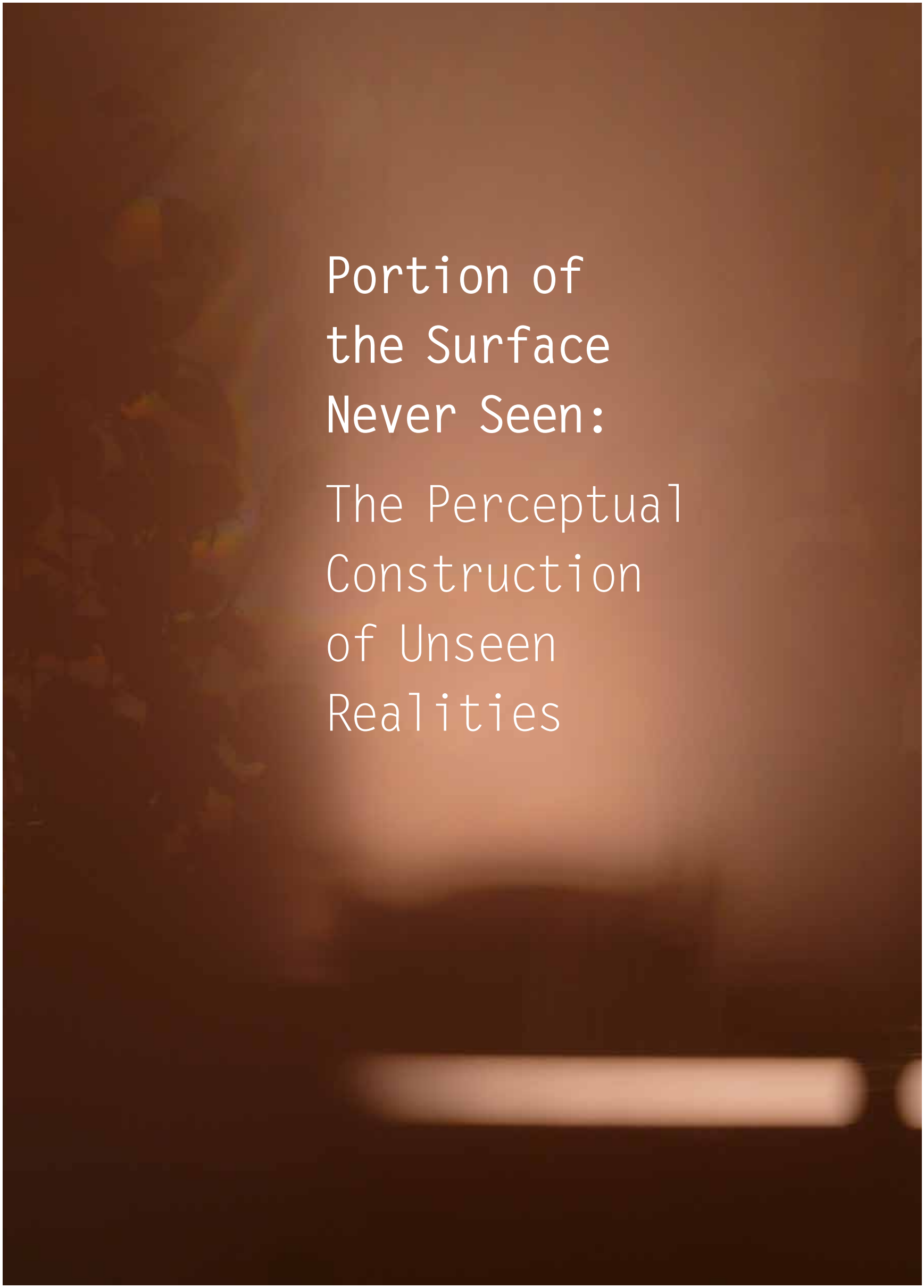
Portion of
the Surface
Never Seen:
The Perceptual
Construction
of Unseen
Realities

Portion of the Surface Never Seen: the Perceptual Construction of Unseen Realities

A thesis submitted in fulfilment of the requirements for the degree of Doctor of Philosophy

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Postgraduate Diploma (Arts)

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March, 2015

Declaration

I certify that except where due acknowledgement has been made, the work is that of the author alone; the work has not been submitted previously, in whole or in part, to qualify for any other academic award; the content of the thesis/project is the result of work which has been carried out since the official commencement date of the approved research program; any editorial work, paid or unpaid, carried out by a third party is acknowledged; and, ethics procedures and guidelines have been followed.

Colleen Lorraine Boyle

March, 2015

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A project such as this is never a solo enterprise. Many people have contributed, some directly, some indirectly, but due recognition must go to the following individuals.

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A Note to the Reader

This thesis has been submitted for examination as an electronic only document, and has been formatted to be viewed in portrait orientation, on a screen or a tablet device. The type size is consequently larger than a print document, and the images rendered at screen resolution (72dpi). If you wish to print this document out be aware that it has a substantial page length. The best way to print is to set up two pages per sheet, which shrinks the text size to a smaller, but still readable size, and renders the images in higher resolution, leaving room for written comments in the margins.

Contents

Abstract

Imaging technology has vastly extended human perception by enabling access to aspects of reality that may never be seen with the naked eye, such as a distant galaxy or the blinding light of an eclipse. This project proposes that technologically mediated images form a perceptual bridge between what we know and what we can imagine, playing a pivotal role in constructing our perception of the unseen. By drawing on the work of image historians, theorists, and artists dealing with visual perception, this research project explores the specific question of how imagination interacts with photographs in order to perceptually construct an image of what would otherwise remain unseen.

