these observations by such a mathematical system as perspective (derived from Medieval optics) foreshadow the formulations of the natural sciences.

(This supports a view of the world as subject to change according to the times), and

After 1500, the landscape backgrounds became more and more important, to the point that the artist often omits the middle-ground drapery and sometimes changes his format from vertical to horizontal to show a greater expanse of landscape behind his Madonnas (sic)- landscapes take on an increasingly Arcadian character.

world through bodily-based common human experience as opposed to elitism and idealism; idealism in the common understanding of the word, and not with any reference to Platonic Idealism.

The works have antecedents in Pointillism and Neo-Plasticism; there is then a connection with Modernism although the works issuing from this investigation do not result in any grand theory or final definition.

Development takes place against a background of contemporary thought in popular science and technology, aided by recent studies in neuro-physiology. It takes up the implication contained within these sciences that our concept of the world outside the self (reality) owes its existence to our physical and psychological evolution and exists only for our species. In brief, it posits that the reality of landscape is all in the mind⁴ and how we view it is not an objective experience. There is the possibility that this reflects a move away from some recent theoretical movements that have influenced much artistic production in recent past years⁵. Video, in particular, has been adopted as a medium that, by its liquidity, exemplifies current research on the stability or otherwise of memory.

⁴ Zeki, Semir, (1999) 'The Brain's Quest for Essentials', *Inner Vision: an Exploration of Art and the Brain*, Oxford University Press Inc. New York, p.1.

All visual art is expressed through the brain and must therefore obey the laws of the brain..... And we have learned enough about the visual brain in the last quarter century to be able to say something interesting about visual art, at least at the perceptual level...

(Zeki is a research scientist and Head of Department, The Cognitive Neurology Unit of University College, London).

⁵ Hart, Bill, (email 18/4/07) - Head of Emedia, Utas:

PS. Meant to say that I thought your presentation was interesting. I'm not sure if people realised but what you are doing is a radical departure from the structuralist and post structuralist approaches to art which have dominated for the past 50 years, whereas you are implying that we are enculturated animals, that the conditions of our evolutionary heritage influence our visual representation.

Memory has an important role in data processing by the visual cortex. To quote neurobiologist Joe Tsien, at Princeton University, New Jersey with regard to the liquidity of memory:

*the brain you have this week is not the brain you had last week. Even the DNA needs to be repaired. So if 'you' are essentially a pattern of synaptic connections, a tangled web of memories, then there is a big problem of how this pattern endures. I don't know how people ever got this static picture of the brain....A memory trace would have to be a dynamic thing just because of molecular turnover.*⁶

To sum up the theme in the light of these issues, the project correlates:

- a) that which is seen, plus the equipment to see with, and the pre-disposition to translate perception as called upon by the visual cortex, with
- b) pictorial space, the nature of colour, the internal dynamics within the frame or other area, subject matter, emotional response to the image, the anticipations and expectations that emerge from tradition, while it creates
- c) imagery that references biological structures and contemporary technology, at the same time retaining aspects of traditional methods to acknowledge the layered nature of

⁶ McCrone, John, (2003), 'Not-so total recall', *New Scientist*, 13 May, Reed Business Information, London, U.K.

discovery, with new computations gaining from older belief systems.

The individual nature of experience and small variations in individual physiology imbue each construct of reality with a certain flavour of expression, within the overall social framework of understanding. Some of the works on paper and canvas, by line, tone and handling of space, are influenced by childhood memories relating to Arthur Rackham, Hokusai, and Gray's Anatomy⁷.

Viewed in its entirety, the exhibition maintains an open, questioning attitude by keeping expectations partially unfulfilled. This is to express the process of constructing reality common to us all, while recognising that, because of the personal aspect of experience and individual physiology and psychology, we can never entirely know another person's view. Clues to understanding the sequence of works, in the form of medical diagrams of the visual cortex and source landscape images, occur as the viewer is about to leave the exhibition. This creates a combined thinking-emotional response that engages the viewer in further interrogation of the exhibited works as recent memory. In this way, the viewer becomes a creative biological participant in the creation of their own reality. Altogether, the project references aspects of popular present day scientific understanding derived from quantum physics about possible alternate concepts of reality that pervade contemporary screen-based forms of

⁷ Rackham, Arthur, 1867-1939, English book illustrator, especially fairy tales.

Hokusai, Katsushika, 1760-1849, famous Japanese printmaker (*The Great Wave off Kanagawa*).

Gray's Anatomy, standard medical reference work with finely engraved illustrations.

entertainment and information that are constant interruptions in our present day lives.

Early Influential Background to the Project

Underlying this research is a network of interests, experiences and cultural influences that provide its early foundation. Growing up in the English countryside fostered a keen observation of nature and an ability to draw it. Encouragement to know the geology, flora and fauna and their functioning by a scientist father accentuated awareness of the world outside the self. A private family life, a large garden to play in, and a library to lose oneself in predisposed the development of an inner world. It helped to form a kind of platform from which to launch ideas and questions. Constants were, ‘why do people look as they do, and behave as they do?’ and ‘what is space and where does it end?’ Answers lay in my father’s library, amongst which were medical books from my grandfather. He had been a surgeon, and the books contained beautiful medical engravings, as did other books and encyclopaedias having illustrations by Arthur Rackham, Hokusai, works of Charles Dickens with illustrations by Boz and Cruikshank.

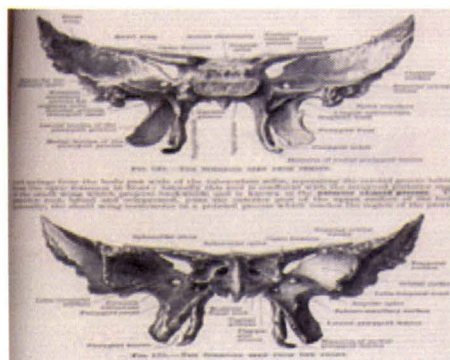


Fig. 1, ‘The Sphenoid, viewed from behind,’ Gray’s *Anatomy*, engraving.

Their line drawings conquered me and formed a predilection to work in fine line. This re-emerged as a drawing style in undergraduate studies⁸. Until I reached grammar school, much of my attention was given to looking and thinking about what I was looking at. I was intrigued by instances of individuals and groups of people making highly selective interpretations of what was happening around them. Technical and aesthetic questions concerning colour, form and space came with attendance at a college of art.

Previous Work that Anticipated the Theme

At undergraduate level, I commenced a series of large pencil drawings on paper. Initially, space, form, and the sensuality of materials were definite considerations. I was invoking aesthetics that were bound up with exploring the process of seeing and enjoying visual experience. It was intoxicating to observe the way in which these large sheets gave the sensation of engulfing the viewer. Another development was to work negative space alternately with positive space until form and ground lost their original identity and fluctuated between the two as the beholder's eye moved over the surface. The result was a continual visual journey in an attempt to find one place for the eye to rest. At this stage, I did not understand that in the visual cortex, cells were firing continually that determine form by edge, luminance and movement, thereby separating a shape from its background. Once this is determined, the cells rest or seek another part of the scene to repeat the process in building up a satisfactory understanding by the brain. I had eradicated tonal and line difference by giving

⁸ Later research revealed that while there are no actual lines in nature, humans have a tendency to draw lines to represent form at an early age.

equal weight to all areas. Hence the continual visual journey.

In these undergraduate drawings, I used the eeriness that can be conjured up by familiar objects presented in unfamiliar ways, as follows:

1. An exercise in graphite on paper, resembling a vast ocean swell moving from bottom left to top right, with a great cross-ripple bisecting it. Running below these, a few trails of fragile cellular shapes. I moved my pencils here and there, connecting the whole structure like pulling together a great spider web. The oceanic forms were derived from sea foam isolated from its original context and greatly enlarged. Edges were exaggerated with one side having multiple definition that made the whole construction look like a contour map.

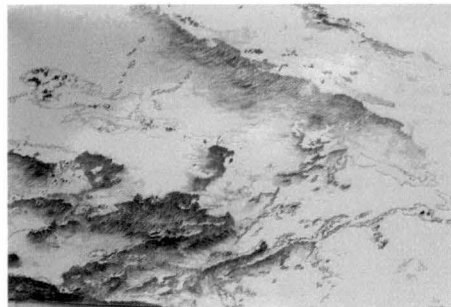


Fig.2, *Ocean*, (2000), pencil on paper, 1.5m x 1m.

2. Zoomed up footprints in sand, photocopied in part, were projected onto a sheet of thick white paper. I worked with black ink and white acrylic, letting gravity take some of the ink into vertical spears. Relationships between the forms were carefully worked. I was developing a heightened sense of pattern, space and viewer interaction.



Fig. 3, *Trace*, (2000), black ink and white acrylic on paper, 1.5m x 1m.

3. In my honour's year, I caught footage of a fountain on video camera. I cropped off the top, applied two video filters and damped down sound and speed. This was projected onto a continuous line of images based on Hampton Beach, Victoria, placed low down on the gallery wall. The projected film ran along the adjacent side wall and bounced off the top left corner of the first image at a right angle. Placed in the gallery⁹ with overhead lights switched off, it ghosted out to resemble a flickering stream of consciousness.¹⁰

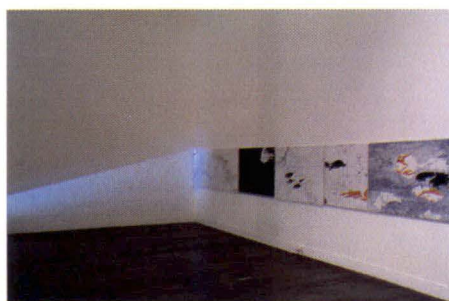


Fig. 4, *Memories of Hampton Beach*, (2002), video and MDF board, 24downstairs, Flinders Lane, Melbourne.

⁹ 24downstairs Gallery, Flinders Lane, Melbourne

¹⁰I had seen a similar effect used at the Melbourne Biennale in the late '90s for a work about Sigmund Freud. A projected image of dust taken from his study was used to great effect by projecting it along the wall, like a bridge in time, onto an old enlarged photograph of his study in Vienna, hung on the end wall.

These works laid the foundations for making large experimental works on walls dealing with image and space that convey engagements with landscape.

Aims of the Project

Classical landscape presents a fixed linear experience viewed from a central all-embracing viewpoint that has its origins in Renaissance perspective. Exemplified by works such as Giorgione's *The Concert*, circa 1500, and the further development of Nature as topic as in Corot's *Souvenir de Mortfontaine*, (1864), it remained a portrayal of the world that persisted into the 20th century, and alongside experimental artists such as the Impressionists and Post-Impressionists. It is a convention that hardly accords with what we have since learned about the viewing process; an accumulation of multiple glances as we scan at random in moving through terrain, and from which the brain constructs a unified image of what lies outside the self. Neither is this unified image to be considered a constant image throughout time,¹¹ nor an absolute imposed on the viewer. Rather, the intent in this project is to create an environment through which the viewer moves and completes their own understanding of the experience.

¹¹ see Joe Tsien, Chapter 1, Theoretical Background to the Works, p.5, on brain tissue and memory

Examples of Classical Landscape, (see footnote #3, page 2):



Fig. 5, *Fete Champetre*, Giorgione, (1508), oil on canvas, 110 x 138cm, Louvre, Paris.



Fig. 6, *Souvenir de Mortfontaine*, Corot, (1864), oil on canvas, 201 x 300cm., National Gallery, London.

On the following page are examples of looking and scanning, taken from experiments by A.L. Yarbus, Russian psychologist, in the 1950's, using trackers on contact lenses worn by the team of viewers. The first image is of the selected picture; secondly, where the eye tracks, notably the human figure, horizon line and foreground detail, while other areas are omitted.



Fig.7, *The Forest of Countess Mordvenova*, Shishkin, (1891), oil on canvas, Tretyakov Gallery, Moscow.

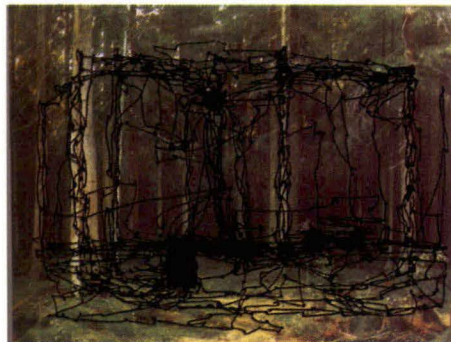


Fig.8, Visual web formed by the human eye in scanning this landscape picture.

Summary:

The aims develop into a variety of experimental works through literary research and studio practice. These vary according to the materials applied to the imagery gathered and the intellectual drive, which comes to include exhibition attendance and influential films.

The Research Approach

In the cortex, physical structures have evolved over millennia to select information for our survival; the same structures, plus psychological experience, feed our interpretation of what we expect to see¹². The project capitalises on this tendency, which involves adjusting perceptions according to expectations on behalf of the beholder.

Motifs express the functioning of the visual cortex and interpretation of the inflow of data within the brain.

Some works are constructions in block form with undefined ground that represent unrefined processing. None of them reach final resolution so much as a stage where imagination can begin to build on remembered form to construct a concept of what is being viewed. The final decision of what this is remains with the viewer.

Central motifs include:

- a severed tree root that resembles a cross-section of the cerebral cortex as portrayed in the standard medical book, 'Grays' Anatomy'. This chance occurrence serves as a double entendre in visual form which links an outside natural form with an inner structure that serves as our 'central processing unit'. It is therefore both image source and symbol
- patterns in rough tree bark that have exaggerated edges and tonal values - they also symbolise skin

¹² Semir Zeki, '(1999), The Neurology of the Platonic Ideal', *Inner Vision: an Exploration of Art and the Brain*, Oxford University Press Inc., New York, p.45.

When we see a man sitting behind a desk, we assume that he has legs but we have no sensory confirmation of that; our assumption is based on our past visual experience, in what is known as a 'top-down' process.....derive(d), I believe, from the brain's stored record.

- interlaced branches outlined against the sky that echo patterns of neural networks in the brain
- fountain jets that suggest light-as-particle bombarding the brain; at the same time, a reference to theories of the structure of light
- water flow and cross currents in a tidal river manipulated by digital camera to portray light-as-wave
- wild entanglements of sea foam, abstracted to illustrate data in the process of translation by the brain
- cratered footprints in sand, zoomed up in size to denote how scale affects conceptions of reality - an increase or decrease in size graphically alters the viewers relationship to that concept of reality.

Recurring themes in the treatment of the central motifs listed above suggest cell functions within the visual cortex such as flux, focus, blur, edge definition, separation of form from ground, movement and direction, binocular vision, colour recognition, tonal values, the primary greyscale vision system common to eyed creatures, and the secondary Red Green Blue colour system essentially developed by primates.

Theoretical Background to the Research

Approach

The last motif quoted above (zoomed footprints), raises the point that scale plays in perceiving 'reality.' It is also a reference that links to the standpoint of Newtonian plus quantum physics adopted in this project¹³. These progressions in scientific thought are used as metaphors and actual factors for a modification in thinking about

¹³ see Chapter 2 - Context, Scientists, Art and Theoretical Background. p.39, fn.37, on Decoherence Theory, Entanglement Theory, The Heisenberg Uncertainty Principle in Zurek, Wojciech Hubert, 'Decoherence, Einselection, and the Quantum Origins of the Classical',

viewing landscape. A world viewed on the scale of Newtonian physics gives a very different understanding from that viewed in terms of quantum physics. This is important because a world view reflects the way that people experience the world, whether dominated by nature and the seasons with slow social and technical developments, or life lived at an accelerated pace with wide-sweeping sudden change. In this project, the view of landscape prevailing when Newtonian physics alone explained the world and cosmos is presented as being in itself now superseded, though not discarded. Its principles provide the basis for how we experience the world in the 21st Century. Newtonian physics describes the world of the large and slow (for example, planetary bodies) as compared to the small and very fast (for example, sub-atomic particles such as photons, electrons). Further research into the nature of energy gave rise to the sub-atomic world of quantum physics, which built on the knowledge gained through Newtonian mechanics. The sub-atomic world is quoted as a metaphor for 21st Century everyday life, because of the technologies founded on principles common to quantum physics that are peculiar to our century. These technologies, which underpin our daily routines and are taken for granted, could be represented by laser scans at supermarket checkouts, medical CAT scans and fibre-optic communication systems - mainly screen-based microchip technology. In the project, a language is developed to express these ideas. Originating in natural forms, it is expressed in lightflow, membranes or their technical counterpart (glass) screens, the nature of digital media, and imagery contained in the three videos.

Recent publications on neuro-physiology, psychology and physics run counter to the idea of the eye as a camera, the

photograph as an impartial record, of memory as a constant record, and there being an explanation for everything. During the research, my reading tastes picked up on works by biologists and neuro-physiologists who combined an interest in visual art with their professional practice. These included reviews of such works by their peers, abstracts from publications such as the *Journal of Neuroscience*, web pages of Stanford University, the Infant Vision Laboratory at Smith-Kettlewell, *Nature* magazine, and the Howard Hughes Medical Institute. Some of these contain issues supportive of ideas found in the project, specifically in relation to visuality:

The primate visual system recovers the three-dimensional surface structure of an object by combining information from a variety of visual cues, including contour, shading, binocular disparity, and motion. Whenever an object moves relative to the observer, the visual motion flowfield is one of the information sources on whose basis the visual system determines the three-dimensional structure of the object¹⁴.

And furthermore, of great interest to me, because I have long been concerned with motion and edge even prior to adding film to supplement the static works:

Moving dots can evoke a percept of the spatial structure of a three-dimensional object in the absence of other visual cues. This phenomenon, called structure from motion (SFM), suggests that the motion flowfield represented in the dorsal stream can form the basis of object recognition performed in the ventral stream.

¹⁴ Kriegeskorte, Niko; Singer, Bettina; Naumer, Marcus; Schwarzbach, Jens; van den Boogert, Erik; Huxley, Walter, and Boebel, Rainer, (February 15, 2003), 'Human Cortical Object Recognition from a Visual Motion Flowfield', *The Journal of Neuroscience*, 23(4): 1451

*SFM processing is likely to contribute to object perception whenever there is relative motion between the observer and the object viewed.*¹⁵

This phenomenon describing the process of 3-dimensional separation of object from ground that is common to mammals may be observed in the behaviour of a domestic cat, which can be oblivious to a static food source, but switches to keen attention when that food source moves. It also has relevance for certain works by the British artist Bridget Riley such as *White Discs*, which could be read as moving dots conveying a motion flowfield - the motion being implied by the mode of construction.

These concerns are grounded in perceiving and representing landscape primarily as an expression of the physiology and function of the visual cortex. Together with the media used, they have some effect on the selection of image, the appearance of images, and the manner of presentation.

Works Comprising the Exhibition (see Chapter 3 - Studio Work for images).

Being 'low-tech' due to financial constraints places works undertaken in the course of the project more readily in daily experience than expensively 'factory-finished' works might have done. Produced by hand at low cost, they are contiguous and have a personal touch. The canvases proceed in triads. The three video films are placed in separate areas to resemble cells, and induce introspection by their interruption of the 2D imagery and by their size. An additional factor is the effect that light, darkness, and a

¹⁵ *ibid*

moving image on a large screen has on us, and on our habituation to receiving quantities of screen-based data.

Regarding the canvas triads, the first canvas serves to introduce the theme, the middle one consolidates it, and the third canvas makes a link to the next three in the sequence. From the set first encountered, they consist of:

- a six panel grid in greyscale placed low on the wall resembling walking and scanning
- triads of works on canvas that initially diminish in size but increase in intensity; nine canvases in all. They introduce primary encounter and stimulation of the visual cortex, from the unfocussed blur and initial stimulation of the cerebral cortex, to the firing of colour recognition cells.

These are then followed by:

- six greyscale panels in a vertical grid that vanishes into the wall and forces selection of viewing area
- three viewing cells of video films projected onto the far wall, suggesting light as wave, particle, and sensory bombardment
- two monotone works on paper that exhibit layering, greyscale vision and edge recognition. They introduce an element of fantasy while revealing processes of their construction such as recording the imprint of the stencil edge - I relate this to the viewing process in struggling to determine what may be real to our understanding and dismissing artifice
- a digital print derived from the last triad image denoting the struggle to focus in binocular vision
- a horizon line of source images, such as the tree root that resembles the cortex, that assist reading of the works in retrospect

- support works displayed separately that illustrate some of the developments and discards.¹⁶

To sum up the material contained within Chapter 1 - Overview:

- a) we live in a state of communion and understanding that, while accepting certain constants, is periodically subject to review and change
- b) the expression of review and change is affected or even initiated by the tools and technology available to us
- c) in this instance, light is viewed as a main component of the data stream by which we construct our idea of what surrounds us
- d) nevertheless, it emerged that light in itself is not the main topic
- e) the works in this project evolved through process but reflect the considerations detailed above.

In Chapter 2 Context, the exegesis examines the background and development of the project with regard to interrelationships of influences and artists. These are discussed by appraising certain works and ideas. A brief section on the visual cortex directs attention to Appendix A where discussion of this major component is accompanied by influential images. These images illustrate functions quoted within the works, and convey the sometimes coincidental appearances between structures within the body and in the world as landscape, as these are perceived by visual perception. Some are

¹⁶ Supporting works are displayed in The Plebiscite area on the ground floor of the Sculpture Department, and in studio G28, also on the ground floor.

included as artworks in their own right, further conveying parallels between the inner and outer worlds that constitute our existence.