Photographic imagery produced by space exploration is used throughout the project as an example of what may constitute an "unseen reality" but the notion of the unseen is also explored through the histories of art and of science, philosophy, geometry, the rhetoric of framing, theories of perception and of photography. Imagination is defined primarily through selected philosophical interpretations, and its possible intersection with visual analogy is examined via analysis of historic and contemporary examples from the arts and sciences. A key objective of this project was to produce artworks that form an interface between seeing and imagining in order to explore perception of "unseen realities". To do this, a vocabulary of materiality was developed in recognition of the legacy of Modernist artists who explored the visual and conceptual concerns of perceptual experience: light, shadow, reflection, and geometry coming to form the basis of the project's practical work. Creative practice provided a workshop for testing imaginative processes and the tautological idea of visualizing the unseen. A practice of generic, everyday photography provided a means of exploring photographic perception from the inside, ultimately highlighting the uneasy relationship between objective and subjective modes of seeing that the camera engages in.

It is intended that this research will contribute to understanding the connections between technology, representation and knowledge. In combining creative practice with disparate concepts from science, art, history, and visual discourse, this project attempts to create what Roger Kemp describes as a "nodal point" where knowledge and imagination meet. This project proposes that imagination has the potential to construct a more holistic reality than the fractured one brought to us by images, albeit one that will never truly be seen.

Introduction

Reality leaves a lot to the imagination.—John Lennon

In 1515, news that an exotic creature had been presented to the King of Portugal reached artist Albrecht Dürer in his hometown of Nuremberg, Germany. Dürer proceeded to prepare a drawing and woodcut of the creature from written description (Figure 01). The result was a hybrid of reality and fiction that so resonated with the public imagination that it was used as a reference long after people had actually seen the creature.[1]

British art historian, E.H. Gombrich (1909–2001) would have described the way Dürer constructed the rhinoceros image as developing a *schema,* stating that an artist always begins with a preconception formed by their previous experience. The *schema* is continually modified until it matches what the artist seeks to express—what they imagine—forming a point at which observation, imagination, and representation meet in the feedback loop of perception.[2] In this project I explore Gombrich's proposed feedback loop of perception and the ways in which it enables us to encounter unseen aspects of reality.[3] Unless I use my imagination, my visual perception is restricted by space, time and physics. For example, even my commonplace digital camera, as it "looks" at the Moon, can only give me a blob in the sky. However, if I use my imagination I construct a hybrid Moon, which brings together

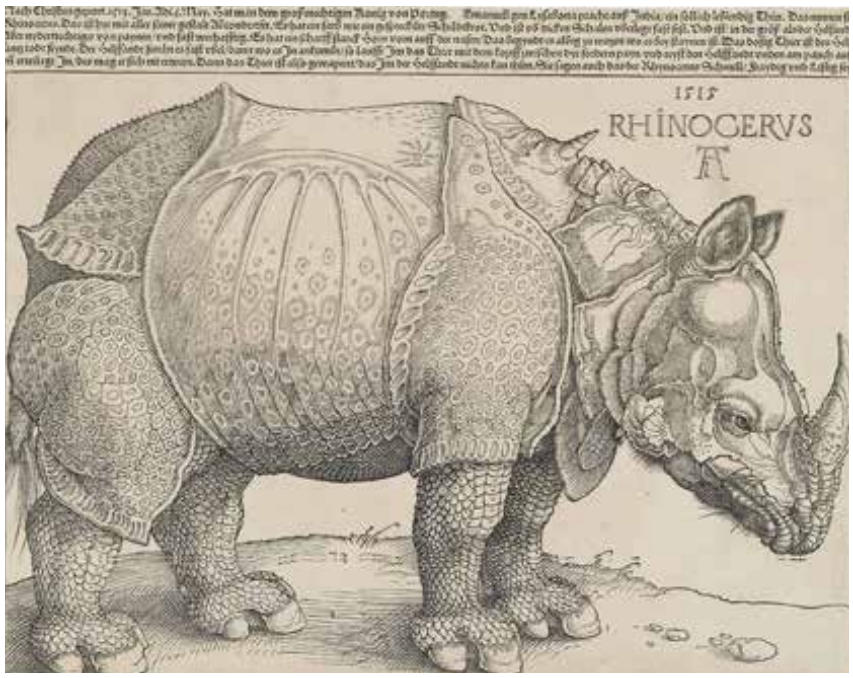

Figure 01.
Albrect Dürer, woodcut
23.5cm x 29.8cm
1515 (Public Domain image)

1. "Albrecht Dürer's Rhinoceros, a Drawing and Woodcut," *The British Museum*, accessed 27 Decem-ber, 2010,http://wwwbritishmuseum.org/explore/highlight_objects/pd/a/albrecht_d%C3%BCrers_rhinoceros.aspx
2. E. H. Gombrich, "Truth and the Stereotype," in *Art and Illusion* (London: Phaidon Press, 1960), 55–78.
3. Gombrich develops his idea of the schema in line with Emmanuel Kant's theory of perception.

its visible and invisible features, its reality and fiction, my previous experience of the Moon and all the images I have seen of it. I also use my imagination to fill in the blind spots, the gaps in representation and experience. Thus, Albrecht Dürer could perceive and represent an animal he had never seen: a rhinoceros, an animal that had not been seen in 16th century Europe for more than 1000 years.

Scientific discovery, too, is often a mixture of what is known and what can be imagined. Einstein famously declared that "imagination is more important than knowledge" but if it were not for his knowledge of Riemann's historic lecture on differential geometry combined with his capacity to imagine freefalling in a lift, he may not have devised the General Theory of Relativity.[4] Aristotle used his imagination as he "looked through the window of geometry" and watched ships disappear on the horizon, ultimately concluding that the Earth must be round.[5] Without the combination of imagination and knowledge, fields of geometry would otherwise have remained undiscovered. Non-Euclidian geometry is an abstract field, its complexities invisible to everyday vision and experience. And yet, just two decades ago, a woman mathematician with a crochet needle, Daina Taimina, drew on her experience of the world she could see (lettuce leaves, knitted shawls, and nudbranchs[6]), her knowledge of geometry, and her imagination, and gave physical form to a complex theory which pushed the limits of conventional representation: hyperbolic space.[7] Geometry plays an important role in this project as it provides a threshold between the realms of science and art, the imagination and knowledge and, importantly, has become so enmeshed with visual perception that it has long been unseen.