Chapter 3 - Studio Work deals with the practical work itself and the influence that exhibition of works had on theory as experiential environment that affected the artworks. Of note is how process became prominent in determining the direction of the project over the theoretical, thus demonstrating how the practice of art itself determines what art is, as opposed to theorising about it.

Chapter 4 - Conclusion summarises how the project has explored perception and representation within its parameters, how it has addressed the issues raised and how the research contributes to the field.

Chapter 2 - Context

Introduction

This chapter illustrates where my aims arise in using fragmented and enlarged imagery, rendered in restricted colour and form, with sharp or blurred edges that overlap or are widely separated, all to convey motion without there being any physical motion. Rather than being a naturalistic landscape painting, the result is an optical flow-field that links to artworks with corresponding aims and to theoretical influences.

I am aware that while I quote the physicality and function of the visual system in the forms I devise, there is a personal character to these forms. They are imbued with elements of personal experience that go back to childhood and are influenced by culture. This occurs in works by the selected artists in their individual expressions of a mutual sensitivity to natural forms, with which I find common interest. One example is the use of silhouettes of branches as a source image: their structure, space, patterning and symbolism relate to something Parr once said of his work :

Like many people interested in the appearance of things, I was aware of similarities in structure and texture of different phenomena and at very different scales. Examples would be the lines etched in beach-sand formed by the water draining back to the sea and aerial photos of the Nile river delta and again, certain dead trees silhouetted against the skyline. These, and many other phenomena, feature 'branching'¹⁷.

¹⁷ Parr, Geoff,(2004) 'Why are all snowflakes different?', *ACUADS* conference paper in Hobart School of Art.

I would include Mondrian's Tree studies in this expression of interest and certain works by the *White Noise* artists.¹⁸

Artists and Scientific Theory

The project occupies a niche in the painterly and photographic responses to ideas about landscape that occur in a range of artists such as Georges Seurat, Piet Mondrian, Bridget Riley, Geoff Parr, David Hockney, and Leigh Hobba. Their works reflect how artistic expression adapts to the beliefs and practices of the time while retaining much that is familiar. It resembles the way that language changes in adopting new words, new phrases and shifts in meaning.

The project's focus on the visual cortex is echoed by selected examples of their practice that re-work their experience of the natural environment. These are experiences produced in close communion with material and process in a highly individual way, with a unique focus on vision. All speak about their experience of nature on a deeper level than could be conveyed by imitative rendering of scene.

They are adept at dealing with the picture plane. This refers to the arena in which the visual activity takes place, not the physical surface. For example, within Riley's black and white works featuring stripes and discs there is a visual activity that advances, recedes, ripples and folds on itself within the painting. (See image, next page).

¹⁸ *White Noise* exhibition (2005), Australian Centre for the Moving Image, Melbourne, see this chapter pp.35-6

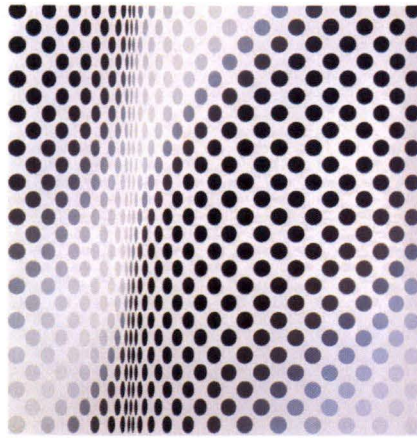


Fig.9, *Pause*, Bridget Riley, (1964), emulsion on hardboard, 112.2 x 106.6cm, private collection.

Riley herself sums up the core issue of her work:

*I draw from nature, I work with nature, although on completely new terms. For me, nature is not landscape, but the dynamism of visual focus.*¹⁹

Refuting the tag of Op Art, she has said of her work that it is not a theory of optics that interests her, (which 'Op Art' might imply), but the appearance of things, and therefore the behaviour of light as she can observe it, rather than the optical reasons for the behaviour of light.²⁰ Her inspiration rose from experiences on long walks in the Cornish countryside. There is this psychosomatic placement of the self as origin of experience, in a process of exploration. As summarised by Robert Kudielka:

her art constitutes an ongoing dialogue with visual experience, manifesting its pleasures, illuminating its connection with emotion, and affirming the capacity of

¹⁹ Intro. Raeburn, Michael, (1999) *Vision: Fifty Years of British Creativity*, Thames & Hudson, London, p. 150

²⁰ Kudielka, Robert, ed., (1995), *Bridget Riley: dialogues on art*, Zwemmer for Philip Wilson Publishers Ltd., London, p. 33, in conversation with E.H. Gombrich

*sight to reveal the mysterious connection between the individual and the world.*²¹

I consider this to be true of Parr also, except that he is not concerned with emotion. He achieves much of his visual play by sophisticated layering processes and vertical or diagonal divisions across the surface.



Fig.10, *the dry 06*, Geoff Parr, (2005), digital print

Parr can achieve an effect of arrested motion and great surface tension which advances towards the viewer.

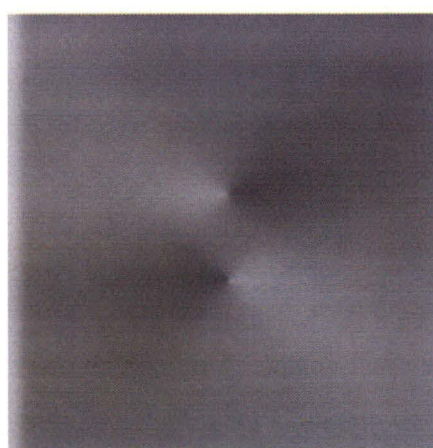


Fig.11, *digit two 2005*, Geoff Parr, (2005), digital print on canvas.

²¹ *ibid*, p.26.

His works express keen interest in the human visual system, preservation of wilderness, and Chaos Theory²² through the use of natural forms transformed by skilful deployment of contemporary technology.

Seurat is important for his focus on vision and process, his use of theory and quoting of technology. He founded Neo-Impressionism, a technique for portraying the play of light using tiny brushstrokes of contrasting colours that became known as Pointillism²³. Influenced by the scientific theories of Helmholtz and Newton on colour optics, he is a foundation figure for two of my influential artists of a later generation, Riley and Parr.

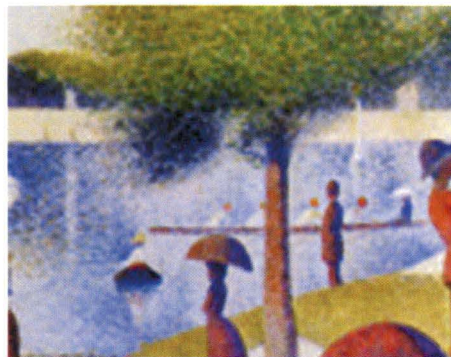


Fig.12, *The Bathers*, Seurat, (1884), oil on canvas, 65 x 89cm., Musee de Louvre, Paris. Detail of foreground riverbank, showing final strokes of colour screen.

During what he dubbed a Neo-Pointillist project, Parr produced screen templates which he superimposed on

²² Parr, Geoff, (2004), 'Why are all snowflakes different?', *ACUADS* conference paper in Hobart School of Art, and

Buchanan, Mark, (2003), *Small World: Uncovering Nature's Hidden Networks*, Weidenfeld & Nicolson, on 'small world networks', forming naturally from chaotic, random situations into simplified random organisations connected by privileged nodes, that do much to maintain order and flow in the cosmos, c.f. Snowflakes and sand formations.

²³ Seurat's style of using dots of pure colour dabbed close together to maximise luminosity has been quoted by Parr in his mid-career work. A modification of it is used in certain spray-painted images within this project that quote the RGB system.

found images, all of which were manipulated in Photoshop. It was a period of quoting Seurat's methods according to present day technology.

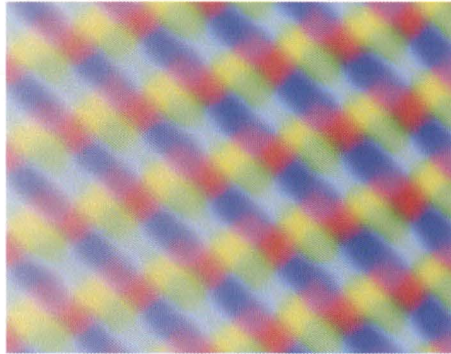


Fig.13 *Screen*, Geoff Parr, (2003), digital print

The science on which Seurat based his work, such as the influence of surrounding colour in modifying colour perception, is a factor in scientific research contributing to this project.

Hockney is interesting primarily for his photographic collages.



Fig.14, *Place Furstenburg*, David Hockney, (1985), photo-collage, 88.9 x 80cm, Artists collection.

These rebound on the nature of reality, time and space, and posit an alternative understanding, (a link with Chaos Theory and fields of random possibilities; later in his career, he became influenced by quantum physics).

Currently, according to a television interview with Robert Hughes²⁴, Hockney has abandoned photography as giving an inadequate rendering of reality and returned to painting - now done without preliminary under-drawing and painting directly with a big brush. I see this as a return to a mode of perception that is closer to experiencing 'reality' through the functioning of the visual cortex. He is quoted as making no great distinction between figurative and abstract art, believing that all art is abstract.²⁵ His driving force throughout has been his own curiosity and his stated interest is "how we see the world and how we depict it - via technology".²⁶ On this occasion, speaking to Nick Stangos about Naturalism, Picasso, and Realism, he made a remark about his work that is relative to the aims of this project, "we do not look at the world from a distance; we are in it, and that's how we feel."²⁷

²⁴ *Shock of the New*, (2007), SBS 3.30pm. Sunday arts programme 27th January. Leafing through a sketch book on the Alhambra in Cordoba, with its forest of arches and columns. Hockney discussed with Robert Hughes how photography failed to delineate the scene, especially the textures at the top of the columns, which appeared flat and uninspiring in photos taken by each of them.. His brush paintings caught the orchard-like effect to the perfect satisfaction of both men.

²⁵ Hockney, David, ed. Stangos, Nick, (1993), *That's the Way I See It*, London Thames & Hudson, preface

²⁶ *ibid*, p.14

²⁷ *ibid*, p. 101

Similarly, Hobba²⁸ uses sound and video to investigate relationships between the body and landscape. The body is specifically his own body, and as expressed to me in a personal interview with him in April 2007:

The work is resolved conceptually by my perception of the relationship of being within the space of the landscape. It is very much about my presence in the landscape, in an other kind of space, whether that be emotional, physical, conceptual, real or imagined.

Immediate, physical presence is an integral part of the experience for the viewer of his video/installation works; wilderness erupts into that viewing space, in its rawness, beauty and power. Other physical sensations can seem to be present such as cold air and vegetative odours but the aim is clearly not illusional so much as an interactive sensual presence, experienced afresh without a gap in time: they are neither retrospective nor bathed in memory so much as a live re-occurrence.

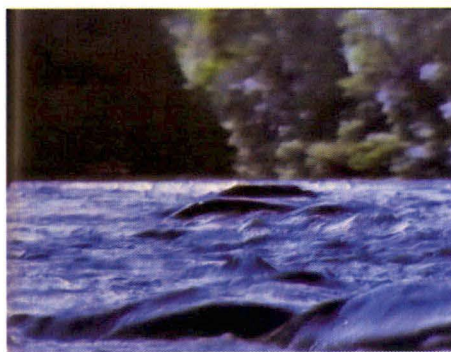


Fig. 15, *River with converging and diverging audio*, Leigh Hobba, (1985), betacam.

²⁸ A musician by training, influenced by John Cage and Stockhausen, he privileges sound in a way that this project uses vision. Hobba's combined vision and sound works are cited in this project.

In *River with Converging and Diverging Audio*, the artist trekked into deep wilderness, mounted his Betamax camera onto a raft loosely moored in the middle of the river, and placed microphones on either bank. Halfway through the recording process, he reversed the positions of these microphones so that they then related to the camera in opposing ways. In the studio, the sound recording was then adjusted slightly as naturally occurring “music” in tandem with the video. The result is the powerful presence described above, where the converging/diverging sound suddenly rips from the screen with the same force that the river now takes on with a close up of a cataract gorge; all of which evokes being in-that-world through sensory experience. It is not memory of that place that is portrayed, as a painting might do, so much as being precipitated into that actual space, with the artist.

Mondrian's progression of tree shapes into a series of vertical and horizontal lines presents a fascinating exposition of the efficient operation of the visual cortex.



Fig. 16 *Red tree*, Piet Mondrian, (1908-10), oil on canvas, 70 x 99cm, Gemeentemuseum, den Hague.



Fig. 17 *Grey tree*, Piet Mondrian, (1912), oil on canvas, 79 x 109cm, Gemeentemuseum, den Hague.

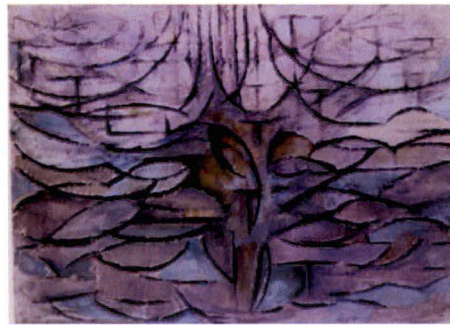


Fig. 18 *Appletree in Flower*, Piet Mondrian, (1912), oil on canvas, 78 x 107.5cm.

He developed an artistic shorthand that conserves energy to employ only what is necessary, in the light of previous experience, to depict objects visually. This parallels descriptions of the efficient action of the brain, as given in the two main reference books²⁹. Interest is excited, also, in the way he progresses shapes to interchangeable form/ground (for example, in Fig. 19), where all is reduced to rectangles and the former 'ground' itself, the white areas, are also converted to asymmetric rectangles that can no longer be read as ground.

²⁹ Zeki, Semir, (1999), *Inner Vision: an Exploration of Art and the Brain*, Oxford University Press Inc. New York, Chapter 1 'The Brain's Quest for Essentials' pp 5-6

and

Livingstone, Margaret, (2002), *Vision and Art: the Biology of Seeing*, Harry N. Abrams Inc. New York, Chapter 4, pp 54-55, both speaking of cellular function that operates with 'constancies' and uses algorithmic-like devices.

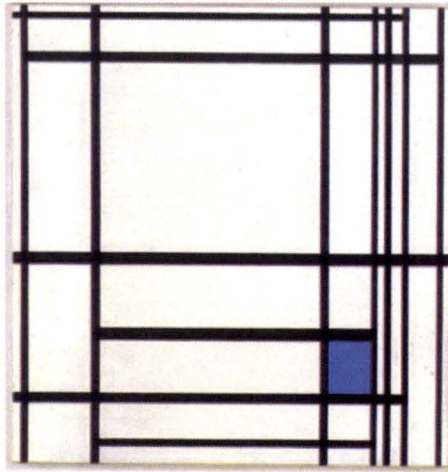


Fig.19, *Composition of line and colour: III*, Piet Mondrian, (1937), oil on canvas.

The horizontal and vertical lines, carefully assessed against the primary colours, plus grey, black and white for balance and harmony, convey the visual mechanism of perception working towards a resolution of reality, prior to naming that reality as a list of predetermined forms (such as trees, buildings). That is, one can read them as descriptions of cellular edge-recognition, movement-direction cells, line and tone recognition functions, and colour-recognition cells switching on and off. In this manner that parallels visual activity, the painted construction remains open to interpretation, and is not a closed-off system; the possibility remains for it to have an alternative identity. Mondrian is also an artist of significant interest to one of my major scientific sources, the neuro-physiologist, Semir Zeki.³⁰ This is principally for experimental work carried out by Edwin Land, (inventor of the polaroid camera), on cortical responses to a mechanism based on Mondrian paintings. Three projectors in turn throw Red, Green, and Blue light onto the image, and the areas of cortical

³⁰Zeki, Semir, op.cit. p.184-7: The Mondrian Machine built by Edwin Land to assess brain activity and colour; also Kawabata, Hiedaki, and Zeki, Semir, (2004), 'Neural Correlates of Beauty', *Journal of Neurophysiology* 91, pp.1699-1705

reaction of a viewer are recorded. Alternately, the device can be used to track areas of the brain regarding motion

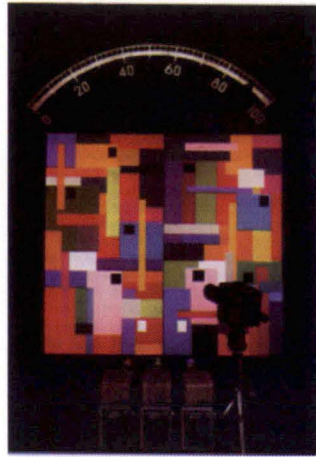


Fig. 20, *Mondrian Machine*, Edward Land.

I had found something in common with Troy Ruffles and Danielle Thompson who explored ephemeral phenomena. While they worked across media as I was being drawn to, it proved to be a superficial interest as the studio work began to take on a direction in common with the action of the visual cortex. Helen Frankenthaler was a more abiding influence, with her prints of abstracted shapes formed by layered and overlapping washes of colour.



Fig. 21, *Gossip*, Helen Frankenthaler, (1961), oil on canvas, 34 x 74cm, Andre Emmerich Gallery, N.Y.

I gained from her compositional techniques such as working with the edge of the frame, where she crops

coloured shape and allows it to disappear into the surrounding wall space. It is implied that the shape continues. I discovered a dynamic technique in the effects and viscosity of poured and thrown paint versus absorption rate into raw canvas or paper.

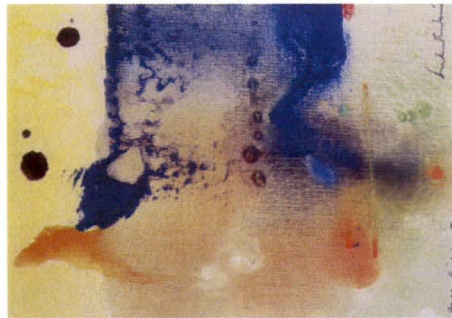


Fig.22, *Untitled*, Helen Frankenthaler, (1977), acrylic on canvas, 20 x 15cm, Phyllis Tuchman collection.

I used this technique in two of the canvas triads. One experimental triad became supporting work, the other is *Blue Splash*, in the chiefly 'black' triad.



Fig.23, *Blue Splash*, Ada Henskens, (2005-7).

This gives force of expression and a strong directional flow across the surface to express, in my case, chemical substance and data in circulation.

While the project has developed in relative isolation, it is in sympathy with video and installations that present abstract-art-as-moving-image. Various video artists exhibiting through Experimenta³¹ scrutinise screen-based reality.

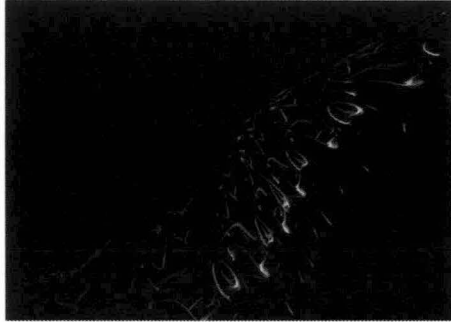
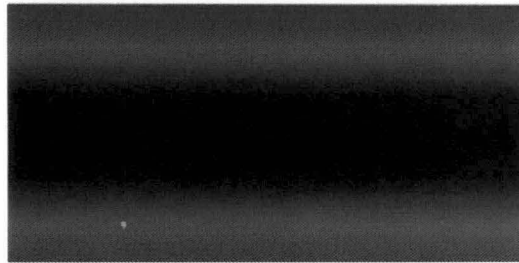


Fig. 24, *Light*, Ulf Landheinrich, (2005), electronic media



Figs. 25-6, *Imaginary Abstract*, Keiko Kimoto, (2005), electronic media.

³¹ Experimenta - a major Australian and international emedia organisation.

They present arresting views of the process of looking with a contemporary edge that involves technology, an interest in science, and a flow between inner and outer worlds. Their constructive strategies promote an interplay between assertion and dissolution, composition and decomposition, as does Parr in *'Forest Whispers.'*³²

This causes prolonging the looking process in order to explore the events unfolding on different levels. Curator Mike Stubbs describes this in an exhibition catalogue:³³

White Noise is an exhibition in real-time. With varying degrees of luminosity, tempo and volume, the artworks invite the audience into a space that is both physical and reflective: not to view pictorial representations of something, or document another time or place, but to invite us in to the here and now

and

All the artists in 'White Noise' ... enjoy working in an area of almost scientific experimentation, in which they can test the limits and find the cracks in-between; they practice the art of accident.....their work also draws upon painting, composing, contemporary art and film. Most important is their interest in pure abstraction, whether created by sound waves, interference patterns, custom-made generative algorithms, home-made graphic interfaces or stroboscopic light.

³² It also reminds me of the constant fluctuations in the life and identity of sub-atomic particles.

³³ Edmonds, Ernest and Stubbs, Mike, eds. (2005) 'A Leap into the Light', *White Noise*, Australian Centre for the Moving Image.