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4. Leonard Mlodinow, *Euclid's Window: the Story of Geometry from Parallel Lines to Hyperspace* (London: Penguin Books, 2002), 153–214. Einstein's statement regarding imagination and knowledge: Albert Einstein, *Cosmic Religion : With Other Opinions and Aphorisms* (Indiana University: Covici-Friede, 1931), 97.
5. Mlodinow, *Euclid's Window,* ix.
6. Nudibranchs are soft-bodied marine mollusks with a distinctive frilly "skirt".
7. In other words, it is near impossible to represent curved space either on or with a two-dimensional surface.

Geometry, in the form of optics, also forms the basis of visual instrumentation. Advances in imaging technologies,[8] from the first lens onwards, have extended our limited human vision and image-making capabilities, enabling us to perceive aspects of our world previously invisible to the naked eye such as the structure of DNA or a distant galaxy. We may never see the "real thing" with our own eyes but the technologically mediated image forms a perceptual bridge between what we *know* and what we can *imagine*, playing a pivotal role in constructing our perception of the unseen.

Science has relied on developments in imaging technology to extend human vision and construct knowledge of unseen aspects of reality. The telescope (17th century) and then photography (early 19th century) are two examples of lens-based technology that fundamentally transformed the way we perceive the world. These technologies became mediators, providing "a unique system of disclosures" that showed us "reality as we had *not* seen it before".[9] American writer Susan Sontag (1933–2004) states that no one "would dispute that photography gave a tremendous boost to the cognitive claims of sight, because—through close-up and remote sensing—it so greatly enlarged the realm of the visible."[10] Galileo (1564–1642) was an early adopter of optical technology, realizing the potential of basic telescopes and microscopes to extend his knowledge of the world. Today, thanks to developments in imaging technology, we can see detail in everything from the tiniest cells to distant star clusters. However, in 1993, science philosopher Don Ihde (1934–) suggested that these transformations in technology come at a cost. He suggested that image technologies have returned observation to a perceptual dimension, a dimension of the mind not the eye or direct sensory input, creating fascination as they reveal the unseen. Ihde proposed that this technological transformation of vision was "non-neutrally acidic to all traditional

8. By "imaging" or "image-making" technologies, I am referring to technologies that mediate the visual. Thus, this includes what might be referred to as "instrumentation"" such as the telescope and microscope.
9. Susan Sontag, *On Photography* (Harmondsworth: Penguin Books, 1982, first published 1977), 119.
10. Sontag, *On Photography*, 115.

cultures": in other words, once our vision was extended by technology it was transformed irrevocably.[11]

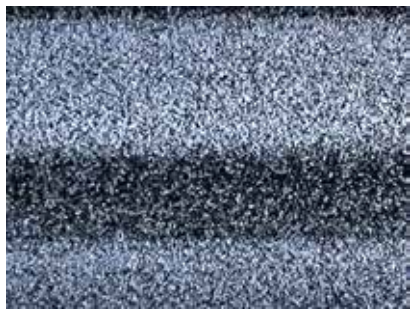

Figure 02.
Collen Boyle
Digital photograph
2010

Similarly, science and technology philosopher Bruno Latour (1947–) suggests knowledge we construct from these images is built upon a history of technological change and *trans-formations* of information that are "telescoped, enfolded, embedded, within one another".[12] Each time we mediate information through new image-making technology some forms of knowledge are made visible or retained, whilst others are ignored or made redundant.[13] Analogue television ("interference" or "noise") is an example of a redundant phenomenon that has not been retained. If you search for "TV static" on YouTube you are not watching TV static at all, but a digitized representation of it (Figure 02). Enlarge it on your computer screen and all you will see is pixelation because analogue TV static can no longer exist in its original form in a digital world. We can only remember—imagine—what it was like to see or hear static in its analogue form: it has been relegated to the unseen. Linear perspective, on the other hand, is perhaps an example of a powerful convention of representation that has been retained. Perspective began as a popular tool for ordering the picture plane during the Italian Renaissance (approximately the 13th to 16th centuries),[14] and soon came to be equated with how we actuall*y* see. Devices such as the *camera obscura*, and then the camera itself, reinforced perspective's links with objective reality, ensuring its survival as a representational framework within both the arts and sciences.[15]

As Ihde and Sontag point out, image technologies remove the act of seeing from our eyes and mediate our perception of the "real thing"

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11. Don Ihde, *Postphenomenology: Essays in the Postmodern Context* (Evanston: Northwestern University Press, 1993), 43.
12. Bruno Latour, "How to be Iconophilic in Art, Science, and Religion?," in *Picturing Science: Producing Art*, ed. Caroline A. Jones et.al (London: Routledge, 1998), 421-26.
13. Latour, "How to be Iconophilic in Art, Science, and Religion?," 421-26.
14. Dates for the Renaissance period, Italian or Northern European, vary immensely from source to source.
15. Most recently, philosopher of science Ronald Giere, current Professor Emeritus of Philosophy at the University of Minnesota, has described science itself as being perspectival, constructing knowledge selectively. See Ronald Giere, Scientific Perspectivism (Chicago: University of Chicago Press, 2006).

through our minds. Without the capacity of technologically mediated images to collapse the distance between the unseen and our selves, the construction of knowledge within disciplines dealing with unseen realities, such as astronomy, would be near to impossible. As the Renaissance ended and the Scientific Revolution began (1543 onwards)[16] the centre of knowledge shifted from God to Man. Representation as an embodiment of knowledge began to be separate from religion and with each advance in image-making technology the elusive unseen realities of the microscopic and macroscopic world were brought closer to our material visible world. With the invention of photography in the early 19th century our belief in imaging technology as a faithful mediator of the seen and unseen was cemented: the eye no longer provided proof of a "real world".[17]

Figure 03.
Collen Boyle
Digital photograph
2012

However, technologically mediated images provide us with *selective* access to unseen realities. Photography-based image making reveals reality to us piecemeal, frame by frame, ripping the image from its continuum whether it's an image of a planet made by a remote sensor, or a snowflake seen through an electron microscope. In describing American artist Alfred Stieglitz' series of photographs, *Equivalents*, made in the 1920s and 1930s, Rosalind Krauss explains that the "clouds were a pre-eminent example of the fact that if photography duplicates the world, it does so only in pieces."[18] I will never see Earth's blue disk from space with my own eyes, but I construct my own perception of this from satellite images presented to me in both print and electronic form. I've often wondered what it might have been like to be National Aeronautics and Space Administration (NASA) astronaut John Glenn (1921–), as he became the first American to orbit the Earth (1962), and the first human to take photographs of its surface from space. I wonder what aspects of the reality of that journey are not brought to me via the photographs and the films—what truths remain untold, what parts remain unseen in the gaps between the images.

16. It is generally accepted that the Scientific Revolution began with the publication of *On the Revolutions of the Heavenly Spheres* by Nicolaus Copernicus, and *On the Fabric of the Human Body* by Adreas Vesalius, both in 1543.
17. Jonathan Crary, *Techniques of the Observer* (Massachusetts: MIT Press, 1990), 138.
18. Rosalind Krauss, *Steiglitz/Equivalents,* October, 11 (1979): 133.

As imaging technologies continue to advance and converge, there is evidence that artists are finding fascination in the idiosyncrasies of redundant forms of image making, such as *camera obscura*, Daguerreotypes, photograms and pinhole photography,[19] looking back in order to understand the difference, if any, in how digital media renders reality. However, merely reverting to obsolete forms of image making is unlikely to advance our understanding of how we construct knowledge via technologically mediated images. Dr Andrew McNamara (Queensland University of Technology) recently suggested that now the digital revolution has occurred we can "seek more complex amalgamations between the old and the new that appear far more equivocal, far more ambiguous, fraught and perplexing."[20] Perhaps by acknowledging the complexities of technology, the images it creates and their historical context, we can reveal what art historian Martin Kemp describes as "structural intuitions" at the "nodal points where scientific and artistic imaging converge" inviting a more holistic understanding of the realities we create via images.[21]

In this project I focus upon Kemp's "nodal points"—these connections between images, knowledge, and imagination—in order to tease out the inner hidden workings of perception. My mode of research does not give preference to artistic practice over theoretical questioning and I have not sought to use art practice as some kind of alternate laboratory in which to develop knowledge. Rather, I have sought to create a complex network that recognizes the incommensurable differences in disciplines and practices but that also allows for confluence and affinity. Any knowledge claims made by this project therefore stem from all modes of enquiry: the theoretical and the practical, the intuited and the rational. Each has fed the other in a

19. For example: Australian painter Paul Uhlmann (b.1962), American-based Australian photographer Adam Fuss (b.1961), Australian photographer Harry Nankin (b.1953), and Australian painter Felicity Spear, respectively.
20. Andrew McNamara, "The Myth of New Media", Media-N Journal, 2006, accessed December 4, 2010, http://eprints.qut.edu.au/6984/.
21. Martin Kemp, *Seen/Unseen: Art, Science and Intuition from Leonardo to the Hubble Telescope* (Oxford: Oxford University Press, 2006), 330.

symbiotic relationship. With this in mind, it must be made clear that in the case of this project, it has not been purely "practice led" and the research has not been solely embodied within the artwork. This would be a naïve claim indeed and one that contravenes the intent of the project, which is to explore the network of relations between image, knowledge, and imagination in order to understand how we come to "see" the unseen. This project has recognized that the Ph.D by project is in fact a product of a bifurcated research method of subjective and objective experiences, a method that has worked—somewhat serendipitously—in alignment with many of the theoretical and conceptual/creative concerns that I have encountered along the journey.

The network of relations between image, knowledge, and imagination can be referred to under the broader umbrella of perception, and thus I have turned to art and theory that has reflected upon this (in one way or another). At the outset of the project, the contemporary interest in photography in the post-indexical age provided ripe pickings amongst photographers such as Thomas Demand (1964–) and Jeff Wall (1946–). Furthermore, artists dealing with remediation and photographs, such as Sara VanDerBeek (1970–) provided tangents into questioning the form and function of a photograph. The exploration of geometry, illusion and photography led me to artists such as Jessica Eaton (1977–) and Barbara Kasten (1936–), and also Shirana Shahbazi (1974–) who adds visual analogy to the mix. Throughout this project these influences helped me address my key research questions. In what ways can I use print and photo-media artworks to construct a bridge or interface between what is seen and what is imagined? How can I use the network of relations between image, viewer, knowledge and imagination to explore the construction of unseen realities? How can inquiry into the history, theory, and artistic practice of technologically mediated image-making contribute to understanding how we construct realities via image-making practice?

Barbara Maria Stafford (1941–), art historian and avowed "imagist" claims that visual analogy is a powerful cognitive tool, capable of

creating new correspondences in space and time via "an involuntary and non-linguistic joining in which the real information in one sense is accompanied by a perception in another sense."[22] For Stafford, American artist Joseph Cornell (1903–) was a master of visual analogy, or what he called "abstract associations". Cornell's obsessive archival work, *GC44*, recognizes that no one image can encompass our perception of reality (in his case, the garden centre at which he worked in 1944) and that the process of associative construction, although more "comprehensive", is potentially infinite.[23] British amateur astronomer James Nasmyth (1808–1890) who, together with financial backer James Carpenter (1840–1899), published *The Moon: Considered as a Planet, a World, and a Satellite* (1871), used objects from the everyday visible world such as plaster models, walnuts, and wrinkled hands to create a series of "lunar" photographs. Through the analogous use of everyday reality in combination with phenomenal knowledge from lunar observations, Nasmyth could create a more "truthful" view of the Moon and transgress the inadequacies of telescopic photography at the time.[24]

My discovery of the work of James Nasmyth and his use of plaster models provided a turning point within the project, which ultimately directed my explorations in both theory and practice away from images alone and towards work that explored the three-dimensional. Other "transitional" nodal points were found in the artwork of Latvian-American Vija Celmins (1938–) and British-Australian Jacky Redgate (1955–), who both deal with perception and the photograph. Two works, in particular, Celmins' 1983 etching, *Constellation—Uccello* and Redgate's 1989 sculpture/photograph *Untitled, Vase Shape #1–5*, make powerful use of art-historical imagery to explore the relationship of the reproduced image to reality *within time*.