Scientists, Art, and Theoretical Background

Research scientists who contributed to the development of this project provide cultural background knowledge, if not specific influence, to named artists. Neuro-physiologist Semir Zeki and biologist Margaret Livingstone specialise in research on the visual cortex and the brain. Both published illustrated books that had significant impact on lay understanding of vision. Both have a parallel interest in art as it relates to their discipline. Robert Pepperell of The Posthuman Laboratory for Arts Research, reviewing Zeki's newly published *Inner Vision: an Exploration of Art and the Visual Cortex* on the Leonardo Reviews website expressed this cultural influence as follows:

As a neurologist with a specialist interest in the study of the visual brain, Zeki attempts to apply the latest neurobiological research to account for artistic production and reception. One of his main theses is that we don't see with our eyes but with our brain, which is to say that the process of seeing is less the passive reception of a coherent image than:

‘(an) active process in which the brain, in its quest for knowledge about the world, discards, selects and, by comparing the selected information to its stored record, generates the visual image in the brain, a process remarkably similar to what an artist does.’ (p.21)³⁴

By this selection and construction the brain and the artist are both searching for ‘constants’ or ‘essentials’ which are the qualities of the visual world that are

³⁴ http://mitpress.2mit.edu/e-journals/Leonardo/reviews/may2003/Einstein_pepperli.html

accumulated through experience rather than fleeting impressions. Hence he states:

‘I shall therefore define art as being a search for constancies, which is also one of the most fundamental functions of the brain.’³⁵

A scholarly paper on perception published by Livingstone and David Hubel, appeared in *Science* magazine.³⁶ The paper showed that anatomical and physiological observations in monkeys indicated that the primate visual system consists of several separate and independent subdivisions that analyse different aspects of the same retinal image. These areas and their functions were identified and discussed briefly. The studies were found to correspond to human perceptual experiments with remarkable consistency, thereby enabling the design of experiments to determine which areas of the system are responsible for particular visual abilities such as figure/ground discrimination or depth perception. Such functions would be more difficult to deduce from experimentation on humans. The studies benefit understanding of vision and the brain, and improve treatment of traumas by identifying the afflicted area more positively.

Theoretical research in quantum physics forms a background to our present understanding of the universe

³⁵ *ibid*

³⁶ Livingstone, Margaret and Hubel, David, (1998) ‘Segregation of Form, Colour, Movement, and Depth: Anatomy, Physiology and Perception’, *Science*, vol. 240, May.

and the technology we have devised.³⁷ Addressed to a range of audiences, published works by these and other physicists deal with mathematically demonstrable theories that question the commonsense concepts of reality arising from our perceptions. In this vein, the Howard Hughes Medical Institute website published a report from the September 9, 2005 issue of the journal *Science*, that the human brain seems to be still evolving - based on sequence changes in two genes that regulate brain size and driven by natural selection³⁸.

In consequence, I reflected on the possibility of further development of the visual cortex - some insects see in ultraviolet light. If we developed a similar ability (an extra type of cone in the retina), we could extend our visual system and, consequently, alter our concepts of reality.

³⁷ (Received undated by hand from Dr Peter Jarvis, Reader, Mathematics and Physics, Utas,) **Decoherence Theory, Entanglement Theory:** Zurek, Wojciech Hubert, *Decoherence, Einselection, and the Quantum Origins of the Classical*, Theory Division, LANL, Mail Stop B288, Los Alamos, New Mexico 87545: a paper defining Decoherence and Einselection in which the behaviour of quanta is discussed according to recent, chiefly mathematically determined, theories and where they reach levels of agreement. It discusses the possible understandings of the universe given by quantum physics while observing the shortcomings of a view given by classical theory alone. In this paper, Einselection (environmentally-induced superselection) “delineates how much of the universe will appear *classical* to observers who monitor it from within, using their limited capacity to acquire, store, and process information. It allows one to understand *classicality* as an idealization that hold (sic) in the limit of macroscopic open quantum systems.” The author also states “What the observer knows is inseparable from what the observer is: The physical state of his memory implies his information about the Universe. Its reliability depends on the stability of the correlations with the external observables. In this very immediate sense decoherence enforces the apparent collapse of the wavepacket”. This remark relates to the behaviour of light in Heisenberg’s Principle - the way that light behaves in a contradictory way in the presence of an observer, and therefore beyond the prescriptions of Newtonian physics.

The Heisenberg Uncertainty Principle - Resulting from experiment in which photons are passed through slits in a screen, this states that if light is not being observed, it acts as a wave. If it is being observed, it acts like particles, against expectations. The presence of an observer makes the difference.

³⁸ <http://www.hhmi.org/news/lahn4.html>

Wojciech Zurek, Brian Green and Paul Davies are physicists who write on quantum mechanics. Quantum mechanics contains a mathematical explanation of how light can have properties of both wave and particle³⁹. Their research is largely concerned with photons; the behaviour of light and theories relating to electromagnetic radiation, which relates directly to the visual perception of reality. Livingstone describes this radiation as follows:

*Electromagnetic radiation is emitted when charged particles are in motion. Light is part of a huge spectrum of electromagnetic radiation that travels through a vacuum (space) at an apparently constant speed of 186,000 miles per second. Primates have receptors in their eyes that are selectively responsive to this particular form of radiation at wavelengths between 370 and 730 nanometers. It is a very narrow bandwidth.*⁴⁰

There is then a common concern with light, vision and scientific theory in the project; the work of Seurat; Riley where she is influenced by Seurat⁴¹ or produces resemblances to motion flow-fields; Parr in quoting Pointillism and Chaos Theory; Hockney experimenting with portrayal of time and space, and Hobba using his body as receptor, creator and mediator of phenomena.

³⁹ The project quotes this quality of light, particularly in the three videos.

⁴⁰ Livingstone, Margaret, (2002) *Vision and Art: the Biology of Seeing*, Harry N. Abrams Inc. New York, p.16

⁴¹ In her painted waves of multicoloured stripes that wrap around each other at differing areas, causing subtle flicker by the effect of colour-surround cells switching on and off.

The Visual Cortex: its relevance to the project and as a link to selected artists

The structure and functioning of the visual cortex is essential to the project as an experience of being in the world. It provides the common experience and bodily structure that forms integrative links to the works and writings of selected artists and scientists whose works adopt the position of Livingstone's definition of vision as being:

*not simply to reproduce the pattern of light falling on the retina (so that someone inside our heads can look at the picture) but to extract biologically important information from our environment.*⁴²

(see Appendix A - *The Visual Cortex*, illustrated with diagrams).

⁴² Livingstone, Margaret, op.cit. p.90

Discussion of specific artistic works: their relation to scientific and philosophical theory and the project.

Seurat seems to have constructed a base structure of his painting (by pencil sketch and rough painting), then superimposed a precise, brilliant dotted screen; first conveying the broad image then adding the vitality, colour and luminosity of the dots.



Fig.27, detail, *Sunday Afternoon on the Island of La Grande Jatte*, Seurat, (1884-6).

He also created several prototypes of major works and made color studies that explored the creation of a surface made luminous by a refracted light effect. Exercising control and precision, he placed a screen of different coloured dots in close proximity to each other. Later, Riley deliberately adopted a similar approach in planning her canvases.

Relating to the use by both artists of small units such as dots, and also to Parr's screens made of small repetitive patterns, is some fundamentally important work carried out by neuroscientist Stephen Kuffler in 1953.

Quoting from Livingstone, *Vision and Art: the Biology of Seeing*, p.53, as follows:

He recorded activity from retinal ganglion cells and found that he could activate the cells (make them signal) with small spots of light. This alone was not news, since it had been clear for centuries that the eye responds to light. What was surprising, though, was that small spots activated the cells better than large spots. Each ganglion cell was optimally activated by a tiny spot of light at some particular spot on the retina, its receptive field. Kuffler deduced that the reason large spots of light were ineffective was that ganglion cells were not only excited by light impinging on their receptive-field centers, but they were also inhibited by light falling on the immediately surrounding region. This organization is called center/surround.

Livingstone and Zeki are intrigued by correspondences in their work and those of Mondrian, Monet, and Seurat.

Seurat's large paintings can be overpowering at first encounter. The tiny juxtaposed dots of different coloured paint, which blend colours optically at a distance, can be difficult to digest as one complete view of a scene.

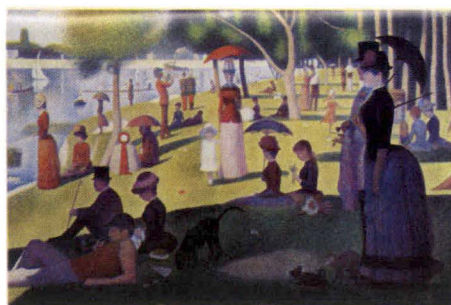


Fig.28, *Sunday Afternoon on the Island of La Grande Jatte*, Seurat, (1884-6), oil on canvas, 189 x 300cm, Art Institute of Chicago.

The painting, *Sunday Afternoon at La Grande Jatte*, has an exaggerated effect of 'construction', and the many compositional verticals help to isolate the figures from one another, though the scene is united by the sparkling atmosphere created by the dots. Fractured colours are enhanced or, alternatively, subdued, by surrounding colours; for example the plum-coloured skirt that gives brilliance to the surrounding grass. Nevertheless, it has a stilted look and seems frozen in time. There is experimentation with material and process, a concern with composition and harmony in a classical sense, and the handling of space.

I do not respond emotionally to Seurat's paintings, but I find them interesting, and they have links to my project and people with whom I find things in common.

Of Seurat, Meyer Schapiro says:

Seurat's dots, I have intimated, are a means of creating a special kind of order. They are his tangible and ever-present unit of measure⁴³. Through the difference in colour alone, these almost uniform particles of the painter modulate and integrate molar forms; varying densities in the distribution of light and dark dots generate the boundaries that define figures, buildings, and the edges of land, sea and sky. A passionate striving for unity and simplicity together with the utmost fullness appears in this laborious method which has been compared with the mechanical process of the photo-engraved screen.⁴⁴

⁴³ Compare to Riley's use of dots, circles and stripes as units of measure

⁴⁴ Schapiro, Meyer, (1978), 'Modern Art: Nineteenth and Twentieth Centuries', *Selected Papers*, G. Brazier, N.Y., p.8

While reading this paragraph, I was reminded of sub-atomic particles, edge recognition cells, the greyscale vision system denoting tonal values, Ben Day dots, and the rigorous ‘unity and simplicity’ prevailing in Mondrian’s elegant structures - or parallels with Riley and Parr. I see Seurat as linked to the other painterly sources as a natural progenitor, though all have found their own practice through individual exploration.

Riley’s work stimulates an intensified visual perception. As with Seurat, it seems to operate best on the viewer when approached by a series of accumulative glances rather than a steady stare. Indeed, it can be rather hard on the eyes to unravel the twists, rolls and reverses that flow across the surfaces of her canvases, particularly the coloured ones, with their subtle variations in tone and intensity of hue along individual stripes and curves.



Fig. 29, 2 colour twist: *Blue/Red and Violet/Yellow series 41-Green added*, (1979), Bridget Riley, gouache on paper, 97 x 50.5cm, artist collection.

As the artist herself remarked to Robert Kudielka, ‘Don’t look at it, just glance.’ and, ‘Sometimes in a glance one can see more than in the close scrutiny of a thousand...’. I find this remark corroborative of contemporary thinking

about the process of seeing; that what we see is built up of numerous visual exploratory fragments by which we build up a whole scene, and that this, moreover, is constantly shifting, whether by graduations of reflected light, external movement, or by saccades of our own eyes.⁴⁵

Riley works closely with the process of seeing, and from the position of being very aware that all painting of nature is essentially an abstraction of that world. Her earlier works are in black and white, then grey is added to the repertoire in the belief that simplicity of materials gives her freedom to concentrate on her aim to convey 'visual interruptions' perceived in nature. Her works are generally large in size. They have a rigorous conception and execution that is evocative of Minimalism, containing no more than is necessary in content. There is great freedom of expression and movement within the frame. Each work exists on its own terms; the tensions created by movement and counter-thrust of surface convey re-lived dynamic experience. The work draws our gaze; is at the same time immersive and an assault on the eyes, necessitating looking, withdrawal from looking, looking again by portion, and re-stating viewing distance. For me, they call up the experience of walking into unfamiliar terrain and the complicated visual sorting process that takes place with this explosion of light and form.

Discussion of 2 works by Riley

White Discs is a black and white work. It consists of a series of black dots of varying sizes floating in a diagonal drift from bottom left to top right on a white background. There is a slight counter drift in the bottom right corner

⁴⁵ Saccade - a rapid movement of the eye between fixation points. The human eye does this constantly.

that is supported by two medium-sized vertical black dots that appear static. Two more small-sized vertical black dots that appear static recur at intervals within the frame. The larger black dots hold the eye, and conjure up chromatic after-images of same-sized dots of exaggerated whiteness on the white ground. Moreover, these phantom dots switch on and off, creating both suspension and flicker. It is an effect that can be experienced in nature, at moments when certain cells in the visual cortex are firing in an attempt to separate form from ground, and link up into a recognisable, edge-defined shape. For me, this closely parallels my aims to convey the visual cortex in action, translating light as form and shape by a series of specialised cellular activities that respond throughout the brain to motion, direction, tone and atomic vibrations that are defined as colour spectra.

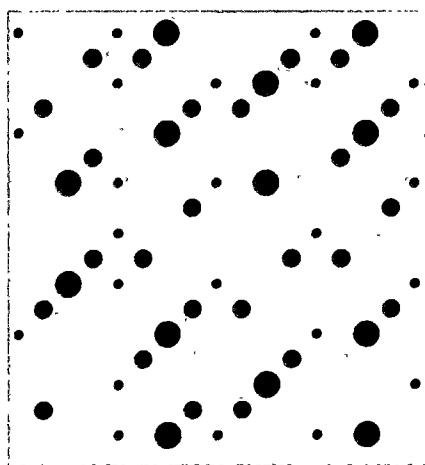


Fig.30, *White Discs*, Bridget Riley, (1964), emulsion on hardboard, 104 x 99cm, private collection.

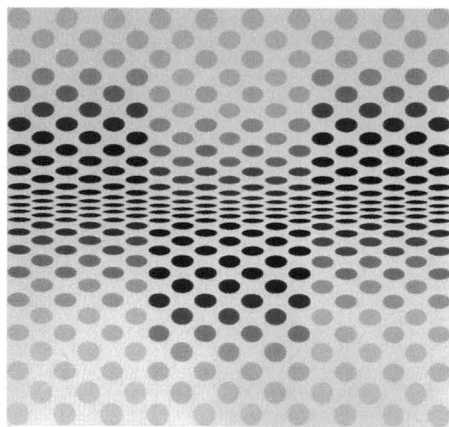


Fig.31, *Where*, Bridget Riley, (1964), emulsion on hardboard, 106 x 113cm, Paul Hirschland, U.S.A.

Where, 1964, is a black, grey and white work, using dots. The greys vary in warm and cool tones that, together with the elliptical shaping of some dots and repetition, create phases of stability and disturbance in the form of squeezing at the lower centre of the board.

The area of greatest constriction creates a horizon line, the bulges at each side and above corresponding, perhaps, to looming trees in a landscape, with a billowing sky advancing above. Riley obtains emotional impact in her handling of paint even with such rigour and economy of means.

Parr produces visually elegant printed series of images and installations to address ecological and social concerns for present day society. Perceptual effect is intensified by the application and manipulation of digital imaging software. This is skilfully applied in a manner peculiar to that medium but reflects the painterly methods of Pointillism in the contradictory working of a grid (his dotted screens), that is opposed by an optical flow-field lying beneath that employs subtly varied form, tone, or colour.

His very personal style of digital technology involves manipulating photographs in Photoshop-Image-Adjustment-Levels sub-menus to play with form, surface and transparency. His exhibited works are usually presented as giclee prints. Acknowledged influences are the writings of biologist Margaret Livingstone (*Art and the Visual Cortex*) and the work of French painter Georges Seurat.

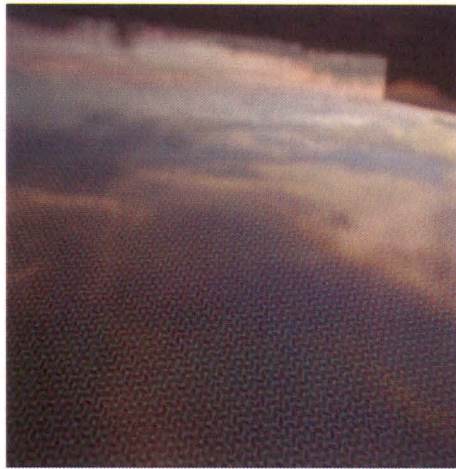


Fig.32, *Stereo-Reflex*, Geoff Parr, (2003), digital print.

Parr gathers fragments and passing scenes from daily life that he refashions into a personal art form, creating non-narrative concepts of reality.

Some of these scenes have been reflections in a mirror or body of water, a fragment observed through the kitchen window or litter on a forest floor. These images are caught on digital camera; images that are marginally glimpsed and easily passed over by the casual eye. They could have been forgotten, discarded. Played around with in Photoshop, they reveal a vast alternate possibility of identity, splitting off and rearing up in new forms that dispute other layers, at times erupting through the surface.

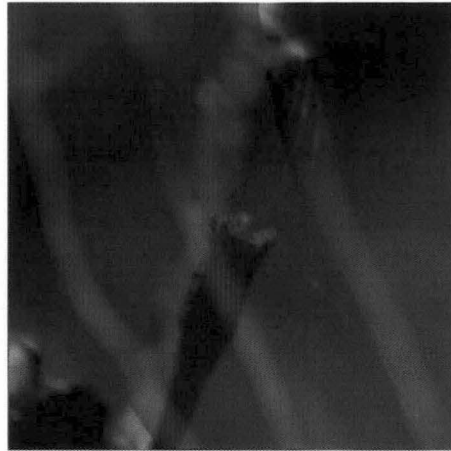


Fig. 33, *f_w_29161+142+1.psd*, Geoff Parr, (2005).

Underlying Parr's work is a deep interest in vision, (as with Riley and Hockney), and understanding of natural processes. In conversation with the artist, he spoke of how the landscape can record past events by weathering, or the passage of creatures by patterned imprint and trail, the distribution of plant life, and formation of natural forms as tenuous as insect trails or snowflakes. Arising from forays into bushland, such thought and experience results in a series of beautiful prints of local wilderness, fragments of debris from the forest floor, or canopy interlaced with sunlight. This is a layered interest, having its base in inquiry and research into physics, photography, and digital imaging, as much as knowledge of the history of a place and poetic observation of everyday phenomena. His essay on *Snowflakes*⁴⁶ gives a description of snow crystal formation dependent on temperature and movement through space, moderated by humidity and atmospheric impurities, in which no two conditions are the same at micro levels. Coincident with these conditions is a molecular symmetry in ice that develops in six directions

⁴⁶ Parr, Geoff, (2004), 'Why are all snowflakes different?', keynote address, *ACUADS 2004*, Hobart, School of Art.

at the boundary tips; between these two forces arise infinite possibilities of form. The essay provides a strong parallel with the action of the visual cortex, where, in its capacity as an information gathering system in a world of constant change, it generates greater efficiency by making subtle, rapid and varied confluences of cellular bodies throughout areas of the brain to abstract, interpret, refine and store generalities in preference to particularities (the brain searches for constants).

I see both systems (snowflake formation and the visual system) as akin to theoretical quantum physics in postulating existence, at a sub-atomic level, as interdependent multiple fields of random possibilities that depend on chance and choice to become an operative reality, within that time and place. I see Parr as expressing representation of landscape in a manner that reflects the concerns and technology of the times, and that is consistent with the aims of this project.⁴⁷

More recently, the grids and screens evident in these works have been replaced by more delicately layered works where screens of lace-like forms resembling decaying debris in the bush obscure and reveal other fragmented layers beneath. The same degree of manipulation is there, but the effect is more subtle, without a particular focal point, and evokes a physical and visual journey through the natural world.

⁴⁷ Parr's essay on snowflakes exemplifies the underlying principles of Chaos Theory; in mathematics and physics, this is a study of events that look as if they are random, but actually have a hidden order or way of acting. It only takes something apparently insignificant to come into the system or pattern for *everything* to change against expectations. The theory relates to a 'blowing up' of minute uncertainties that eventuates into enormous differences, and negates absolute certainty in prediction from what is 'known'. The link to 'blowing up' of image in the project is deliberate. Further, the *White Noise* artists exploit technology in exploring 'the art of the accidental', (see p. 36).



Fig. 34, *w11.psd*, Geoff Parr, (2005), digital image.

Parr sees emedia as having an advantage over painting or traditional photography in the facility that Photoshop has to provide ‘detail, repetition, absolute precision, an ability to “save” as required, flexibility and convergence.’⁴⁸

Throughout my research into this artist’s work, I have noticed an increase in surface tension and dynamic visual play between layers, from earlier works where there was an obscured image partially discernible on a lower layer, through a gridded screen. These devices (of increased surface tension and visual play between layers) force the viewer to attempt to identify the image while playing against a tightness of surface that has to be breached visually. It is one of the effects that I find he has in common with Riley and Seurat and reflects the act of looking according to Zeki and Livingstone. That is, it is an effect that conveys the experience of scanning a view that the brain commences to translate from form, ground and motion into a recognisable experience, by penetrating membrane and seeking constancies.

⁴⁸ Parr, Geoff, (2003), ‘Art Practice in the wake of an ARC Large Grant’, *Survey: Current art and design research and practice within Australian tertiary art and design schools*, Tasmanian School of Art, University of Tasmania

Mondrian manages to use one particular colour in a painting and manipulate its relativity to other components by means of the surrounding colour, shape and placement within that painting so that this one hue acquires varying visual force depending on where it occurs. If analysed in greyscale, I suspect that this would be a matter of tonal values that are accentuated or diminished by surrounding factors.