As the project developed conceptually it demanded an inevitable

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22. Barbara Maria Stafford, *Devices of Wonder: from the World in a Box to Images on a Screen* (Los Angeles: Getty Research Institute, 2001), 20.
23. Jodi Hauptman, *Joseph Cornell: Stargazing in the Cinema* (New Haven: Yale University Press, 1999), 23.
24. Martin Kemp, *Seen/Unseen: Art, Science and Intuition from Leonardo to the Hubble Space Telescope* (Oxford: Oxford University Press, 2006), 270–71.

change in my creative practice and I began to look to artists dealing with the three-dimensional, and to theories of the phenomenology of perception. Conceptual and Minimal art of the 1960s and 1970s as embodied in the work of artists such as Mel Bochner, Donald Judd, Robert Smithson, Robert Morris, and Sol Lewitt provided a fresh avenue of research that disclosed a new world to me. It allowed me to explore the use of reflective surfaces within space and, when applied to previous explorations with images, became the material and conceptual nodal point of the project itself. Contemporary artists dealing with perception and geometry after Modernism, such as Olafur Eliasson, now fell into relevance.

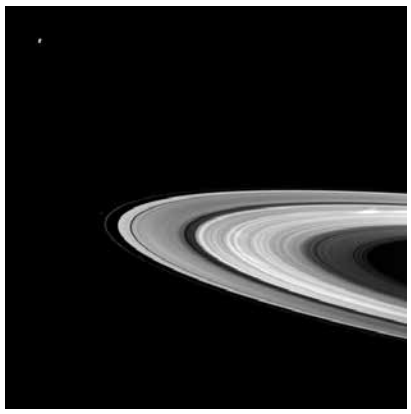

Figure 04.
Spokes in the rings of Saturn as imaged by the Voyager 2 spacecraft
Image: NASA/JPL

Nonetheless, the most influential of all cultural artifacts upon this project has, undoubtedly, been images of space exploration as exemplified by the work of the USA's National Aeronautics and Space Administration (NASA). These images have captured my imagination for many years and been the topic of previous study and professional employment at planetaria. For me, these images are the epitome of what it means to see the "unseen". The astronauts of the various exploration programs from the 1960s through to the present day have taken countless photographs that provide us with a view of our home planet—and the universe beyond—that we shall never see with our own eyes. Likewise, the many space exploration probes and satellites that have been launched since the Russians sent up Sputnik in 1957 have provided unblinking mechanical eyes in the service of science and surveillance that have travelled beyond any reality we had previously encountered, relaying images bit by bit back to Earth to be reconstructed and interpreted by a seeing mind: the unseen made real (Figure 04).

In this research project I explore the perceptual construction of unseen realities by utilizing the network of relations between image, viewer, knowledge and imagination. I begin from the premise that although technologically mediated images *purport* to provide an objective "truth" the reality they disclose is, in fact, fragmented and selective. I attempt to create a representational space that acts as a bridge or interface between seeing and imagining, inviting the con-

struction of a more holistic reality. By resurfacing disregarded or redundant knowledge left behind by the "eyes" of machines, and using it in analogous play with the selective vision of technologically mediated images, I create connections between forms of knowledge across disciplines and across time. Taking a historical perspective on image-making within the arts and sciences, I attempt to traverse the gaps between images, examining the continuities and/or discrepancies in how we construct a perceptual reality which begins with knowledge, is completed by the imagination, and which remains unseen.

Prologue

Images come thick and fast, from the future, from the past.—Leftfield

Pictorial Prologue

At the beginning of this project, in order to combat the 'blank canvas' of my studio walls I covered them with photocopies of images that I found meaningful and visually stimulating. Over time, images came and went, but five of them remained in pride of place. Only time, and a little reflection, would throw any light upon the reasons as to why I was constantly attracted to these images. Ultimately, they formed the basis for a project that was to lead me through a web of interconnection between images, perception, imagination, and knowledge. In this prologue, I intend to set the tone of the project and draw out some of its key themes and concerns by taking a brief look at these five images to which I was so attracted.

The Lost Wheel Map *of Ambrogio Lorenzetti, 1345*

Lorenzetti's *Lost Wheel Map* (Figure 05) remains an art historical mystery, brought into being through the gap it has left in the context of the wall it once inhabited. Moreover, upon the surface of the wall there is a trace, a physical mark left by the machinations of the once revolving map, that indicates a reality in time, a reality that is no longer available and which is locked in the past.

Figure 05.
Simone Martini
Equestrian Portrait of Guidoriccio da Fogliano
1328–30

The blank section below the image of the equestrian contained the *Lost Wheel Map* of Ambrogio Lorenzetti of 1345, Palazzo Pubblico, Siena.
Image: http://www.poderesantapia.com/art/ambrogiolorenzetti/cartatopografica.htm

Raphael's The Marriage of the Virgin*, 1504*

Figure 06.
Raphael, *Marriage of the Virgin*
1504, oil on panel, 170cm x 118cm
Pinacoteca di Brera, Milan
Image: Public Domain

Raphael's *The Marriage of the Virgin* (Figure 06) depicts a wedding on the plaza of a temple-like building, the tiles of the plaza leading the eye to the dual focal points of the figures exchanging rings in the foreground and the open door of the temple in the distance. These points are aligned along the vertical centre of the painting and it is from these points that Raphael has masterfully constructed his composition in accordance to the rules of perspective. The underlying structure of this painting is hidden and yet overt, for although the picture's symmetry and seemingly natural order render it immediately pleasing to the eye it is simultaneously unnatural in its order and perfection. The eye is pleased and then unsettled as the consciousness comes to terms with perceiving an expertly constructed reality.

A still from 16mm footage of NASA astronaut John Glenn on his Friendship 7 flight around the Earth in 1962

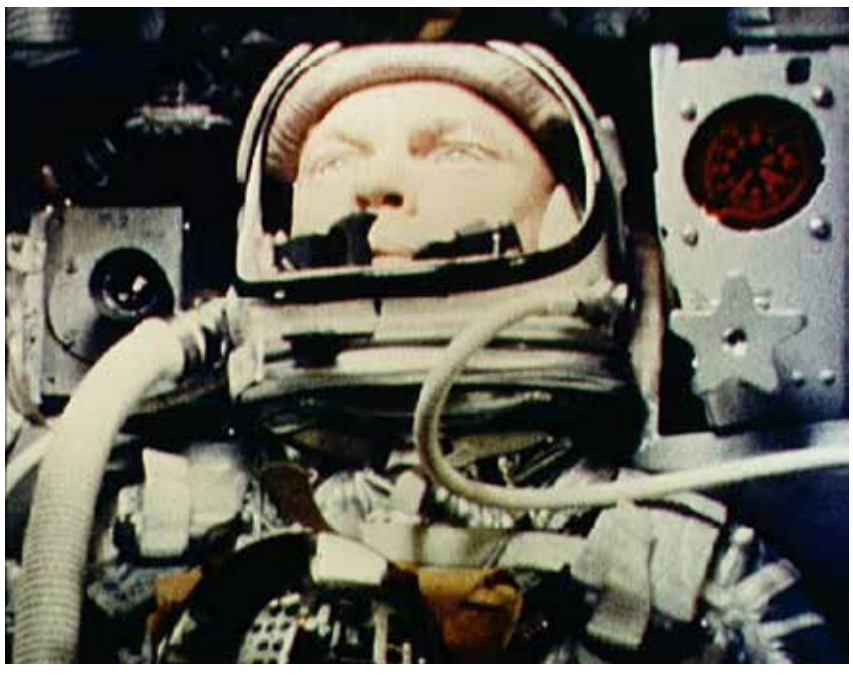

Figure 07.
Mercury Astronaut John Glenn
abord the Friendship 7
Image: NASA/JPL

In 1964, NASA astronaut, John Glenn, was the first American to orbit the Earth. As he tumbled around the globe like so-called 'Spam in a can' a mounted 16mm motion picture camera recorded his reactions and movements from the chest up.[1] This particular frame (Figure 07) shows Glenn as he looks out of the capsule window, his face lit with sunlight reflected from the Earth's surface. This frame, when viewed in isolation, is part of an unseen continuum, one that encompasses the other frames of film and the narrative they produce. However, this continuum can be broadened to include that which takes place outside the frame and which includes aspects of Glenn's journey the camera was not privy to. Glenn's eyes lead us literally out of the camera's frame of reference, out of the unseen window and simultaneously inward to our imaginations.

1. In Philip Kaufman's 1983 film *The Right Stuff* test pilot Chuck Yeager declared that "Anybody that goes up in the damn thing [a Project Mercury rocket] is gonna be Spam in a can." This was common parlance amongst test pilots at the time.

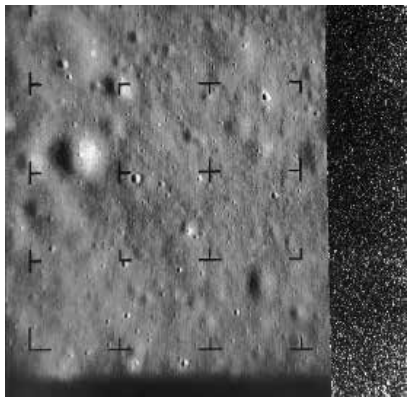

Figure 08.
The final frame taken by a Ranger spacecraft (1964)
Image: NASA/JPL

The final frames taken by NASA's Ranger 7 spacecraft before it crashed into the lunar surface in 1964

Prior to the Apollo 11 Moon landings in 1969, NASA sought to study the lunar surface by sending unmanned probes. The Ranger series of spacecraft in the mid 1960s took and transmitted some remarkable images of the Moon, its craters and plains, and then crashed into the surface. The result of this rather dramatic approach to photography is that the last frames to be transmitted are interrupted by television static—never completed—lost to machine blindness (Figure 08).

Hubble Space Telescope image of a galaxy, 1994

Figure 09.
A galaxy as imaged by the Hubble Space Telescope's Wide Field Planetary Camera II (1994)
Image: HST/NASA

The Hubble Space Telescope (HST) has provided a unique window on the cosmos and done much to construct our individual 'view' of what constitutes outer space. One of the artifacts of the production of these extraordinary images through the 1990s is a black space in the corner of the frame: a gap or apparent loss of data (Figure 09). This data gap is a stark reminder that the camera is a tool, a machine in the service of vision that is incapable of true revelation. It will always leave something out but what we do with that 'something' is up to our imaginations.

Bringing it Together

These five images provide a brief glimpse of the concepts that will be explored through this exegesis as I attempt to unravel the processes and thoughts that eventually constituted this project. As the examples shown above indicate, images are a product of human perception that reveal much about how we construct reality both seen and unseen, proximate and distant. In this project I explore the perceptual construction of the unseen realities an image makes available to the viewer by recognizing that media such as photography are not "purely indexical" but a "complex field of relations between the

apparatus, the user, the viewer and the medium"[2]. The concept of an image as a medium—a threshold or window—an intangible space in between what we see and what we can imagine, is used extensively through the project. As I outline in the following chapters, an image is a gate through which information passes in more than one direction. Furthermore, they are a point in time and space in which information is contained and transformed. The work I created for this project attempted to draw on these aspects of images and bring them together in a nodal point that is simultaneously located in the physical space of the object[3] and the immaterial space of the imagination.