According to Livingstone, the greyscale visual system was the earliest to develop, and remains a powerful factor in vision, but its data can be masked for us by our being accustomed to the RGB colour system that primates developed in refining their perceptions.⁴⁹

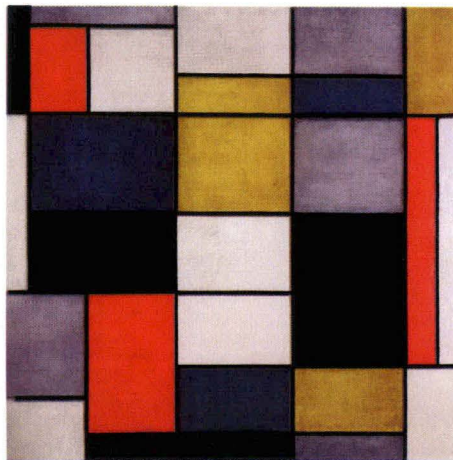


Fig. 35, *Composition A*, Mondrian, (1920), oil on canvas, 90 x 91cm.

Riley wrote of Mondrian:

In Paris Mondrian worked first from the lattice-like drawings of trees done previously in Holland and then from small diagrammatic notes he made of the planes of interior walls exposed in the demolition of large houses near his studio. These walls bore the remnants of

⁴⁹ Livingstone, Margaret, (2002), *Vision and Art: the Biology of Seeing*, Harry N. Abrams Inc. New York.

the wallpaper and paint that had once decorated rooms on each floor and presented patches of colour placed haphazardly on a flat surface. Both motifs were treated close up, filling the visual field, and provided Mondrian with a loose, informal grid within which he could articulate planes of subdued colours: the warm-cold binaries of classic Cubism, his own lightly coloured greys, or muted shades of red, yellow and blue. Ultimately the two aspects of his Cubist paintings that were to prove most important to the development of his later abstract work were the dynamic relationships of these areas within the picture plane and the new role assigned to the spectator in assessing these relationships. That is to say, the way in which we 'read' the paintings is a constituent part of their formation.⁵⁰

As mentioned previously in this Chapter, the interaction of Mondrian's painted surfaces with the visual cortex is of great interest to researchers involved with vision such as Semir Zeki and Edwin Land.

Hockney disagreed with the concept of photograph as true record, a fact evidenced in the way in which a wide angle lens distorts the image. He produced his 'joiner photographs,' each panel of which contains a record made at a different time, therefore becoming a journey of the self or beholder through space and time (see previous image of *Luxembourg Gardens*).

Livingstone gives weight to his journey-through-time/space photographic constructions when she quotes Henri Matisse speaking of live experience versus photographed motion as follows:

⁵⁰ Riley, Bridget,(1997), *Mondrian: Nature to Abstraction*, Tate Gallery Publishing, London.

*Movement thus understood corresponds to nothing in nature: when we capture it by surprise in a snapshot, the resulting image reminds us of nothing that we have seen. Movement seized while it is going on is meaningful to us only if we do not isolate the present sensation from that which precedes it or that which follows it.*⁵¹

The context is a discussion of Monet's Impressionist painting, *Rue Montorgueil in Paris, Festival of June 30, 1878* in contrast to the painting, *The Rape of the Sabine Women* (circa 1634) by Nicolas Poussin in relation to the value of peripheral vision added to the acuity of the central gaze.



Fig.36, *Rue Montorgueil, June 30th, 1878*, Monet, (1864), oil on canvas, 80 x 48.5cm., Musee d'Orsay, Paris.

⁵¹ Livingstone, Margaret, (2002), 'Acuity and Spatial Resolution' p.77 *Vision and Art: the Biology of Seeing*, Harry N. Abrams Inc. New York.



Fig.37, *Rape of the Sabine Women*, Poussin, (1634), oil on canvas, 154 x 209cm, Metropolitan Museum of Art, U.S.A.

As summarised by Livingstone, speaking first of the Monet, then the Poussin:

..our own spatial imprecision allows illusory conjunctions to complete the objects. That explains why we see complete flags in 'Rue Montorgueil' even though many of them are just a single stroke of paint. Therefore low spatial precision may lend vitality to a painting because the visual system completes the picture differently with each glance. Moreover, the spatial imprecision gives the painting a transient feel, because such spatial imprecision is compatible with a single glance, a fleeting moment in time. The highly detailed, action-packed 'Rape of the Sabine Women' by comparison looks relatively static, because you can see hundreds of details. Seeing so many details is incompatible with the (presumed) transience of the incident depicted - by the time you moved your eyes from one act of savagery to another, the scene should have changed.⁵²

⁵² Livingstone, Margaret, op. cit., Ch. 5, Acuity and Spatial Resolution pp. 75-76.

Summary

There are substantive links between the works in the project, the works of artists of particular interest, and an investigative awareness of human visual perception in action when viewing landscape. Infinite complexity within an apparently simple view is a common thread both to the works in the project and the artists of interest. It finds expression in the practice of enlarging the size of a fragment to reveal a hitherto unperceived 'landscape'; and the potential to question our understanding of what we think we know.

Chapter 3- The Studio Work

Introduction

Originally, curiosity into the appearance of things gave rise to the project, probing into the why and wherefore, considering how things might take an alternate twist on what it is that constitutes reality. Philosophically, reality seemed to be a form of consensus. I had noticed tendencies developing in my work that indicated an affinity with pattern, repetition, strategies to vibrate between form and ground. On exploration, I found that these were tendencies within the brain that developed out of survival techniques, focussed on vision. Articles from popular science give cases of aberrations in vision that manage to function in a manner to give 'normal' results as if some constant within the brain demanded it. Measuring brain activity reveals that we process only part of the data we receive.⁵³ The question arose as to what the unprocessed part might be and how it might alter our ideas of what is 'out there'. With this in mind, I saw a need to explore the natural world and express it in suitable terms as a visual artist. Initially, I had to shed other preoccupations such as constructs of time, memory and memento mori expressed as veiled layers on lightboxes or waxed paintings.

Structure of the chapter

This chapter is divided into two sections. In section one, the works appearing in the exhibition are described chronologically, with illustrations. Discussion of methods and the relationship of form to content are included in the

⁵³ Suffering from hearing loss since my mid-twenties, I experience what audiologists term 'white noise' which is sound expressed as untranslated whistle and crackle within the auditory system. Evidently, it is also common for humanity to miss a certain amount of information visually.

description. Section two includes exhibitions where progress was evaluated, with resulting clarification of direction, discarding of some works, and the resolution of critical issues. The chapter ends with a conclusion of how the work was adapted and focussed within the parameters of the project.

Section 1: The Works - Background

In the studio work, the branching evident in bark, branch, twig, foam and ripple is used as a metaphor for capillary structure, for dendrites, and neurones within the visual system.



Fig.38, *Tree branches at Port Arthur* photo, (2004).

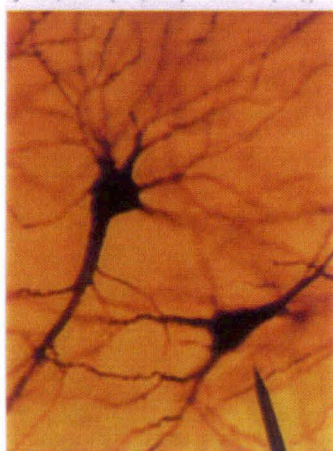


Fig.39, *Primate Neurones*, <http://www.hhmi.org:80/senses/b140.html>, (viewed 17/09/2005).



Fig. 40, *Blue Splash*, detail, Ada Henskens, (2005-07).

Such structures have some resemblance to those used in the first triad of Black and White canvases, including the one which I think of as *Blue Splash*, and three large experimental supporting works. They are employed to convey forms within the human body that are similar to forms perceived in nature, by virtue of repetition and patterning. These link one's inner world with the world outside the body as an experience of existence. The concept of branching, therefore, forms a slender but significant link with neural and external natural structures, aspects of Chaos Theory (derived from quantum physics), and statements by Parr regarding some of his motivation.⁵⁴

The block-like units evident in some works result, in part, from the way that the photograph has had its tonal values exaggerated in Photoshop (Levels), with edges sharpened slightly. Further contrast is gained by photocopying; in this process; ink accrues considerably in the dark areas of the image. The image is then printed onto acetate and

⁵⁴ Parr p.22, fn.17, and p.51, fn.47 for 'branching' and Chaos Theory.

projected onto thick paper. The definition of form and edge is all the more noticeable for being a fragment.⁵⁵

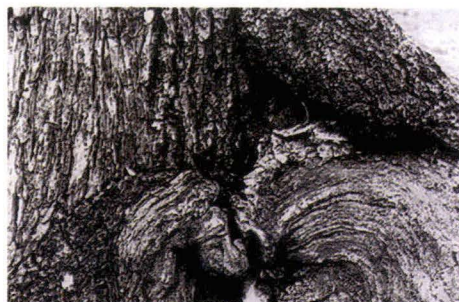


Fig. 41, *Tree root*, (2003) Franklin Square photo.



Fig. 42, *Tree root*, (2003), Franklin Square, photocopy.

The composition is abstracted further by selecting shapes from the projected image in a manner that gives a dynamic, exaggerated, flow pattern.



Fig. 43, *Abstracted tree root* (2004).

⁵⁵ The process reflects looking. In laboratory experiments on the viewing process, if what is being viewed by the visual cortex, at an intermediate stage of processing, is projected onto a computer screen, it would appear in this form. That is to say, the visual object presents itself as an assembly of blocks of indeterminate tone that proceed to add colour, refine shape, and take on identity, in nanoseconds.

A flow pattern may follow the original branching lines that are distinctly part of the bark of a specific tree, a tree which had developed bark through the layering of various nutrients, in a manner peculiar to its identity as a life form.

The abstracted pattern that I obtain by these processes expounds that developmental process, and is used to correspond to the formation and function of cells within the visual cortex. This latter selection is then used to form the painted image or stencil. The final works resulting from these processes are discussed in detail in this chapter and consist of the following:

- a line of six stencilled panels on MDF board
- three triads of related canvases - nine in all
- six panel monotone on MDF board where the image appears to vanish into the wall
- three videos in adjoining enclosures
- two monotone stencilled works on paper and foam-core board
- a digital image on binary vision and focus
- a horizontal line of photographic source images.

Support works appear in a separate space in the Sculpture Department (The Plebiscite), and in my ground floor studio (G28).

The line of Greyscale MDF boards

This is an expression of the theme using stencil, spray paint, and MDF board placed as a horizontal line of six-panels. It has been removed from its context in historical development as the third work to be produced, and represents a walk through landscape while scanning. Each

panel measures 60 x 60 centimetres. The same process used on the second canvas triad is exaggerated on the boards, as the paint does not sink into the sealed surface. Edges, for example, are sharper where the layers overlay each other. It is painted with black and white commercial gloss spray paint. Light behaves in quite a different way here because it bounces off the surface. The panels are spaced, with form and tone at each edge not quite matching up with the surrounding panels. There are, however, sufficient clues in these units for the brain to create links in the gaps between. The play of blur, focus, edge recognition and motion detection cells is stepped up considerably. Using monotone aids this process. A small amount of grey was introduced, with greater variety of tone, and the primary greyscale vision system is obviously invoked. They have a quality of speed of execution.



Fig. 44, *Line of MDF boards, studio work in progress.*

The Canvas Triads

Triad 1

This consists of three canvases in near-black and white. Each measuring 1.5metres x 1 metre, the three canvases are placed side by side like banners.

Canvas 1

A thin Cerulean Blue wash was first poured across the raw canvas to portray neuronal-chemical activity. The canvas was rotated sharply while the paint was being poured to let motion and gravity be the brush. This sharp motion is

retained in the resulting blue form; its slender lines and splashes convey neurones firing. By pouring this colour onto raw canvas, it was absorbed and dried within seconds, appearing to be part of the ground until I brushed dark paint into surrounding areas, interspersed with white fragments. This had the effect of activating the blue colour. The white fragments generally form a third layer above the blue and dark paints, as they were the last to be applied. Complicating this white 'layer', a few white fragments are painted as if they thread below areas of the dark and the blue paint, invoking the principle of occlusion, whereby an object is partially obscured by another object lying in front of it.⁵⁶ The three layers, therefore, contain some areas that contradict expectations and add subtlety to visual efforts to separate form from ground.



Fig.45, 1st canvas, 1st triad.

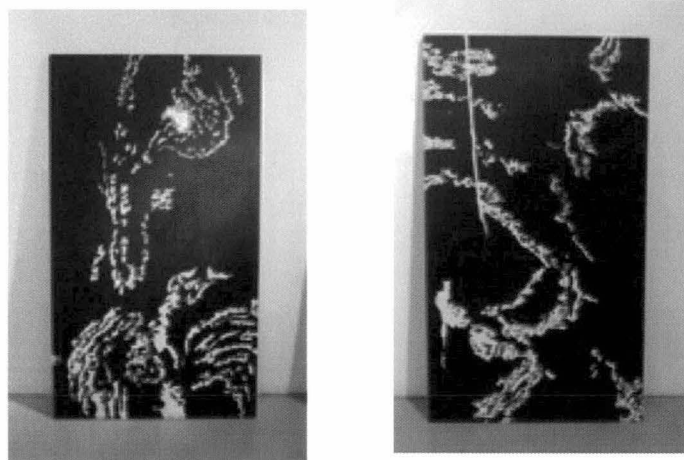
Although the blue paint was the first material to be applied, it appears to float above the dark and white

⁵⁶ Occlusion: Together with comparative size, (leading to apparent perspectival recession), and tonal values, occlusion is one of the means by which the brain determines three dimensional space and where objects lie in this space.

shapes, compressing these into the background where it crosses under or over them.

Canvases 2 and 3

The second panels are in 'Black'⁵⁷ and White. The white forms reference structures in the cerebral cortex such as neurones and blood vessels that parallel branching forms in observed nature. They have a twig-like appearance. A small screenprint has been inset into each canvas. The spidery screenprint image is taken from a cross section of the cerebral cortex from *Gray's Anatomy*⁵⁸. Coloured to represent the circulatory system, one inset uses Magenta, the other uses both Magenta and Ultramarine Blue for cellular systems bathed in arterial and venous blood structures. The blue and red screenprint is deliberately misprinted to offset venous blood colour within the RGB colour system. The structure of the cortex was later highlighted with paint applied with a fine sable brush.



Figs. 46-7, 2nd canvas, 3rd canvas, 1st triad.

⁵⁷ see p. 68 later in this chapter on how this colour was achieved and why.

⁵⁸ The same image appears in the source images on the last wall. It is one of the beautiful naturally occurring structures within the body that can be seen as artworks in their own right.

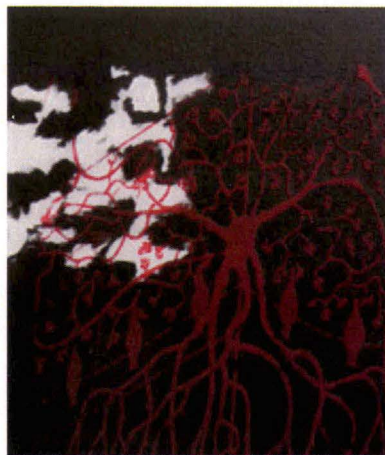


Fig.48, detail *canvas 2, 1st triad*, showing screenprint insert taken from Gray's Anatomy, representing tissue and blood.

Extra layers of paint are applied to certain areas to vary the density, and therefore luminance, of the canvas. By fusing painting and informative diagrams in a combination of technologies, the project alludes to processes by which we process information and construct belief systems today while retaining older technology.

Methods employed in these works to achieve expression of the visual cortex in action are as follows:

1. Quoting art methods

As stated in Chapter 1, because the project takes place within a visual arts context, the works are essentially artworks rather than diagrams made to convey theory. Painterly stratagems, such as a loose painterly style, are employed to help achieve this. There is emphasis on the characteristics of the medium, for example, evidence of paint flow. In one canvas, attention is drawn to the canvas edge by means of raised black longitudinal lines that reference the frame, (and emphasise it as vertical painting). The screenprinted inserts are purposefully diagrammatic, to quote (medical) scientific inquiry associated with

abstraction and personal interpretation. The fragmented, cropped images communicate across the gaps between each canvas chiefly through the organisation of the white components in order to give the impression of a continuous field.

2. Quoting brain function

Each contains an image derived from the severed tree root selectively modified to symbolise the brain in the process of apprehending an object and determining its form by action of the visual cortex. Communication across the gaps also references the ability of the mind to fill in gaps from constancies⁵⁹ - that is to say, previously recognised identities that it builds up from experience. It builds up a concept by consulting what is previously known while computing aspects of a perceived form via the visual cortex.

3. Quoting the visual cortex⁶⁰

Examples would be determination of form by edge-recognition, tonal values and luminance that separate form from surrounding ground, and any motion evoked by this form. Both patterning and angular broken shapes suggest flow and direction within the painted area. In the Greyscale visual system, if motion occurs, the determination of the direction of that motion is detected by the firing of appropriate cells, whether occurring horizontally, vertically, from any side or angle, advancing or receding. The complete images are chiefly in Greyscale to denote the primary visual system. It was also more effective in concentrating the viewer's attention on visual activity. Limited colour is inserted to represent neural and

⁵⁹ Constancies, see Ch.2 - Context, p.37.

⁶⁰ see images Appendix A, The Visual Cortex.

circulatory structures within the brain, but the general scheme is severe and limited at this stage. A build-up of colour occurs in succeeding works to represent the secondary RGB system that developed later, amongst primates.

4. Methods devised to strengthen visual impact

Ground and form have been worked against each other successively in order to accentuate form against surrounding form, rather than a commonly occurring procedure of form against ground. To delineate a stronger form against an unaccentuated ground tends to produce a picture that has a rather irresolute all-over surface. Working form against ground, then ground against form, in successive layers, generally tightens the surface advantageously, especially when certain areas are unobtrusively picked out for thicker paint, sharper delineation of edge, or accenting by tone or colour. This is one way in which surface tension can be subtly increased to heighten visual activity. Having done this, the selection of form is visually loaded by heightening some of the white areas by paint density, sharp edges, or suggesting rotating motion against 'floating' areas.

The first layers were a mixture of Bright Red, Ultramarine Blue and Cerulean Blue, Raw Sienna and some Mars Black. Pure Black was avoided. White was laid down fairly thinly, followed by three more thin washes, in a different chemical mix of white, in the same allover manner. For the final layer, Mars Black gave a velvety finish and depth, while certain white areas were re-worked. The purpose of the mixed colour layers was to engage colour-responsive cells in the visual cortex to respond to the wavelengths at which these colours are determined

within the brain. The viewer's eye responds to the colours in the lower layers while consciously registering only the 'black' top layer. A discerning viewer might be aware that the surface creates a deeper visual engagement than is immediately apparent. A similar thing can happen with a photograph that picks up subtleties of colour that a viewer may not be aware of firsthand.

Triad 2

These three canvases measure 40 x 30 centimetres and they are made with spraypaint and stencils. This process was chosen as representing everyday presentation of information through advertising, mass media and graffiti. They are displayed close together in the manner of such commonplace advertising material.

The first two canvases are worked in Black and White in reference to the Greyscale visual system. The second canvas is almost the reverse of the first, with the black sprayed on white, but more fragmented. The intention is to portray how the mind can switch from one formed image to another, seeking resolution.



Fig.49, 2nd triad, 1st canvas.

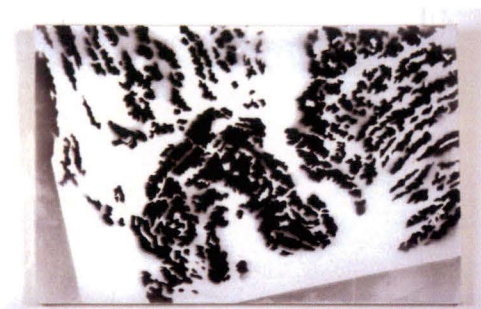


Fig.50, 2nd triad, 2nd canvas.

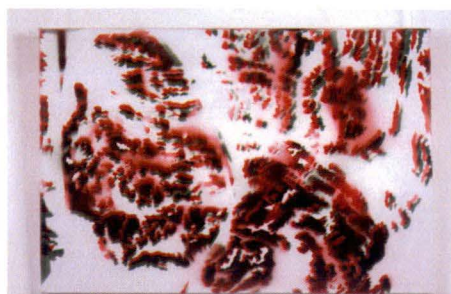


Fig.51, 2nd triad, 3rd canvas.

In the third canvas, I introduce colour, colour-contrast with overlapping edges, and an increased suggestion of motion. The suggestion of motion is achieved chiefly by the directional flow of the pattern, moving from bottom right to the upper left side, and the 3D effect of the red and green paint. The jagged forms, constituting the pattern flow and its direction, are emphasised along one edge by building up a thicker layer in the spraying and stencil-lifting process. A white diagonal runs from lower right almost to top left of the canvas, in contrast to the four coloured quadrants that are tilted to the left. Some small, brightly coloured, sharp-edged shapes are superimposed at crucial areas of tension to direct the eye to the upper left by their visual weight.

Methods employed in these works to achieve expression of the visual cortex in action:

1. Physical manipulation

I cut stencils, working first the 'positive' shapes, then surrounding ground, ('negative'), except that finally there is no negative/positive in the usual sense, because working dark and light areas against each other eventuates in a state of virtually equal visual weight. The process was repeated two or three times, spraying over the positive stencil, then spraying over the negative stencil. This process built up contact points between the two stencil patterns with areas of sharply raised edge where they met, and others where I overlapped the stencils, with shapes or areas of blur. This effect was assisted by lifting the stencil edge slightly during spraying to achieve the blurring, (paint was allowed to float under the lifted stencil), and ripping the stencil off before the paint was completely dry, for edge definition; in this way, some of the paint was dragged off with the quick removal of the stencil. A cheap spray paint was used, so the colour is not pure, and contains a lot of fluid. It has some quality of a carbon copy, a lifted impression, something not well defined, like a memory. (See image in Studio Work)

For the second canvas, the stencil was cut in half and shifted slightly during process. Cutting the stencil into sections and adding some loose extra fragments gave a very sharp edge. Moving sections of the stencil made sharper juxtapositions of forms and introduced motion into the piece. A portion of the stencil edge was included by over-spraying. This was to draw attention to the work as a process of producing an image, (which parallels looking; striving to create a totality from an assortment of fragments).

For the third canvas, the two complementary stencils were used as before, but after the first spray run, they were cut

up into three segments and moved around. Some small, loose fragments were dropped onto the surface during the process to vary shape, break up large areas and intensify optical recognition processes. This panel is visually strong and suggests early 3D film experiments and binocular vision. Whenever this triad has been shown, formally or informally, viewers warm to this canvas, tend to approach it and identify it as 'friendly'. Perhaps the 3D effect is evoking memories.

2. Using colour

Unlike the canvases in the first triad, which were painted directly onto unprimed canvas, those in the second have a white ground laid down in order to make the paint layer stand out from the surface a little and to add sparkle to the colour. It also references a building up of data to a more complicated structure. Unprimed canvas in the early works is 'membrane'. The primed canvas is 'acquiring structure'. The third canvas references the RGB colour system. The effect of motion occurring in the second canvas is exaggerated in the third one, and areas of extreme overlap occur, with colour running into colour (Red and Green, creating a third tone and Brown colour). It links to the next triad of narrow screenprints that use colour more fully. (See figs. 11-13).

Progression is suggested by reversing the Black and White themes of the first two canvases, then introducing simple, sharp, colour into the third. This set of canvases was made with the video films in mind - in terms of visual bombardment.

Triad 3 -RGB

These long thin canvases are coloured Green and Red, Blue and Green, and Red and Blue, respectively.

General Method

A section of the photocopied severed tree root image was projected onto acetate film. From this projected image, a selection of marks was taken that reflected the pattern of its individual external structure. A succession of screens was prepared and printed, laying one colour over the other when dry. With each succeeding canvas, the pattern increased in area until it covered the whole of the third canvas, illustrative of an accumulation of cerebral processing efficiency.

Methods employed in these works to achieve expression of the visual cortex in action are as follows:

The pattern is taken from tree bark enlarged in size. It is then photocopied to emphasise the action of the visual cortex in processing data to determine identity of object, background, surrounding objects and any motion. As previously, the block-like forms correlate to the appearance of a form in its medial apprehension by the visual cortex as it might appear if projected onto a computer screen. Untranslated by higher processing centres across the brain, it can only be expressed in terms of the cellular action which catches data at this stage such as uncombined luminance, edge, direction and colour. As yet, there has been no comparison sought across the brain to compare constancies and determine probable identity.

The Green/Red canvas

The area of selected marks was small and flowed along part of one side of the canvas. Green was printed first, then overlaid with Red. Certain areas result as clear Green, others in clear Red that exaggerate the edges of the block-like forms. Other areas form a third colour by completely overlapping, and give an effect like 3D film.

The result suggests binocular vision, and is rather hard to look at for long.



Fig.52, 3rd triad, Red/Green, Blue/Green, Red/Blue canvases, (2007), installation shot at Inflight Gallery, (actual lighting).

The Green/Blue canvas

This canvas presented some difficulty in that the luminosity of the two colours was similar in strength and a strong edge/contrast was not at first obtained (blue and green are close together in wavelength). With careful placing of the stencil, it was possible to build up the contrast at some of the edges, and have more of a coloured area at the edge. As a canvas, it is as quiet as the first Red/Green is 'noisy'.

The Blue/Red canvas

The same procedure was followed except the mark-making was allowed to cover the surface. It has a tapestried effect. It could suggest a coppice of tree trunks, a bark pattern, (which is a return to source), or stacked cells in the visual cortex. These three canvases can be placed in a variety of ways as long as they follow the sequence of smallest to largest pattern, or alternatively, largest to smallest. Progression of complexity is implied.

The Greyscale grid

Six rectangular MDF boards, each measuring 600 cm x 450 cm, are placed vertically on the wall. They suggest a floating motion, and provoke optical scanning in order to establish oneself regarding the presumed scale. They are derived from a photograph of footprints on a sandy beach, in full sunlight, and have a cratered appearance when enlarged. Placed before the viewing cells of the video films, they are the summation of imagery used upto this stage. Following the video cells, there is a change of effect in the images leading to the informational source images.

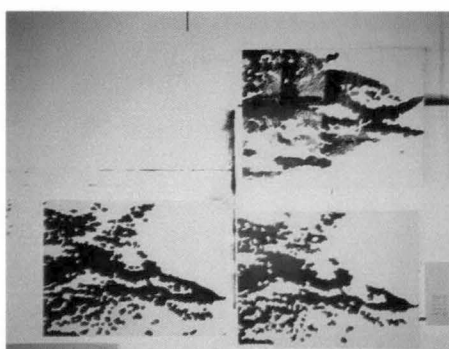
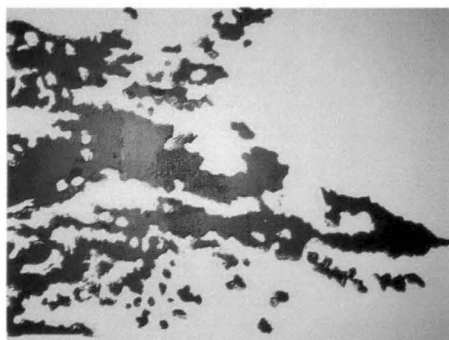


Fig.53-4 *Greyscale Grid*, (2007) rolled paint on MDF, studio shot - work in progress with detailed panel.

Methods used

Equally sized panels of 4mm MDF board were given four coats of gesso and white acrylic as grounds to add depth of tone to the very simple motifs. The backs had been sealed

with shellac. A specialised stencil method was used again as representing cellular activity as it produces a block-like appearance with exaggerated edges and tonal contrast. The acetate image used as projection had to be reduced to half size in order to cover all of the papers (representing the boards) within the margins of the image. On previous occasions, I had cut the main image into six equal segments, and projected each segment onto a different paper. From these papers, two stencils would be cut, for a black and white of each, then transferred to each corresponding board in the sequence. For this piece, there were three layers of each black stencil, three layers of each white stencil. (In actual fact, the 'white' is known as Plimsoll Grey, to match the off-white colour of the gallery walls). This time, with this method, the image flowed beyond the confines of all the boards so that only a portion of each segment was selected. The scale had therefore to be changed, because the aim was to link shape and colour components across the gaps to present a more precise formation. As with previous works, the stencils were layered and lifted during the process to build up the edges of the forms. Rollers gave a softer surface to this work, which is less aggressive to the eye and assists a coming-to-end of the visual journey. In low sheen dove grey that tones with the gallery walls and black acrylic commercial paint, they melt into the wall and challenge the viewer to separate form from ground. At the same time, they are raised minutely from the wall as a lightly sculptural reference that quotes depth perception, and gives subtle cast shadows.

Subtle variations have been given in certain areas to engage the viewer by:

- varying the thickness of acetate used for stencil, (thereby influencing how the paint flows over, under and around the stencilled shapes by offering a greater resistance to it)
- two panels near the middle, off-centre, where the order in laying down paint is altered from starting with a black layer and finishing with a light, (this affects the strength of the colour at the edges where it occurs)
- adding one extra roll of white paint to the top of the second panel where this occurs so the effect is not too blatant - the middle right panel, black form near the top is softened
- not pinning down some loose shapes so that the roller can pick them up and transfer them as 'ghost' shapes to another area, whether of the same or a different colour, (by implication, awaiting further definition).

The three Videos

The video works emerged from experimentation in a field that was new to me and came about through an opportunity to borrow a mini dv digital camera. Its plasticity of image, and ability to portray flux and data flow in the form of light and water, was captivating. Wishing to avoid narrative, I found it generally worked to better effect to exclude sound. Concentrating on vision gave a more direct sensation of bombardment of the senses by incoming data, the intermittent processing and rebound effect of outward flow. While no one affected the form or intent of the videos, I have found encouragement in viewing work by other artists.

General rationale and methods

The project uses three film images of moving water to reference light as wave and data flow within the brain, light as particle, and visual bombardment. This concept builds on earlier work in my Honours year in which a moving jet of water was captured to convey stream of consciousness⁶¹. Light as water also exemplifies current research on the stability or otherwise of memory which plays an important part in data processing by the visual cortex.⁶² The flexible nature of video is ideally suited to reflect an outer world in flux, open to alternate understanding. It is a suitable medium because of the ease with which you can invest familiar images with alternative readings by slight manipulations of tone, scale, distortion of shape, unexpected colours and movement. Similarly, a photographic image can reference time and memory, or be re-staged to present a sense of immediacy. By shifts in transparency or density, you can imbue a scene with a sense of time past or a present weighted with action. These inferences are used within the project to reflect the brain building a concept of reality, searching for constants with which to make comparisons for fast and efficient processing; a process that parallels television technology in this respect⁶³.

The three films are installed in individual cells. The viewer proceeds from one to another in succession. The films are projected from the floor up so as to engulf the viewer into immediate experience on entering. This builds

⁶¹ see image Ch. 1, p.10, fn.10

⁶² see quote Ch.1, Joe Tsien, p.5

⁶³ Livingstone, Margaret, *Chapter 12, 'Television, Movies, and Computer Graphics', Vision and Art: the Biology of Seeing*, Harry N. Abrams Inc. New York, 2002

up in intensity to the visual bombardment of the third film. Only the third one incorporates sound, leaving the visual image to predominate in the other two.

Video 1

The original film was recorded from the River Derwent with the tide coming in. I called it *Lux Fiat*, and experimented with this particular film for several exhibitions, try-outs and competitions. It was replaced by a new version of *Blackstream* after the exhibition *ReVision*, held at the Inflight Gallery in August/September, on the grounds that it seemed to belong in another context. It resembled fabric rather too strongly. The new clip represents both wave and constant data flow, inwards and outwards. It was taken from a fountain at full bore and so possessed interesting patterns, subject to altering its identity as water. An accumulation of foam surrounding the base presented material that could be factored as brain tissue and chemical reaction.

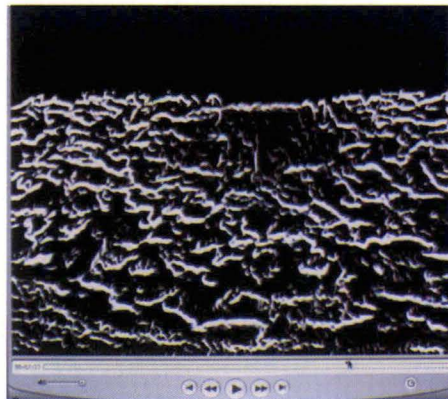


Fig.55, *Blackstream III*, video clip.

In filming, the camera was panned to follow the pattern of water as it dispersed across the fountain bowl up to a metre around the jet. The speed was slowed by 50% and alternate clips played in reverse. This gave a dynamic pouring and sucking motion that appeared deeply

purposeful. Two filters were applied in Final Cut Pro; Compound Arithmetic and Find Edge, which gave black with sharpened white edges. The original referents are almost completely altered and take on a reading that is difficult to resolve, but something familiar is retained that is tantalizing. By its severe colour and fantastic appearance, the clip links up with the first canvas triad presented in terms of Greyscale vision. Sound was removed so as to empower visual appearance to the utmost.

Video 2

This clip is based on a fountain jet in Franklin Square, Hobart, filmed on a bright windy day. These conditions gave sparkle, velocity and random direction to the stream of water. The edited clip represents visual bombardment by light as particle. It also references the information assault of electronic technology; photons in motion.

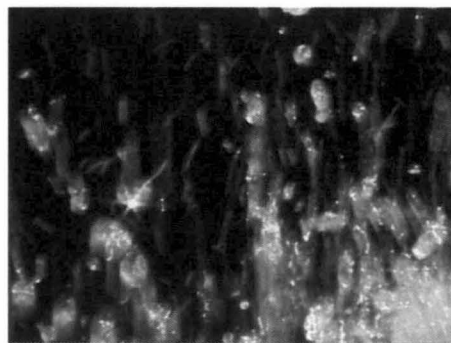


Fig.56, *Light as Particle*, video clip.

Manipulations and effects

Using Fast Shutter speed, the digital camera was pointed upwards and through the jet to capture the brilliance of the sun shining through the water, rendered translucent against the sky. At times, the stone background intruded, but this was used during editing to add dark tones and

force that smashes towards the viewer. The shutter speed made the water particles stand out against each other and any ground, enhancing the effect of coming forward. Two video filters were applied; Edge Detection and Channel-Invert, which removed the identity as water and enhanced the physical qualities of the particles. The audio file was removed as before.

Video 3

Based on another clip of the Franklin Square fountain filmed at Fast Shutter speed.

Manipulations and effects

The movement had to be contrived so that it appeared to come out from the screen directly at the viewer. Motion was speeded up and two video filters applied to suggest particle bombardment.

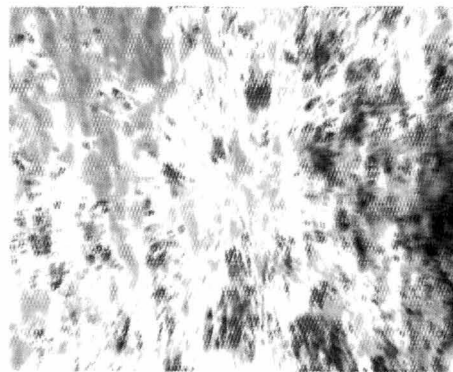


Fig.57, *Water/Light bombardment*, video clip.

Summary of the function of the videos

Presented as a triad like the canvases, the three films reference each other through medium, colour and form in a way that enhances their total effect. They interrupt the work on walls at a juncture where these may have become somewhat repetitive, but they also link to them as representing the visual cortex in action. They possess many of the same referents such as edge, separating form

from ground, assessing tonal values, attempting to place these cues within a field of experience, in a way peculiar to their medium.

The Monotone works on paper

These two adjoining panels are made from the same image as the series of Greyscale MDF boards mentioned previously, with more emphasis on sharp edge and diagonal flow. The selection of units differs slightly and there is freer handling of the acetate stencil sheets by moving them during spray painting. Edge recognition and motions cells are quoted as a deliberate attempt to portray motion and direction. Attention is drawn to the visual cortex in action while simultaneously revealing artistic artifices used by registering the edge of the stencil sheet and highlighting the paint. The sprayed paint is absorbed more immediately by the thick paper, so gives a different texture. The effect resembles ice floes but the viewer is very aware that they are two painted sheets of paper hanging loosely on a wall. An effect of fragility is sought that references the materials used, and that portrays a contemporary landscape in terms of global warming with melting of the polar ice-caps.

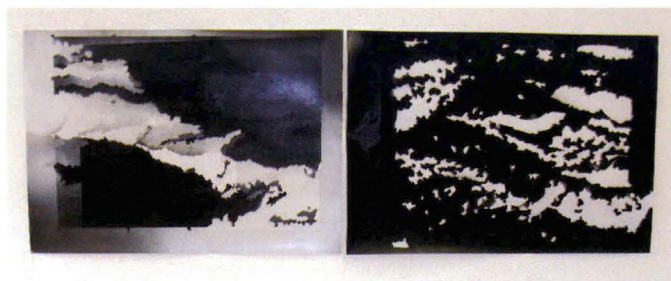


Fig.58, *Heading South*, spraypaint stencil on paper.

Focus

This digital image is developed from a segment of the 3rd canvas of the 2nd triad, (Red and Green). It represents binary vision focussing on two almost identical surfaces, adjusting to minor variations to obtain a whole image.

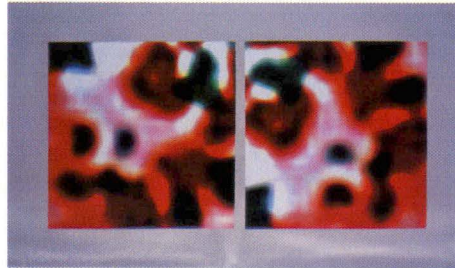


Fig.59, *Focus*, digital print.

The Coda of source images

These form a coda to the other works, literally letting them tail off in visual and emotional terms. They are source images that provide clues to the context, illustrate a process or exist as medical referents. In contrast to the main works, their abstraction due to process is not so evident. The viewer is in fact more likely to read them as the factual evidence, if diagrammatic at times, on which the other works are founded.

Supporting Works

1. These consist of a triad of large canvases 2 x 1.5 metres. They were the original attempts to incorporate natural forms with abstract representations of cellular activity in the visual cortex to create a suitable visual language that conveyed the theme. They all contain the tree root form resembling a cross section of the brain. The first canvas represents an experience known as 'whiteout' which occurs when the

visual system cannot process the data sufficiently because of insufficient contrast, such as is evident in a snowstorm. This canvas expresses initial raw data flow. The second canvas links to the previous one by size, shape, colour and motif. The form is being registered as data by the cells in the retina. It is at a primary stage of processing. The third canvas represents tissue, vascular flow within the brain and the passage of data flow. It contains a pour of red paint to effect this.

2. A large experimental earlier work in acrylic paint, ink, graphite and pencil was the progenitor of the doctoral series. It was with this that I noticed that I was picking up on pattern and edge recognition - the results were like a contour map.
3. Translucent works on paper - a discarded attempt to convey light containing form.

Section 2, Studio Work - Exhibitions and Development of Ideas

Much of the first three months was spent pursuing themes associating time, place and memory within landscape. Lacking a car was initially a problem in that it restricted access to open landscape. Hobart and its immediate surrounds are dominated by historic buildings that evoke memory, and the first work reflected this. Records of pioneer gravestones in St David's Park were selected for their historical interest or evocative patterns. I used voile sheets and condensed charcoal or lithographic crayon to take rubbings from them. Some rubbings were also made on rice paper, but these did not transfer the memorial patterns well and remained inert as imagery. Trial pieces using the voile sheets were set up and photographed in the studio. It was interesting to see how light behaved when

shone through a projector onto lines of diaphanous material. The inscriptions took on emotional qualities that produced a personal response. The result was an exhibition in which I recalled the impact that this avenue of relocated gravestones had on me when I was newly arrived to Tasmania. I had wandered along, aware of a tenuous intrusion of former time into the present, speculating what the experience of the settlers' arrival might have been. Being an imaginative recall of the past, a mental event, the exhibition was staged as something existing in the head, and was titled *Behind Your Eyes*.

Behind Your Eyes

The installation was held in the Fine Art Gallery, University of Tasmania's campus in May 2003. It was intended as a memorial to the pioneers arriving by water in sailing boats, and the presence they left in the form of their gravestones in St David's Park.



Fig.60, *Behind Your Eyes*, (2003) F.A.G., detail of voile sheet frottage with tombstone text.

The sheets were suspended from the ceiling across the gallery in three receding layers, and the video of sunlight sparkling off the river projected on to them like a stream of light that represented an epic passageway of settlers boats

from a far horizon. Something of a cinematic cliché, it had some force in the way the light flowed and sputtered, due to editing. It produced much feedback that was very useful. One piece of criticism was quite true though. The sober memorial aspect of the voile/sails was rather opposite in effect to the dynamic flow of light. The audience generally were won over by the theatrical effects which were enhanced by incorporating some local sound. Of interest was that the viewers tended to accept this as contemporary sound issuing from outside the gallery instead of part of the recording process.

Summary

The projector should have been placed behind the installation, to shine through. It was projected from the front to avoid having the effect of a white hole (the projector lens) showing through the semi-transparent sheets, but this could have been avoided by building a ledge near ceiling level and angling the projector downwards. While it was valuable to see how ideas and materials fared when put into a public space, and the experience served to sharpen techniques in film-making, it also helped me to decide that this was a diversion, and not what my work was mainly concerned with. Preoccupation with memory did not fit in with my interest in phenomena.

Result

The voile sheets and gravestone motifs were discarded. I turned to producing large works on canvas, (the large triad in Supplementary Works), that were tentative portrayals of the brain responding to data in the form of light while beholding landscape.

Influences on the redirection of the work at this stage

Concurrent with this, I began reading Livingstone's and Zeki's books, and had some conversations with Parr on the books and topics arising from their content. I attended any exhibitions that he held. I noticed an old elm tree in Franklin Square which had a remarkable root formation. The root had been severed at some stage and the regrowth had twisted to resemble a section through the human brain. It reminded me of a fine engraving from an old medical book. I photographed it, then photocopied it several times to build up the ink deposit and accentuate tonal values of areas that most bore the resemblance to the engraving. I made exploratory works with turpentine prints on paper to determine how to use the image as a motif for the brain.