Figure 10.
Colleen Boyle
Digital photograph
2012

A Note on Method: Making & Matching with Everyday Photography

Many creative practitioners engage reflexive thinking to progress their projects, a process that involves the combination of intuitive/subjective and empirical/objective modes of analysis. Inger Mewburn of the Australian National University suggests, however, that this mode of practice is not merely a theory or processes to follow but an assemblage of human and non-human actors, all of which contribute to the process and outcomes.[4] One non-human actor that proved itself indispensable to this project and allowed me to reconcile the apparent opposition of objective and subjective, the analytical and the intuitive, was photography.[5]

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2. Nicolas Mirzoeff, "Networked Subjects: or, the Ghost is the Message", in *New Media, Old Media: A History and Theory Reader*, eds.Wendy Hui Kyong Chung et. al (New York: Routledge, 2006), 336.
3. The word "object" here is not to be limited to three-dimensional artwork but is meant to include anything presented as such.
4. Inger Mewburn, "Lost in Translation: Reconsidering Reflective Practice and Design Studio Pedagogy", *Arts and Humanities in Higher Education*, October (2011): 363-79.
5. For a full account of my encounter with the challenges of research via creative practice see my paper "Take(s) One to Know One" in the appendix.

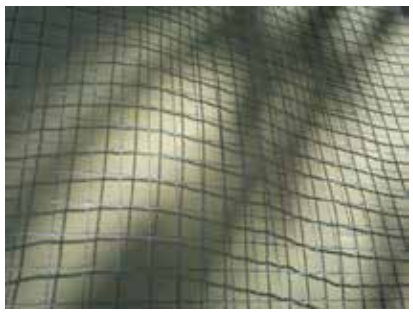

Figure 11.
Colleen Boyle
Digital photograph
2011

The introduction of a practice of "everyday" photography proved useful in exploring how I imaginatively interact with technologically mediated images and the world I perceive around me. By "everyday" I mean not a daily activity, but one where I looked at and made photographic images of the world I experienced in general, and which was conducted in addition to documenting the progress of work in the studio.[6] Although I began simply by photographing what I found myself aesthetically or conceptually attracted to, a pattern soon emerged in the type of images I was making. Light though windows, shadows on walls, reflective surfaces, mirrors, colored lights — these simple, everyday, optical delights continually caught my eye and became the subject of my photographs. After some time, I realized that I was using photographs as some would use a sketchbook, and the camera in my mobile telephone meant that I could take quality resolution images any time and anywhere. The resulting body of images (hundreds in total) has not only provided two-dimensional photographic material for the project but has, perhaps more importantly, informed the three-dimensional works I have made.

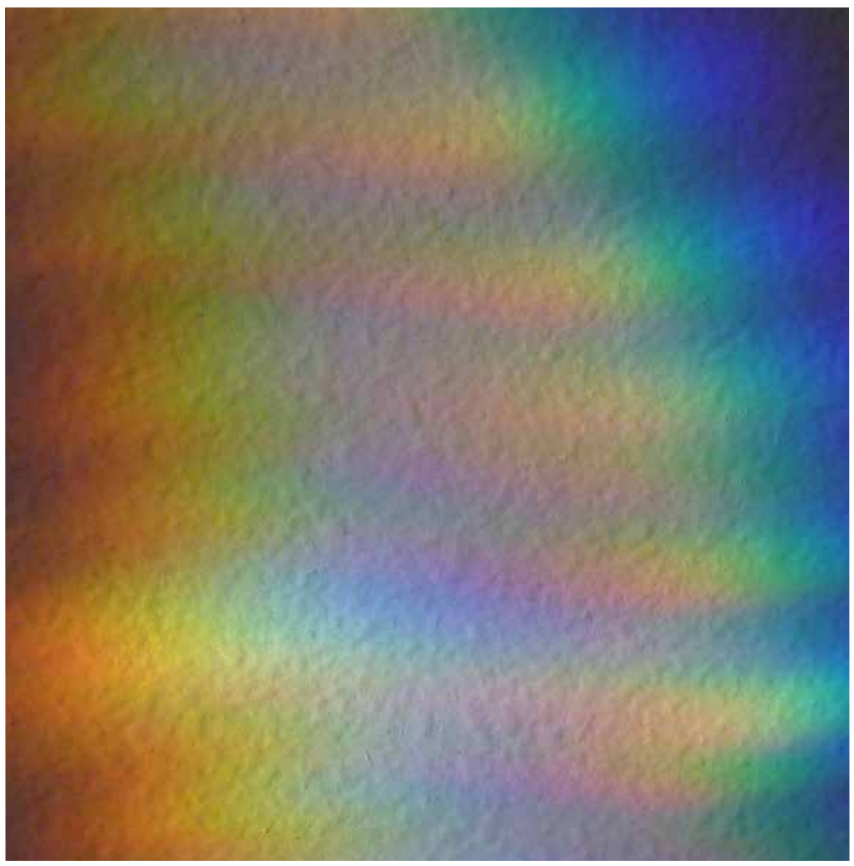

Figure 12.
Colleen Boyle
Digital photograph
2010

The photographs provided me with a reference book on the workings of light upon objects, through materials, and across surfaces. Some photographs revealed reflective qualities of certain materials and others the possibilities of dynamic lighting upon an object. Sequences allowed me to review the way daylight shifted through a room at sunset and video captured the simple dynamic of shadow upon a screen or the flicker of light through glass. The documentation of these phenomena led to creative decision-making, sometimes directly and immediately, but mostly only after some time had passed and the photographs were reviewed. The camera and the photo-

6. Mundane as this may seem, it is interesting to note that the first photograph ever taken was *View from the Window at Le Gras* by Niépce in 1826 and that it is a very simple "everyday" view of rooftops.

graphs were preparing me to see objectively what would have otherwise remained unseen, i.e. my subjective, intuitive choices. This process of everyday photography initiated a mode of reflexive thinking that was interpretive and generative and provided first hand experience of Gombrich's concept of "making and matching".