I borrowed a digital camera and began to collect patterns of light sparkling off the river or fountains, and the play of light in interiors of old buildings. Experimental paintings on paper and MDF board, with the subject of colour and texture, resulted from reading Margaret Livingstone's book on *Art and Vision*. It was a period of casting around to define the topic further, deepen theoretical knowledge, and find a suitable way to express these ideas once they became more consolidated. I filmed patterns of water reflected onto boat hulls which suggested a photoelectric effect like neurones firing. Attempts to remove these patterns from the boat hulls proved to be unworkable with the film processing software available. This is possible in Photoshop with a still image, by selecting similar colour, saving this as Selection, deleting anything that does not match, then dropping the selection into a suitable

background. The idea was abandoned as unworkable. Instead, I deployed Effects menus on the camera and Final Cut Express until I had an interesting layered effect of waves of water.

Photographic material was gathered on a visit to Port Arthur. Some tangled branches outlined against blue sky caught my attention - Mondrian's tree studies came to mind. The colours emphasised the sandstone ruins and the church spire. Visits to Bruny Island and Lake St. Clair gave an opportunity to sketch and observe the nature of the terrain. Light infiltrating the forest canopy made dancing patterns of light on the track - unfortunately I had no camera on hand, but it persisted as an influence.

Redirection, new works and exhibitions

Following these experiences, I instigated a document search within the University library system under Art and Vision, and received a steady flow of abstracts relevant to my topic. This helped to guide the way in which I applied my materials, but it was essentially the working process that determined the outcome. Encounters with landscape, combined with insights gained from reading material, (scientific abstracts on vision and the physical world, artists such as Frankenthaler) led to experiments with paint on canvas. I wanted to produce a series of works that would capture my explorations of unfamiliar terrain, and how an individual experiences this mentally, particularly visually. I decided to work in triads that would progress a suitable theme across the surface of the three, and gradually diminish in size across two more triads, as a demonstration of gaze that narrows as it focusses. A segment of the scarred tree root that resembled the brain was selected and manipulated to exaggerate its qualities. This was projected

onto the first canvas, using thin oil paint onto a rabbit-skin glued surface. Commencing with oil was a choice influenced by colour - Italian pink, (actually more yellow than pink) and Brown Pink, both of which give warm tones that suggest earth and vegetation, and look very attractive with a charcoal grey motif floating over them. I intended to repeat this across all three surfaces with variations. However, passing on to the next canvas, I placed a similar motif asymmetrically and in black and white acrylic. This was an abstract image being processed by the Greyscale System. My reading was beginning to affect my expression more, in terms of the visual cortex, its structures and its functions. The third canvas did not evolve as I had previously thought. It became evident to me that I had to link up the source image, the primary visual system, and the physical structures within the body. The root motif occurred here upside down, at the top of the canvas, resembling brain tissue. I experimented with a process gained from Frankenthaler by pouring thin pale red acrylic from a dish onto the unprimed canvas and immediately rotating it across the canvas like an arterial flow; both blood and neurone. With every work, each time a pattern is drawn from the projected motif, a slightly different selection is made. By this, I wished to reflect that in the physical world, nothing stays the same, whether it is molecular turnover within the body, or data transmitted to it.

A review of works in progress was held at the Fine Art Gallery, University of Tasmania's campus, in April 2004, to enable my supervisors and I to evaluate the 2D work to hand. This contained one triad, and experimental oil paintings on paper and MDF board to reference the secondary RGB colour system that is superimposed on the

the wall by long steel pins, the sheets cast fragile shadows, but they were going in a different direction - ephemerality. The first works on MDF board were scrapped as not achieving anything consistent with the expression of work that was emerging. These boards were cannibalised towards making a series of greyscale MDF boards. Also scrapped were the oil on paper works of colour and texture; I commenced a triad of long, medium-sized canvases in 'black' and white, with screenprint insets.

Two of these large canvases were displayed in the foyer of the State Library, Hobart in June 2004, together with the green predecessor of this project. Unfortunately, I was unable to photograph this display due to pressure of work, but I did note that they presented well in a wide, very public, space. I commenced work on a second triad of the same length, but much narrower. These would deal with interaction of the visual cortex and data at a later stage, and introduce some colour.

During August 2004, I made a visit to Belgium, Paris, Lille, Koln, Trier, Antwerp and Amsterdam. While in Amsterdam, I saw work by Montevideo, a group of young contemporary artists. The Museum van Hedendaagse Kunst Antwerpen (MuHKA), in Antwerp, had some interesting pieces by artists unknown to me. Video art was flourishing in the Netherlands due to a scheme set up and funded by the late Prince Bernhardt. In Paris, time was short, so I concentrated on the Pompidou Centre and contemporary art galleries. I found a commercial gallery in Koln that handled works by Richter and Polke. It was informative to see what was happening in other countries, though some of the smaller artist-run spaces were

Greyscale system. One of these small boards was screened by voile to make the viewer strain to see the abstract grid underneath, a relic of earlier veiled lightbox works. At the far end was a collection of translucent works on paper, inscribed with random dot patterns, loosely assembled together. There was no video at this stage. (*see images*).



Fig.61, *Before the Naming*, (2004), Installation view, F.A.G., Sandy Bay campus, showing discarded experimental works with colour.



Fig.62, *Before the Naming*, (2004), Installation view, F.A.G., Sandy Bay campus, showing discarded translucent works with tree bark frottage.

Results

The works on display were beginning to link up chiefly through colour, but there were about three expositions of the theme going on that were not consistent. By itself, the frottage on translucent paper was interesting. Attached to

disappointing in the times they were accessible and in content, especially in Belgium.

On my return, I re-examined the works on canvas and conferred with my supervisors. As the first triad was not linking up satisfactorily in a way that described the progressive action of the visual cortex, I reworked some as follows:

The second large canvas of the first triad resembled the first canvas expressed as black and white, but was weak. The thinness of paint was counterproductive and unable to carry the image unassisted. I found a photograph of a landscape where trees framed the left edge. I applied a red filter in Photoshop, cut off the left edge, reduced Hue and Luminosity and elongated the image. Four strips were printed off, each with gradually diminished hue. These were pasted onto the right hand side of the canvas, about 10 centimetres from the edge and a miniature strip inset into the now long, narrow strip running from top to bottom. It was an abstracted reference to landscape as source, and the pale red linked up to the warm oil-painted under-painting of the first canvas. (This was later over-painted and became 'Whiteout'). It then made a more substantial link both to the first canvas by colour and the 'brain' image, and to the third canvas for the same reasons. The message they carry is initial undifferentiated visual confusion, Greyscale data flow, and blood flow around brain tissue in the third.

I started work on the last triad of the three, which was small and expressed close-up focus and cells firing in the visual cortex to determine form, tone and colour. While determining how to approach this part of the series, I was learning about film capture and process with Final Cut

Pro, a complicated software for a beginner. Experiments with stencilling on boards replaced building up edge by drawing and painting with a brush, and gave intriguing results. It was a process of learning by doing, in each case. The outcome was an exhibition at Sidespace Gallery, Salamanca Arts Centre, in January 2004. Entitled *Just Looking, Thanks*, the motivation was to see how the works on canvas would sit with a video piece; if they would carry the theme.

Just Looking, Thanks

Set in an old warehouse, with massive timbered columns, wooden beamed ceilings, floorboards, and white painted brick walls, double doors access the gallery, three deeply recessed windows are on the left-hand outside wall.

Three sets of canvas triads were placed in sequence around the walls. Reading from right to left on entering were the three largest canvases (now support material). Immediately opposite the entrance were the three long black and white canvases, in the centre of the back wall. Spotlit from above, these long canvases dominated the space. A little to one side was a small black and silver television set on a low white stand, displaying a looped film featuring light as wave, which I called *Lux Fiat*. The final triad was of spray-painted stencils. A paintbrush was not adequate to convey sharp edges in the required manner. These three small works were each separated by a recessed window. Almost overlooked inside the door was the large green and graphite canvas, progenitor of these works, that resembled a contour map of scattered islands adrift in an ocean.



Fig.63, *Just Looking, Thanks*, (2004), installation view, Sidespace gallery, S.A.C., (earlier stage of development).

Summary

The exhibition was well attended by the general public, some staff and colleagues from the Art School, and the local art critic from *The Mercury*. Once again, it was illuminating to see how artworks take on another presence when placed in a public space. The pieces integrated well with the video; the works presented were becoming more cohesive. There was useful feedback and the critic, Georg Andersch, wrote up the show in his column. It appeared that I was beginning to find the visual language needed to express the theme.

The second triad, largely in black and white - the *Blue Splash*, was satisfactory, the other two had the screenprint enhanced. Where the original purpose had been to use very thin paint on unprimed canvas, in practice this required many coats of paint for meagre effect. The aim to convey membrane by thinness of visual content was not working as intended; something more substantial was needed to convey activity. I put these works aside to add a top layer of Mars Black at a future date and entered *Whiteout* in Living Artists' Week, when it was displayed at Headroom, Burnett Street, Hobart, in August 2005. Definition of the project benefited each time works were put into a critical arena, so when an opportunity came to

present an illustrated paper at a conference in Hobart, I applied. This was the *Senses of Place* conference held at the Hobart School of Art, Hunter Street, between 5-8th April 2006.

*Senses of Place: exploring concepts and expressions of place through different senses and lenses,*⁶⁴ 6-8th April, School of Art, University of Tasmania, Hobart

My paper was entitled *Constructs of Place through Landscape and the Visual Cortex*. I gave a brief summary of my project at that stage, with the observation that constructs of reality can vary according to personal experiences but are underpinned by a common evolutionary physiology. I gave reasons for my adopted position and the means by which I demonstrated these as a visual artist. The talk was accompanied by a Powerpoint presentation that illustrated the points I made, some of which were the third triad of canvases with their source material. At this stage, I had not developed the links with physics and deeper research into aberrations within the visual system that could support alternative concepts of reality, so did not raise these issues. Added to this, we only had thirty minutes for our presentation, which had to include question time. It was a valuable experience in making my topic comprehensible to a professional audience.

I recalled articles in *New Scientist* and *The Age* newspaper featuring examples of blind people who could paint in colour and perspective. Others who suffered extraordinary injuries either recovered some sight or were encouraged to duplicate visual processes by other means

⁶⁴ Convenor, Professor Frank Vanclay of the Tasmanian Institute of Agricultural Research, University of Tasmania; held in conjunction with a musical performance, a public lecture, a performance piece, a public debate, sculpture trail and a conference dinner

such as placing a sensitive instrument onto the tongue, itself a highly sensitive organ. I related these instances to experiences of reality by other means - a link to quantum physics, marginalised data, and artistic exploration of media. I pursued similar books, journals and related articles on the internet, and contacted a physicist⁶⁵ at the University for his opinion on certain theories in the context of my topic. He was positive, supportive, attended exhibitions and sent me reading material. I then turned my attention to film making and editing. This mostly concerned attempts to produce the second film of the video triad, where I used water to represent light. The final stage of this film is described on p. 29, a clip of a fountain flow that has some aspects of a vortex, edited to black and white. To try out this artwork at an intermediate stage of construction I titled it *Blackstream I*, and entered it online into a touring exhibition held by d>Lux emedia, commencing at the Chauvel Cinema complex in Paddington, Sydney in 2005, commencing in August.

Blackstream I, d>Art 05 August-September 2005, Screen, Sound, Web, Mobiles.

The film was a simpler version of the second video seen in the project's exhibition. I selected a different assortment of clips, cropped the top of the frame to give a horizon line which would register as such once the whole sequence was darkened, slowed the speed, applied two filters and then reversed the sequence. The appearance was now converted to a column that rose from a writhing mass of white-edged black material, spewing out even more of the same, and moving between three edges of the frame. It

⁶⁵ Dr Peter Jarvis, Reader, Mathematics and Physics Department, University of Tasmania

then reversed, sucking in part of the mass and disappearing into the residue.

Result

The work was very well received. Invited to attend the opening, I was unaware of the Artsbridge programme which would have enabled me to do so. The film featured on *dLux media/arts* website, (www.dlux.org.au), their poster/catalogue, and was written up in *Realtime* October/November 2005 by Gail Priest and in *Filter* magazine, issue 61 by Sue Ballard of ANAT, (*see bibliography, Publications*). Gail Priest wrote very positively on the film's enigmatic qualities, but made the observation that it was a bit unsophisticated to merely reverse the flow. I edited the film with this in mind, then entered this film as *Blackstream II* for exhibition at InFlight artist-run space in April 2006.

Blackstream II, InFlight Gallery, 237 Elizabeth St., Hobart
InFlight is a converted garage at the back of a cafe off Elizabeth Street, Hobart. It is administered by emerging artists and specialises in new experimental work. It has a video gallery running alongside the reception area, backed by a white-walled rectangular main gallery. *Blackstream II* appeared in the video gallery and was shown in conjunction with an installation entitled *Mobility* by University of Southern Queensland artists. For this version, I had selected some different clips from the original sequence, omitted reversing the motion, and added some transitions that were consistent with light bombardment and a stutter of data flow. The film was a sequence of looped clips, about eight minutes long.

Result

This film was more successful in expressing the theme and fitting in with the first clip, (*Lux Fiat*). Together with my

supervisors, the Head of Video department Leigh Hobba and physicist Peter Jarvis attended, plus students and members of the general public. While the professional artists had some minor reservations about the transitions used⁶⁶, Dr Jarvis found that the film fitted well as an image of 'space foam'. His son mentioned his frustration in deciphering its meaning, only to see this change as soon as he thought he had resolved its nature. This is precisely the ambiguity that I wish to convey. It was written up in *Realtime* by Diana Klaosen in the June/July issue. Nobody knew what the substance in the video was, so this was intriguing. This section of the video triad was edited again for the final exhibition and simplified by removing the transitions.

At this stage, I planned and began work on the black and white series of MDF boards. The board was damaged in transit due to financial and transport constraints. I had to make the panels smaller and square instead of the rectangular shape I preferred, so the result was not what I had intended. I had intended to link this series to the black paintings and the second video by the shapes employed and by being monotone. I allowed the character of the emerging patterns to dictate its overall appearance, aiming to have binary areas of motion/rest, focus/blur, that flowed over the edge in a way that could link up with surrounding panels. I placed it as a spaced grid, on a large wall on the ground floor where many students passed by, so as to test its capabilities as a visual art piece. I did not receive much feedback, wrapped the pieces up, put them aside and spent some time on further self-tuition in film-compositing. I made a temporary third video, because I

⁶⁶ The reservations were that transitions become too well-known and detract from the integrity of the piece.

needed to ascertain how the 2D works were linking with theme and videos. I booked the Fine Art Gallery, Sandy Bay campus, for a one day trial.

Videolite, Fine Art Gallery, University of Tasmania, June 2006

This resulted from an experiment with film to represent light as particle. There were two problems with film stock in that it had been a very windy day when I filmed, and movement of tree foliage in the background of the preferred clip could not be disguised sufficiently. My second choice of clip also suffered from the wind, which at times had swept the water jet to one side, revealing a granite plinth that supported a statue. However, this spray of jetted water, filmed at Fast Shutter speed in bright sunlight, was ideal in portraying light particles moving at speed. A compromise was made by heavy editing of the clip where background intruded. My supervisors and the Head of the Video department reviewed the three films as they were at this stage and we discussed them and how they might be exhibited, ultimately. One of the supervisors found *Lux Fiat* disturbing on a large scale, because of its motion and colour. I later found out that certain artworks can induce nausea, and this had been a comment at some exhibitions of Bridget Riley's works. Other than this, general comment was that the three sequences were linking together in the desired manner and perhaps could be projected with each film occupying adjacent walls, the two films on side walls narrowing to match the width of the film on the end wall. This was a technical problem associated with the way that projectors throw an image along a wall.

Result

The three films were linking together. They each expressed something about the nature of light and vision. By colour, form and effect they were making links with the work on walls. I wished to present them in a way that would strengthen these associations, in case a departure of medium proved to be a disruptive factor. While I had considered how these works could be presented in the gallery, from time to time these conceptions changed with the addition of new works needed to carry the theme a stage further. In the meantime, I set about reducing jerky movement in *Lux Fiat*, and improving the colour from queasy grey to a more pleasing bluish tone.

Reappraisal of Studio Work and Ideas

I now had a reasonable amount of work, had deepened my ideas by reading, discussion, producing work and testing it out in a public space. Attending exhibitions and resourcing the internet gave me access to contemporary works by other artists. While enthusiasm was leading me to being unduly influenced by theory, the final result of which would have been an illustration of someone else's research, a return to studio practice balanced this.

Fascinating examples were aspects of the behaviour of light as observed in physics papers on theories such as The Heisenberg Uncertainty Principle,⁶⁷ or the role of flow-fields in detecting objects in medical experiments of mammalian behaviour. Fortunately, I needed to express scientific research in physical ways that were inevitably influenced by the materials used. I found that the theories gave strength to the argument that how we ordinarily think of the world is open to so many possibilities. The

⁶⁷ see p.1

possibilities I have explored are manifested in the exhibition works, as expressions of being in the world, supported by the interaction of the visual cortex. At this point, I changed the title of the project to describe the topic more accurately. The previous title had been *Phenomenology: an Investigation into Landscape by Traditional Means and Technology*. The work had taken a decided focus on representation and vision.

On completing the three videos, it was necessary to assess how they integrated with the work on walls before the final exhibition.

ReVision, InFlight Gallery, 237 Elizabeth St., Hobart 31st July-22 August, 2007.

This was a joint show, with *ReVision* in the main gallery space. It presented an opportunity to try out formats for the final exhibition. Having to show the video and canvases in the same space meant that the total works would have to be restricted, particularly as the video would occupy the whole back wall, focussed from the floor to ceiling in order to immerse the viewer. The theme of the exhibition questioned reality as commonly perceived by means of the visual cortex. It seemed apposite to deconstruct the white cube with its questionable guarantee of authenticity as artworks merely by their being placed within its walls. The long narrow canvases of the first triad were placed fairly closely off-centre, leaning casually against the right hand wall; a manner that served to recall the galleries former identity as a garage. The video streamed against the back wall and finished at the level of steel beams supporting a low roof of industrial origin. On the right hand wall were the second and third triads, each triad placed well apart. The video display was introduced

by a title illuminated by a LiveType font, (that is, a flashing light moved amongst the text momentarily), and the video was visible from the outside as a stream of light..



Fig. 64, *ReVision*, (2007), installation view, Inflight gallery.



Fig. 65, *ReVision*, (2007), installation view, Inflight gallery, canvases leaning against wall.



Fig. 66, *ReVision*, (2007), 3 film video loop, back wall, Inflight gallery.

Result

The works on canvas linked up well, chiefly through the fragments of red colour; the entire works, including video, through greyscale. Lighting had been restricted to two spots angled at each triad, while the vigorous splashing of

light from the back wall video embraced the whole space below the level of the mesh of steel roof beams. It all served to dramatise the works on display. Because these were limited in number, they did not have to compete for considered scrutiny. I received a considerable amount of useful feedback on what people thought the show was about, the placement of the works, and their own personal ideas that the exhibition raised for them.

Following this exhibition, I did some more work using still images from *Blackstream I* and the third canvas from the second triad. Working with Photoshop Layers, I abstracted them to A3 sized images for printing out by a commercial press. I submitted one for display in Living Artists' Week, under the title *Focus* (*see images*).

Focus, Living Artist's Week, Shopfront Art Trail, 24th August - 2 September, 2007 African Delights, 246 Elizabeth Street, Hobart

Focus is a fragment taken from the Red/Green canvas of the second triad appearing in the project's exhibition. It was magnified in Photoshop to a point where it resembled a pool of interactive colour. Printed off as two panels on an inkjet printer, the second image was rotated slightly before printing off to give subtle variation. Both panels were mounted on adhesive foam core board overlaid by Stonehenge paper, with a slight division between the two intensely coloured prints. The eye struggled to fuse the two panels into one, occasioned by the slight variation between them, and accentuated by the low luminance of the surrounding mount. The work referenced bifocal vision and data flow.

Summary

From a tenuous enquiry into the appearance of surroundings, and variations that can occur by chance effect, the research found solid ground for expression.

This was accomplished by a fusion of new and old technologies backed by contemporary theories in various sciences and humanities. This fusion effectively updated an expression of what happens when we look and attempt to portray what lies outside the self.

Chapter 4 - Conclusion

The project commenced with an emotional reaction to relocation to a locale that presented a layered historical experience, namely, Hobart. In this, it reflected aspects of a private childhood terrain; a rural area where the early Industrial Revolution gestated, with accompanying invasion of Georgian industrial architecture into a world of farm, woodland and river, edged by the moorland of the mountainous Pennine Chain. This 'closed-circle' experience provoked scrutiny of the visual process that gave rise to the emotional reaction, and why certain aspects of looking appeared to be enhanced, such as patterning, outline of objects, and tonal contrast. Eventually, this enquiry led to a fusion of interest in physics, the human psyche, physiology and philosophy with my art practice. Thus, the series of works presented draw on evolutionary physiology, cultural influences and personal experience. This eclectic approach results in providing an insight where the works become metaphors for perceived phenomena, membrane and the firing of cells in the visual cortex. As such, they act as the means to portray a reassessment of our viewing of the natural world. In this examination of the flux between light-flow and how the brain interprets this data, I found bark and internal tree structures to be very successful in portraying the action of cells within the visual cortex, and water as a metaphor for light. Video has added another dimension through which to express the theme. Expression of this exploratory process necessitated the development of an appropriate way of using materials to delineate form in a way that could suggest perception as acuity of vision, for example, or the restless scanning of

the eye responding to movement, edge, shadow, sparkling light.

It was also necessary to convey that the project takes place in a culture that is dominated by screen-based information technology. This technology is both the product of, and chiefly aimed at, a consumer society, with heavy emphasis on advertisement, entertainment, social issues of the moment, and includes passing reference to public education. The development of the project references this background of contemporary thought in popular science and technology, and uses classical landscape as antithesis and starting point. As the studio work progressed, recent findings and studies in neuro-physiology provided a powerful driving force that allowed me to expand upon implications that our concept of reality owes its existence to our physical and psychological evolution in a way that exists only for our species. Given the open-ended approach that I adopted at the outset, minor shifts in focus occurred, as follows:

- while the first two aims remained the same, that is, the search for the 'real' using light as data flow to the brain and its interpretation, the initial preoccupation with memory, morbidity and installation was abandoned, as were experiments with dot patterns on drafting paper and gravity induced maps in paint.
- I came to use a life form (trees) and movement (water) to focus on light as a vehicle.
- There was a move away from using (macro) landscape to (micro) fragments of forms found within landscape.
- This was a move from literal evocation to an abstract mode that conveyed parallel processes in perception, theoretical physics and electronic information

- There was no longer a need for completion by the viewer. The passage and translation of data between the viewer and the outside world, in order to fit within the neurological and physical state quoted, could remain in a state of flux as a passing experience. Completion did not suit random viewing as it occurs today, in the excess of information passing through the human system.

My works find their place within an experimental framework exemplified by the selected artists and scientists with this difference. In common with the scientists and at a difference to the artists, my works express physiological perception in terms of the gradual resolution of data into form and ground as an anticipated image that is never completely resolved. It remains in a state of progression. In this it is faithful to the idea of an ever-changing flux of possibilities of being that occurs within quantum physics and vision itself. In addition, emerging from the conclusions reached in this project is a view of society as being inescapably animal in origin, merely overlaid by a drive to socialisation and resultant cultural conditioning. This is a contribution to the field in presenting, within other conclusions of the research, a move away from structuralist and post-structuralist assumptions about the human condition as purely enculturated being. The emphasis is on an interactive physical world and a move away from a homocentric condition dominated by language and social systems.

The project concludes that while we have consensus of what constitutes our world, especially in visual experience, this appears to be subject to evolutionary constraints and

personal physiological, psychological and cultural influences. These factors can occasion a need for review, and a consideration that our present modes of perception are narrow and are yet to undergo further evolution. It is implied that it is possible that other forms or extensions of reality may exist beyond immediate cognition.

Future works may develop along the lines of *Focus*, the mediated digital print derived from one of the triads of canvases, and a work in process named *Blackflower*, which is a still of Blackstream II, manipulated in Photoshop to resemble a dahlia-like flower. The emerging motivation is to take mundane imagery and translate it by technical means now available to posit other possibilities of viewing the object; of giving alternate forms of existence. Another possibility would be to make random film of bush, sky, beach and water with a High Definition digital video camera, and run it through various filters and modes to examine how else the film might appear, mediated solely by the technology employed - in effect, letting an alternate reality emerge.

Appendix 1 - Information on the visual cortex

With one exception, the following information is extrapolated from *Vision and Art: the Biology of Seeing*, by Margaret Livingstone, (2002), Harry N. Abrams Inc. New York.

The eye

The eye initiates extraction of information. Light passes through the pupil, and the lens focuses the image on the retina, a sheet of layers of neural tissue that lines the back of the eyeball. The first layers are the ganglion, bipolar, and horizontal cells; the cells that respond directly to light, the photoreceptors, are in the outermost layer. The photoreceptors contain light-absorbing chemicals, pigments that generate a neural signal when they absorb light. The signals pass toward the front of the eyeball through the bipolar and horizontal cells to the ganglion cells, which send their signals from the eye via the optic nerve to the brain.

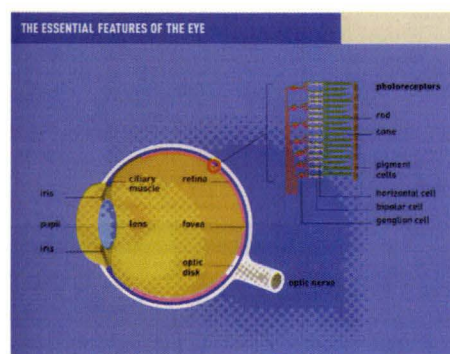


Fig.67, Structures of the Eye.

Throughout the series of works, the eye is invoked as lens and screen; the image surface as membrane.

Ganglion Cells

They first code the data. Some of the shapes in the works resemble actual structures within the visual cortex and eye, such as dendrites within the ganglia.

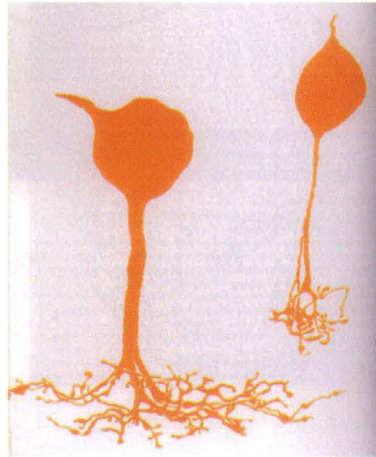


Fig.68, *Dendrites.*

The Fovea

Cells are structured within and around this centrally-placed depression so as to reduce interference in the light path and give sharpness of vision. This causes a predisposition to eye and head movements when scanning for maximum efficiency of vision in order to focus the eye in successive sweeps of maximum acuity.

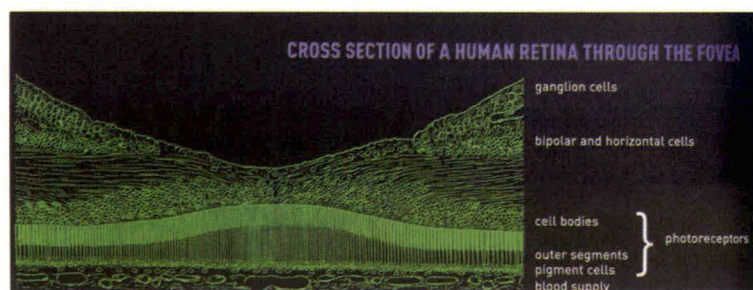


Fig. 69, *The Fovea.*

By contrast, peripheral vision seems to be blurred and imprecise. According to Livingstone, the lower acuity of peripheral vision is not simply blurred vision. It seems to imply actual loss of precise spatial information. These procedures are reflected within the art works by alternate areas of sharpness and blurring, especially in the spray-painted works. (See images, Ch.3, Studio Practice).

The Brain

Visual signals are processed first in the occipital lobe, and then higher processing occurs in the parietal lobe and the temporal lobe. A diagrammatic representation of the human brain is posited against a selected source image to form a parallel as illustrated in the two images below.

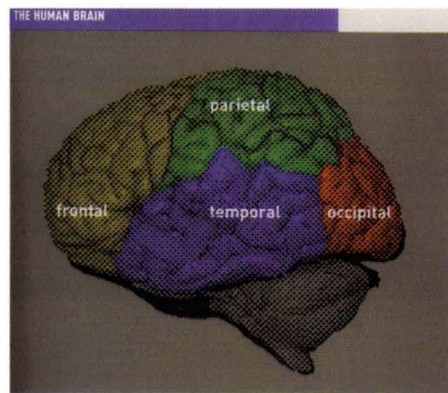


Fig. 70, *Areas of the Brain.*

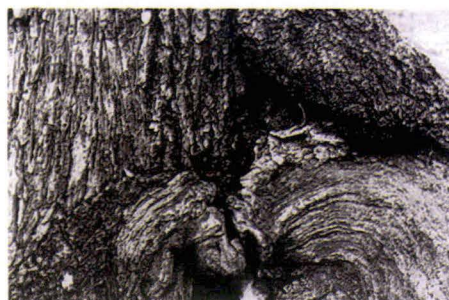


Fig.71, *Tree Root resembling cross section of Brain.*

The Thalamus

The thalamus resembles an appealing artwork itself. As a data processing body, it immediately follows the retina via the optic nerve. Within it are two systems that relate to the primary greyscale visual system, and the later evolved RGB colour system which ‘piggybacks’ on the already existing primal system. This evidently is a much more efficient use of systems than having to develop a separate new system, with attendant duplication of tissues and connective organisations.

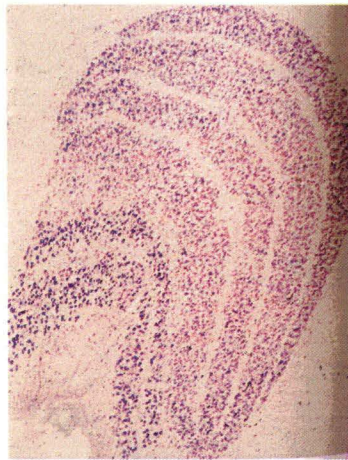


Fig. 72, Cells in the Thalamus.⁶⁸

It compares to the development of colour television from the black and white system; according to Livingstone:⁶⁹

The two classes of ganglion cells communicate with different parts of the brain. In this microscopic section of part of the thalamus, each purple dot is a single neuronal cell body (brain cell). The upper four layers receive inputs from the small retinal ganglion cells, and

⁶⁸ Zeki, Semir, (1999), *Inner Vision: an Exploration of Art and the Brain*, New York, Oxford University Press Inc.

⁶⁹ Livingstone, Margaret, (2002) *Something Really Strange About Color Television Broadcasting, Vision and Art: the Biology of Seeing*, Harry N. Abrams Inc. New York, pp192-195

the lower two layers - with larger, darker-staining cell bodies - receive inputs from the large retinal ganglion cells. The two subdivisions of the thalamus project to different layers of the primary visual cortex.⁷⁰

In another instance of a factual form taking on a secondary identity of fantasy/fiction, Parr manipulates imagery that, at times, take on resemblance to a totally different kind of organism. (See Fig. 33, p.50).

The What and the Where visual systems

Broadly speaking, the primary Greyscale (colourblind) system determines where an object is situated, and the latterly developed RGB colour system determines with greater precision what that object might be.

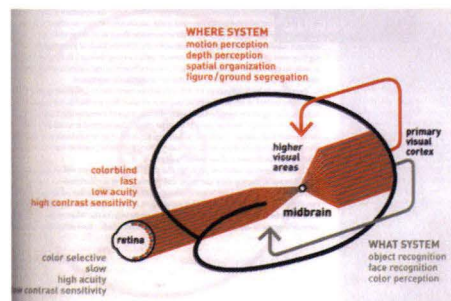


Fig. 73, A Simplification of Systems within the Visual Cortex according to Livingstone.

The Greyscale (Where is it) system uses luminance and sensitivity to contour. The RGB (What is it) system, uses a process known as 'surround antagonism' to locate 'edge'. Most information about a shape is located at its edge, and the brain responds to the contrast obtained in this way rather than defining all points of 'colour' across the surface. This makes for greater speed and efficiency, and interestingly, reflects the way that computer systems are devised to operate.

⁷⁰ibid, p.50.

Colour

Light is a physical entity, while colour is a perception. We have two kinds of colour receptors, Rods and Cones.

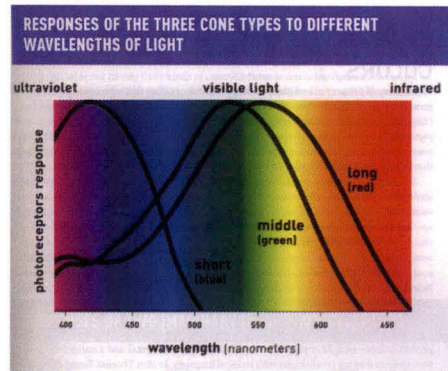


Fig. 74, Cone Colour Response.

Cones are associated with daytime vision, Rods with night time. Cones dominate the centre of gaze, Rods at the periphery. The primate system has three cone types from which it constructs millions of colours. They are long-, middle-, and short- wavelength, popularly known as Red Green and Blue (RGB). The response of each cone type depends on both the wavelength of light and its intensity. There are minor variations between individuals on how their visual systems react to wavelength and interpretation of wavelength. Blue and green offer widely differing interpretations in particular.

Cellular structures within the system

The form and function of these cells are quoted within the works. (See images next page)



Fig. 75, Centre Surround Cell.

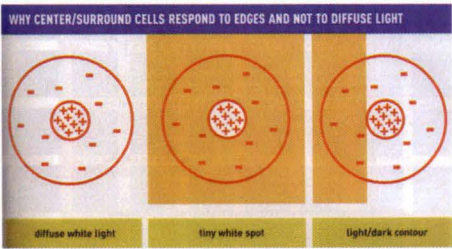


Fig. 76, Centre Surround Response.

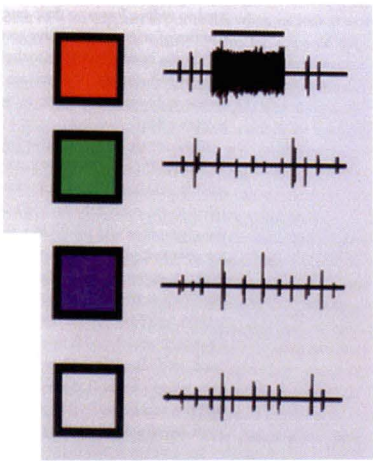


Fig. 77, Colour Response.

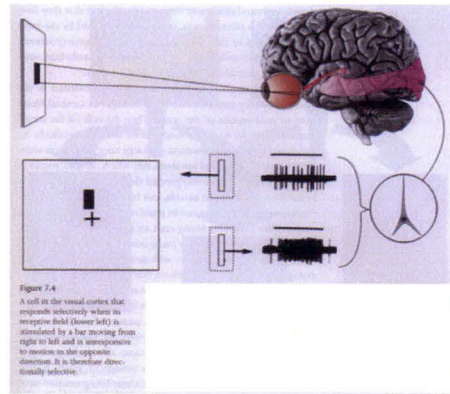


Fig. 78, Motion Cells.

(In addition to these illustrations and Semir Zeki's books, biologists Margaret Livingstone and David Hubel demonstrate, by research and experiment, that reality as we know it is entirely dependent on the brain. An example is the construction of colour by the brain, from the qualities of light reflected off surfaces⁷¹).

⁷¹ Livingstone, Margaret, and Hubel, David, (1988), *Segregation of Form, Colour, Movement, and Depth: Anatomy, Physiology, and Perception*, *Science*, 6 May, vol. 240, No. 4853.

Appendix 2 - Bibliography

1. Borer, Alan, (1997), *The Essential Joseph Beuys*, Cambridge Mass., MIT Press
2. Brennan, Teresa and Jay, Martin, (Ed.), (1996), *Vision in Context: Historical and Contemporary Perspectives on Sight*, New York, Routledge
3. Broude, Norma, (1978), *Seurat in Perspective*, New Jersey, Prentice-Hall Inc.
4. Buss, Robin, (1986), *Critical Guide to the French text of Les Enfants Terribles by Jean Cocteau*, S.A. Valencia, Artes Graficas Soler
5. Chipp, H. Herschel, (1968), *Theories of Modern Art*, California, University of California Press
6. Clemence, Will, (1959), *Screen Process Printing*, London, Blandford Press
7. Davies, Paul, (1984), *Quantum Mechanics*, London, Routledge & Kegan Paul
8. Davies, Paul, (1977), *Space and Time in the Modern Universe*, Cambridge, Cambridge University Press
9. Davies, Paul, (1982), *The Accidental Universe*, Cambridge, Cambridge University Press
10. Davies, Paul, (1989), *The New Physics*, Cambridge, Cambridge University Press
11. Deleuze, Gilles and Guattari, Felix, (1977), *Anti-Oedipus: Capitalism and Schizophrenia*, New York, Viking Press
12. Deleuze, Gilles, (1986), *Cinema 1: the Movement Image*, Minn., University of Minnesota
13. Derrida, Jacques, (1981), *Dissemination*, trans Johnson, Barbara, Chicago, Chicago University Press
14. Evans, David, (1995), *How to Write a Better Thesis or Report*, Victoria, Australia, Melbourne University Press
15. Fine, Ruth, (1993), *Helen Frankenthaler Prints*, New York, Harry N. Abrams Inc.
16. Foster, Hal; Alain-Bois, Yves; Buchloh, Benjamin; Krauss, Rosalind, (2004), *Art Since 1900: Modernism, Antimodernism, Postmodernism*, London, Thames & Hudson

17. Fraser, Bridget, (1987), *Stencilling: a Design and Source Book*, New York, Henry Holt & Co.
18. Freud, Sigmund, (1977), *Case Histories 1: 'Dora' and 'Little Hans'*, trans. Alix and James Strachey, , Harmondsworth. London, Penguin
19. Fry, Roger, (1965), *Seurat*, London, Phaidon Press Ltd.
20. Glass, Frederick, (1923), *Stencil Craft: the Artistic Practical Handicraft Series*, London, University of London Press Ltd.
21. Gray, Henry, 1825-1861, (1967), *Gray's Anatomy: descriptive and applied*, ed. Davies, David Vaughan; Couplad, Rex E., Longmans, London, U.K.
22. Greene, Brian, (2000), *The Elegant Universe: Superstrings, Hidden Dimensions, and the Quest for the Ultimate Theory*, New York, Vintage Books (Random House, Inc.)
23. Grundberg, Andy, (1990), *Mike and Doug Starn*, New York, H.N. Abrams
24. Harrison, Pegram, (1996), *Frankenthaler: a Catalogue Raisonne Prints 1961-1994*, New York, Harry N. Abrams Inc.
25. Hegel, George Fredertick, (1979), *Introduction to Aesthetics*, trans, T.M.Knox, New York, State University of New York Press
26. Heidegger, Martin, (1997), *Being and Time*, trans. Macquarie, John and Robinson, Edward, New York, Harper
27. Hockney, David, (1988), *Hockney on Photography: Conversations with Paul Joyce*, London, Jonathon Cape
28. Hollebone, Alix and Sarah, (1980), *Screen Printing: the Beginner's Guide*, London, Adam & Charles Black
29. Horrocks, Roger, (2001), *Len Lye: a biography*, Auckland, New Zealand, Auckland University Press
30. Ionesco, Eugene, (1974), *Le Roi Se Meurt*, ., London, Harrop & Co. Ltd.
31. Johnson, Dale, (2001), *How to Do Everything with Your Digital Camera*, NYSE, U.S.A., Osborne McGraw Hill
32. Johnson, Steven, (2001), *Emergence: the Connected Lives of Ants, Brain, Cities and Software*, N.Y. Scribner
33. Kieran, Michael, (2003), *Photoshop Color Correction: the Essential Guide to Color Quality for Digital Images*, Berkely CA, Peachpit Press

34. Kodak Technical Publications, (1995), *Infrared and Ultra-Violet Photography*, Rochester New York, Eastman Kodak Company
35. Kosloff, Albert, (1968), *Photographic Screen Process Printing*, Cincinnati Ohio, The Signs of the Times Publishing Company
36. Kudielka, Robert, (1995), *Bridget Riley: Dialogues on Art*, London, Zwemmer (P. Wilson Publishers Ltd.)
37. Lane, Richard, (1982), *Images from the Floating World: the Japanese Print*, New York, Dorset Press
38. Larson, Philip, (1972), *Painting: New Options*, Minneapolis Minnesota, Walker Art Centre
39. Leader, Darion and Groves, Judy, (1996), *Lacan for Beginners*, Australia, Icon Books Ltd., Allen & Unwin
40. Leighton, John and Thomson, Richard, (1997), *Seurat and the Bathers*, London, National Gallery Publications
41. Livingstone, Margaret, (2002), *Vision and Art: the Biology of Seeing*, New York, Harry N. Abrams Inc.
42. Mitchell, Juliet, (1974), *Psychoanalysis and Feminism*, London, Allen Lane
43. Moorhouse, Paul, (2003), *Bridget Riley*, London, Tate Publishing
44. Morgan, Michael, (1977), *Molyneux's Question: Vision, Touch and the Philosophy of Perception*, Cambridge, Cambridge University Press
45. Morgan, Michael, (2003), *The Space Between Our Ears: How the Brain Represents Visual Space*, London, Wiedenfeld & Nicholson
46. Narazaki, Muneshige, (1967), trans. Pomeroy, Charles, *Masterworks of Ukiyo-e*, Tokyo, Japan, and Palo Alto, California, Kodansha Int. Ltd.
47. Odam, John, (1999), *Start with a Digital Camera: A Guide to Using Digital Photography to Create High Quality Graphics*, U.S.A., Peachpit Press
48. Pelevin, Victor, (2003), *Attracted to the Light/ Photographs by Doug & Mike Starn*, New York, PowerHouse Books
49. Popper, Karl, (1999), trans. Comiller, P, *All Life is Problem Solving*, London, Routledge
50. Proust, Marcel, (1996), *La Recherche du Temps Perdu, Swann's Way*, London, Vintage Classics, Random House

51. Proust, Marcel, (1996), *La Recherche du Temps Perdu, Within a Budding Grove*, London, Vintage Classics, Random House
52. Proust, Marcel, (1996), *La Recherche du Temps Perdu, The Germanes Way*, London, Vintage Classics, Random House
53. Riley, Bridget, (1997), *Mondrian: Nature to Abstraction*, London, Tate Gallery Publishing
54. Riley, Bridget, (1995), *Dialogues on Art/with Neil MacGregor*, (Ed.) Kudielka, R., London, Zwemmer
55. Rosenblum, Robert, (1999), *On Modern American Art: Selected Essays*, New York, Harry N. Abrams,
56. Sartre, Jean-Paul, (1972), *The Psychology of Imagination*, London, Methuen
57. Schapiro, Meyer, (1978), 'Modern Art: Nineteenth and Twentieth Centuries', *Selected Papers*, New York, G. Brazier
58. Schirato, Tony, Webb, Jen, (2004), *Reading the Visual*, NSW, Australia, Allen & Unwin
59. Stangos, Nick, (Ed.), (1993), *David Hockney: That's the Way I See It*, London, Thames & Hudson
60. Storr, Robert, (1997), *On the Edge: Contemporary Art From the Dannheiser Collection*, New York, Museum of Modern Art
61. Townsend, Chris, (2006), *New Art from London*, London, Thames & Hudson
62. Troy, Nancy, (1979), *Mondrian and Neo-Plasticism in America*, Connecticut, Yale University Art Gallery
63. Viola, Bill, (1995), *Reasons for Knocking at an Empty House*, London, Thames and Hudson, Anthony Offay Gallery
64. van der Wolk, Johannes, (1987), *The Seven Sketchbooks of Vincent van Gogh*, trans. Swan, Claudia, New York, Harry N. Abrams Inc.
65. Waddington, C.H., (1970), *Behind Appearances: a Story of the Relations Between Painting and the Natural Sciences in this Century*, U.S. MIT Press
66. Wands, Bruce, (2006), *Art of the Digital Age*, London, Thames & Hudson
67. Weintraub, Linda, (2003), *Making Contemporary Art: How Today's Artists Think and Work*, London, Thames & Hudson

68. Wichmann, Siegfried, (1981), *Japonisme: the Japanese Influence on Western Art Since 1958*, London, Thames & Hudson
69. Zeki, Semir, (1999), *Inner Vision: an Exploration of Art and the Brain*, New York, Oxford University Press Inc.
70. Zeki, Semir, (1993), *A Vision of the Brain*, Oxford, U.K., Blackwell Scientific Publications

Journals and Catalogues

1. Broderick, D, (2003), 'Sight: the big switch', *The Weekend Australian*, August 16th-17th
2. Edelman, G, (2007),,, 'The Cogitator', *Discover Presents The Brain*, interviewer Kruglinski, S, U.S.A., Guccioni Jr., Bob, Associate Publisher Huber, Thomas M., Spring 2007, pp. 18-23
3. Hohman, A & Ehlers, I, (2006), *Berlin Contemporary*, Berlin, Jovis Verlag, Kurfürstenstr. 15-16,
4. Parr, G, (2003), 'Art Practice in the Wake of an ARC Large Grant', *Claiming Ground ACUADS* paper, Hobart School of Art, Tasmania
5. Kronenberg, S, (2001), 'The Plains: Wimmera and the Imaging of Australian Landscape', *Art Monthly Australia*, no 145 Nov 2001, pps 24-26
6. McCrone, J, (2003), 'Not-so total recall', *The New Scientist*, 3 May 2003, PMP Print, Australia for Reed Business Information, London
7. Kunda, M, (2006), *Geof Parr: Periscope*, Carnegie Gallery, Hobart Tasmania,
8. Stein, R, *Blinded by the Light*, The Age, Tuesday 2 September 2003, Fairfax Publications
9. Malpas, J & Holmes J, (2007), *Leigh Hobba: the Presence of Space*, Tasmanian Art Gallery and Museum, Hobart
10. Thomas, S, 'Women in Black and White: Summer at the Museum of Contemporary Art', *Art & Australia*, Winter vol. 42 No. 4
11. Zeki, S, & Kawabata, H, (2004), 'Neural Correlates of Beauty', *Journal of Neurophysiology* 91, 1699-1705

Papers and Abstracts

1. Ginsberg, Naomi; Garner, Sean; Vestergaard Hau, Leni, (2007), 'Coherent Control of Optical Information with Matter Wave Dynamics', *Nature* 445, pp. 623-626
2. Guyon, I, (1991), 'Applications of Neural Networks to Character Recognition', *International Journal of Pattern Recognition and Artificial Intelligence* 5, pp. 353-382
3. Kerzel, D, (2002), 'The Locus of "memory displacement" is at least partially perceptual: effects of velocity, expectation, friction, memory averaging, and weight', *Perceptual Psychophysiology*, May; 64(4), pp. 680-692
4. Kleiner-Fisman; Galit, CA; Lang, Anthony, E, (2004), 'Insights into brain function through the examination of art: the influence of neurodegenerative diseases', *Neuroreport* 15(6) April 29: pp. 937-993
5. Kriegeskorte, Nikolaus; Sorger, Bettina; Naumer, Marcus; Schwarzbach, Jens; van den Boogert, Erik; Hussy, Walter; Goebel, Rainer; (2003), 'Human Cortical Object Recognition from a Visual Motion Flowfield', *Journal of Neuroscience*, 23(4):1451, February 15
6. Livingstone, Margaret, (1988), 'Art, Illusion and the Visual System', *Notes - Scientific American*, vol 258(1), pp. 68-75
7. Livingstone, Margaret & Hubel, David, 'Segregation of Form, Colour, Movement, and Depth: Anatomy, Physiology and Perception', *Science*, vol. 240, May
8. Muckli, Kriegeskorte; Nikolaus, Lanferman; Zanella, F; Singer, W; Goebel, R; (2002), 'Apparent Motion: Event-related functional magnetic resonance imaging of perceptual switches and states' - art. no. RC219, *Journal of Neuroscience* 22 (9): RC219-RC219
9. Nestes, O; Navarro, R; Antona, B; (2003), 'Bayesian model of Snellen visual acuity', *Optical Society of America*, 20(7), pp 1371-1381

10. Parr, G, (2003), 'Art Practice in the Wake of an ARC Large Grant', *ACUADS* conference, Hobart School of Art
11. Quon, Jane, (2005), 'Phenomenology and Artistic Praxis: An Application to Marine Ecological Communication', *Leonardo*, vol. 38, no. 3, pp. 185-191
12. Sornborger, A; Sailstad, C; Kaplan, E; Sirovich, L; (2003), 'Spatiotemporal analysis of optical imaging data', *Neuroimage*, March; 18(3): pp. 610-621
13. Wolf, F, (2005), 'Symmetry, Multistability, and Long Range Interactions in Brain Development', *Physical Review Letters*, *The American Physical Society*, 11 November 2005 pp.
14. Zeh, H.D., *The Physical Concept of Time*, Prelim. 5th edn. (Oct 04): www.time-direction.de
15. Zurek, Wojciech, 'Decoherence, Einselection, and the Quantum Origins of the Classical', *Theory Division LANL*, Mail Stop B288, Los Alamos, New Mexico 87545

Films

1. Cocteau, Jean, (1950), *Orphee*, France
2. Greenaway, Peter, (1982), *The Draughtsman's Contract*; (1985), *A Zed and Two Noughts*; (1988), *Drowning by Numbers*, U.K.
3. Hertzog, Werner, (1979), *Nosferatu the Vampyre*; (1979), *Wozzeck*, Germany
4. Hitchcock, Alfred, (1963), *The Birds*, U.K. and U.S.A.
5. Lynch, David, (1977), *Eraserhead*; (1986) *Blue Velvet*; (2001), *Mulholland Drive*, U.S.A.
6. Murnau, Friedrich Wilhelm, (1922), *Nosferatu*, Germany
7. Varda, Agnes, (*The Gleaners*, (2005)
8. von Trier, Lars, (1994), *The Kingdom*; (1996), *Breaking Waves*; (2000), *Dancer in the Dark*, Denmark
9. *Montevideo* cd, (2004), (various artists worldwide), Amsterdam, Netherlands

Websites

1. www.experimenta.org.au
2. www.d>lux.org
3. www.hhmi.org/news/lahn4.html, *Human Brain is Still Evolving*, 09/17/2005 12:08 pm
4. www.hhmi.org/research/investigators/lahn.html, *Genetic Basis of Human Brain Evolution*, 09/17/2005 12:10 pm
5. <http://eyecareamerica.org> (Smith-Kettlewell Institute)
6. <http://www.stanford.edu/home/medcenter/>
(Stanford University, USA)
7. <http://plato.stanford.edu/entries/qt-entangle/>
(3/1/06 11:26 AM, *Quantum Entanglement and Information*, Stanford Encyclopedia of Philosophy, Stanford University, USA)

Appendix 3 - List of works submitted for exhibition

Fig. 40, <i>Blue Splash</i> , detail	p.61
Fig. 43, <i>Abstracted tree root</i>	p.62
Fig. 44, <i>Line of MDF boards</i> , studio shot, work in progress	p.64
Fig. 45, <i>1st canvas, 1st triad</i>	p.65
Figs. 46-7, <i>2nd and 3rd canvas, 1st triad</i>	p.66
Fig. 48, Detail, <i>canvas 2, 1st triad</i> , with screenprint insert	p.67
Fig. 49, <i>2nd triad, 1st canvas</i>	p.70
Fig. 50, <i>2nd triad, 2nd canvas</i>	p.71
Fig. 51, <i>2nd triad, 3rd canvas</i>	p.71
Fig. 52, <i>3rd triad, RG/, B/G, R/B canvases</i>	p.75
Figs. 53-4, <i>Grayscale Grid</i> , studio shot, work in progress	p.76
Fig. 55, <i>Blackstream III</i> , video clip	p.80
Fig. 56, <i>Light as Particle</i> , video clip	p.81
Fig. 56, <i>Water/Light Bombardment</i> , video clip	p.82
Fig. 57, <i>Heading South</i> , spraypainting	p.83
Fig. 59, <i>Focus</i> , digital print	p.84
Figs. 64-5, <i>1st triad</i> in final state	p.103

Group of source images contained on cd in back pocket

Three videos on dvd in back pocket, cd of images.

Supporting works in Plebiscite and studio

Triad of large canvases, early discarded works

Frottage on voile from Behind Your Eyes experimental work

Trial pieces for screenprinting 3rd triad

Trial pieces for MDF boards

Charcoal and lithographic crayon on translucent paper

Trial MDF boards and paper works in studio

Trial screenprint on canvas in studio

Appendix 4 - List of Illustrations

Referenced

- Fig. 1, *The Sphenoid, viewed from behind*, Gray's Anatomy, engraving, (1967), Longmans, London, U.K. p.8
- Fig.2, *Ocean*, (2000), pencil on paper, 1.5m x 1m p.10
- Fig. 3, *Trace*, (2000), black ink and white acrylic on paper, 1.5m x 1m p.11
- Fig. 4, *Memories of Hampton Beach*, (2002), video and MDF, 24downstairs, Flinders Lane, Melbourne p.11
- Fig. 5, *Fete Champetre*, Giorgione, (1508), oil on canvas, 110 x 138cm, Louvre, Paris p.13
- Fig. 6, *Souvenir de Mortfontaine*, Corot, (1864), oil on canvas, 201 x 300cm., National Gallery, London p.13
- Fig.7, *The Forest of Countess Mordvenova*, Shishkin, (1891), oil on canvas, Tretyakov Gallery, Moscow p.14
- Fig.8, *Visual web formed by the human eye in scanning this landscape picture* p.14
- Fig.9, *Pause*, Bridget Riley, (1964), emulsion on hardboard, 112.2 x 106.6cm, private collection p.25
- Fig.10, *the dry 06*, Geoff Parr, (2005), digital print p.26
- Fig.11, *digit two 2005*, Geoff Parr, (2005), digital print on canvas p.26
- Fig.12, *The Bathers*, Seurat, (1884), oil on canvas, 65 x 89cm., Musee de Louvre, Paris. Detail of foreground riverbank, showing final strokes of colour screen p.27
- Fig.13 *Screen*, Geoff Parr, (2003), digital print p.28
- Fig.14, *Place Furstenburg*, David Hockney, (1985), photo-collage, 88.9 x 80cm, Artists collection p.28
- Fig.15, *River with converging and diverging audio*, Leigh Hobba, (1985), betacam p.30
- Fig.16 *Red tree*, Piet Mondrian, (1908-10), oil on canvas, 70 x 99cm, Gemeentemuseum, den Hague p.31
- Fig.17 *Grey tree*, Piet Mondrian, (1912), oil on canvas, 79 x 109cm, Gemeentemuseum, den Hague p.32

- Fig. 18 *Appletree in Flower*, Piet Mondrian, (1912), oil on canvas, 78 x 107.5cm p.32
- Fig. 19, *Composition of line and colour: III*, Piet Mondrian, (1937), oil on canvas p.33
- Fig. 20, *Mondrian Machine*, Edward Land p.34
- Fig. 21, *Gossip*, Helen Frankenthaler, (1961), oil on canvas, 34 x 74cm, Emmerich Gallery, N.Y. p.34
- Fig. 22, *Untitled*, Helen Frankenthaler, (1977), acrylic on canvas, 20 x 15cm, Phyllis Tuchman collection p.35
- Fig. 23, *Blue Splash*, Ada Henskens, (2005-7) p.35
- Fig. 24, *Light*, Ulf Landheinrich, (2005), electronic media p.36
- Figs. 25-6, *Imaginary Abstract*, Keiko Kimoto, (2005), electronic media p.36
- Fig. 27, detail, *Sunday Afternoon on the Island of La Grande Jatte*, Seurat, (1884-6) p.43
- Fig. 28, *Sunday Afternoon on the Island of La Grande Jatte*, Seurat, (1884-6), oil on canvas, 189 x 300cm, Art Institute of Chicago p.44
- Fig. 29, *2 colour twist: Blue/Red and Violet/Yellow series 41-Green added*, (1979), Bridget Riley, gouache on paper, 97 x 50.5cm, artist collection p.46
- Fig. 30, *White Discs*, Bridget Riley, (1964), emulsion on hardboard, 104 x 99cm, private collection p.48
- Fig. 31, *Where*, Bridget Riley, (1964), emulsion on hardboard, 106 x 113cm, Paul Hirschland, U.S.A. p.49
- Fig. 32, *Stereo-Reflex*, Geoff Parr, (2003), digital print p.50
- Fig. 33, *f_w_29161+142+1.psd*, Geoff Parr, (2005) p.51
- Fig. 34, *w11.psd*, Geoff Parr, (2005), digital image p.53
- Fig. 35, *Composition A*, Mondrian, (1920), oil on canvas, 90 x 91cm p.54

- Fig.36, *Rue Montorgueil, June 30th, 1878*, Monet, (1864), oil on canvas, 80 x 48.5cm., Musee d'Orsay, Paris p.57
- Fig.37, *Rape of the Sabine Women*, Poussin, (1634), oil on canvas, 154 x 209cm, Metropolitan Museum of Art, U.S.A. p.57
- Fig.38, *Tree branches at Port Arthur*, photo, (2004) p.60
- Fig.39, *Primate Neurones*, <http://www.hhmi.org:80/senses/b140.html>, (viewed 17/09/2005) p.60
- Fig.41, *Tree root*, (2003) Franklin Square photo p.62
- Fig.42, *Tree root*, (2003), Franklin Square, photocopy
- Fig.43, *Abstracted tree root* (2004) p.62
- Fig.60, *Behind Your Eyes*, (2004) F.A.G., detail of voile sheet frottage with tombstone text p.86
- Fig.61, *Before the Naming*, (2004), Installation view, F.A.G., Sandy Bay campus, showing discarded experimental works with colour p.91
- Fig.62, *Before the Naming*, (2004), Installation view, F.A.G., Sandy Bay campus, showing discarded translucent works with tree bark frottage p.91
- Fig.63, *Just Looking, Thanks*, (2004), installation view, Sidespace gallery, S.A.C., (earlier stage of development) p.95
- Fig.64, *ReVision*, (2007), installation view, Inflight gallery p.103
- Fig.65, *ReVision*, (2007), installation view, Inflight gallery, canvases leaning against wall p.103
- Fig.66, *ReVision*, (2007), 3 film video loop, back wall, Inflight gallery p.103
- Fig.67, *Structures of the Eye*. Appendix 1 p.110
- Fig.68, *Dendrites* p.111
- Fig. 69, *The Fovea* p.111
- Fig. 70, *Areas of the Brain* p.112
- Fig.73, *Tree Root resembling cross section of Brain* p.112

Fig. 71, <i>Cells in the Thalamus</i>	p.113
Fig. 72, <i>A Simplification of Systems within the Visual Cortex according to Livingstone</i>	p.114
Fig. 73, <i>Cone Colour Response</i>	p.115
Fig. 74, <i>Centre Surround Cell</i>	p.116
Fig. 75, <i>Centre Surround Response</i>	p.116
Fig. 76, <i>Colour Response</i>	p.116
Fig. 77, <i>Motion Cells</i>	p.117

Appendix 4

Ada Henskens - Curriculum vitae

Education:

- 2002 BFA (Hons.), Monash University
- 2001 BFA, Victorian College of Arts
- 1998 Diploma Visual Arts, RMIT
- 1987 Private Secretary's Certificate, London Chamber of Commerce, U.K.
- 1984-6 Four year M.A. French Language & Literature (incomplete), Waikato University, N.Z. and Keele University, U.K.

Solo Exhibitions:

- 2006 *Lightwave*, video, Fine Art Gallery, University of Tasmania
- 2005 *Three Canvases*, foyer State Library of Hobart
- 2004 *Just Looking, Thanks*, Sidespace Gallery, installation with video and canvases, Salamanca Art Centre, January
- 2004 *Before the Naming*, Fine Art Gallery, University of Tasmania, paintings and drawings, April
- 2003 *Behind Your Eyes*, voile and video installation, Fine Art Gallery, University of Tasmania, May
- 2002 *The Monstrous Regiment*, Glass Gallery, Monash University, Caulfield

Collaborations:

- 2007 *ReVision/Guts*, with Ali Richmond, 3 in 1 video, canvases and sculpture, Inflight artist-run space, Elizabeth St., Hobart
- 2006 *Blackstream II/Mobility*, with UNSQ staff and graduates, video and installation, Inflight artist-run space, Elizabeth St., Hobart

Group Exhibitions:

- 2007 *Focus*, Living Artists Week, African Delights, Hobart
- 2006 *Heading South*, CAST members show, Tasma St., Hobart
- 2005 *Blackstream I*, video, d>Lux emedia touring exhibition and Chauvel Cinema Complex, Sydney
- 2005 *Blue Splash*, CAST members show, Tasma St., Hobart
- 2005 *Whiteout*, Living Artist Week, Headroom, Hobart
- 2002 'Memories of Hampton Beach', *Dining Alone*, 45downstairs, Flinders Lane, Melbourne
- 2001 *Prisoner*, Wallara Travelling Scholarship Finalists show, VCA Gallery, Dodds St., Melbourne
- 2000 *Fragments*, George Paton Gallery, University of Melbourne
- 1998 *Sight Seeing*, First Site, RMIT, Melbourne
- 1984 *Children in Sunlight*, Rotorua Regional Art Exhibition, Rotorua Art Gallery, New Zealand

Associated Works:

- 1974-5 Artist in Residence, Matamata College, Waikato, New Zealand
- 1976 Schoolchildren's Holiday Art Programme, Matamata Society of Art, Waikato, New Zealand

Awards:

- 2007 Research Postgraduate Scholarship, Utas
- 2007 GRSS grant, Utas
- 2006 GRSS grant, Utas
- 2005 GRSS grant, Utas
- 2004 GRSS grant, Utas

2003 Fee free Scholarship for Ph.D, Hobart
School of Art, Utas

Publications:

- 2006 Klaosen, Diana, 'Growing art, shaping perception',
Realtime June/July 06, No. 73
- 2005 Ballard, Sue, 'dLux media arts - D>art05:
Distributed Art and Mobile Journeys', *Filter*,
ANAT, issue 61
- 2005 Priest, Gail, 'Video lite', *Realtime* October/
November, 05, No. 69
- 2005 *D>Art.05* screen section, poster and catalogue
- 2005 www.dlux.org.au/dart05/index.php?pgID=screen
- 2005 Andersch, Joerg, 'Bounty of Summe'r, *The Mercury
Magazine*, 15th January
- 2002 Wise, Kit, *Dining Alone* exhibition catalogue essay
- 2000 Hguyen, Hugh, *Fragments*, George Paton Gallery,
www.union.unimelb.edu.au/gpg/ehibi_4_200.html

Articles by the Artist

- 14/4/08 *LimboLand*, www.stock-site.org.au//node/84
- 19/2/08 *Knock Knock, Who's There*, www.stock-site.org.au//node/84
- 2006 *Constructs of Place Through Landscape and the Visual
Cortex*, illustrated paper at Senses of Place
Conference, School of Art, Utas, Hobart.

Collections

Drawings and paintings are held in private ownership in
Wavre, (Belgium), Melbourne, (Australia), Hobart,
(Australia), Matamata, (New Zealand), and by Mr and Mrs
Flint, Marple, Cheshire, (England).