In the introduction to Gombrich's book on art and perception, he acknowledges his debt to the work of psychologists and philosophers (particularly Karl Popper) in respect to the theoretical model of Kant's "schema".[7] How the schema works will be outlined more thoroughly in a subsequent chapter, suffice to say here that the schema is similar to a model or a basic premise or idea of something that we unconsciously hold within our minds. Each time we experience a slightly different version of a thing, such as a teacup, we modify and add to the base model in our mind. As Gombrich elaborates on the how and why of illusionistic visual representation he touches again and again upon the use of schemata as an aid to push artistic endeavour from the darkness of the unknown and as-yet-unseen to the vivid color and light of the known and seen. A well-developed visual schema can aid the artist to explore new forms via the recognition of categories of form or a particular play of light and shade to which the artist can then imaginatively add. He provides a solid example of how we continually match what we see with our inner schema in a description of how a draughtsman may copy a "nonsense figure" or inkblot:

> *The draughtsman tries first to classify the blot and fit it into some sort of familiar schema—he will say, for instance, that it is triangular or that it looks like a fish. Having selected such a schema to fit the form approximately, he will proceed to adjust it, noticing for instance that the triangle is rounded at the top, or that the fish ends in a pigtail. Copying, we learn from these experiments, proceeds through the rhythms of schema and correction. The schema is not the product of a process of 'abstraction', of a tendency to 'simplify'; it represents the first approximate, loose category which is gradually tightened to fit the form it is to reproduce.*[8]

7. E.H. Gombrich, *Art and Illusion: a Study in the Psychology of Pictorial Representation,* London: Phaidon Press, 1960: 24.
8. Gombrich, *Art and Illusion*: 63–64.

Sometimes our schemata can lead us astray, if the gap between the known and the unknown is a little too large and we end up applying the "wrong" schema. This was the case with Albrecht Dürer and his now infamously imaginative 1515 depiction of an African rhinoceros (Figure 01). Because Dürer had never seen a rhinoceros he had to rely upon existing schemata of exotic beasts such as dragons. Combined with the fact that he had nothing concrete to work from save verbal descriptions it is understandable that the eventual woodcut would look like it does. What is not quite as readily understood is how this malfunctioning schema held so much sway for the next few hundred years, pervading even those representations that were said to be made from life.[9] The example of the rhinoceros demonstrates that an artist must always begin with what they know when faced with the unfamiliar and that "an existing representation will always exert its spell over the artist even while he strives to record the truth,"[10] something simply cannot be created from nothing.

As an artist, or anyone intent on representation, one "must have learned the trick if only from other pictures you have seen"[11] and this is precisely how I used my "sketchbook" of everyday, vernacular photographs: they taught me tricks. And, as they taught me the trick of making and matching they also showed me how to work with my objective and subjective modes of seeing the world in a manner that is unique to photography.

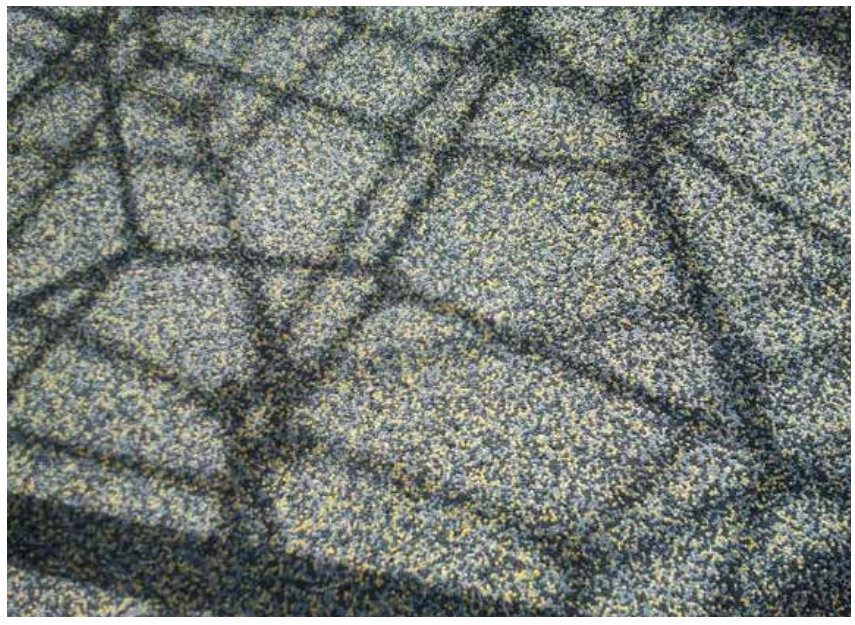

Figure 13.
Colleen Boyle
Digital photograph
2014

9. Gombrich, *Art and Illusion*: 71
10. Gombrich, *Art and Illusion*: 72
11. Gombrich, *Art and Illusion*: 73

As Gombrich stated, "an existing representation will always exert its spell over the artist" and for me this is particularly true of photographic images of outer-space, a place seen by the naked eyes of but a handful of individuals. In previous work, I have outlined how the images made in the name of space exploration sit in an intermediary zone between art and science, admired as they are by a broad number of people for their aesthetic qualities, and by others for the information they yield in the service of empirical observation.[12] The space agencies of today, such as the National Aeronautics and Space Administration (NASA) and the European Space Agency (ESA), fully understand how to use the aesthetic qualities of the images they produce for scientific research in the service of media and public affairs, using them in everything from web-sites to posters and glossy coffee-table books. As much as this could be seen as blatant propaganda in order to justify the massive amounts of money spent on their activities, these images have now lodged themselves permanently in the collective psyche and constructed the space of "outer-space" as a very real place. Few images dealing with microscopic world could be recalled so easily to mind as something as iconic as the Earth seen from space or an astronaut walking on the Moon. These images have laid the foundations upon which the majority of us have built our inner picture of "out there", and have forged the schema that enables us to build a bridge between what we have seen and know, and what we shall never see but may imagine. For this reason they are used in this project as both conceptual example within this exegesis and as appropriated imagery in the artwork I have produced.

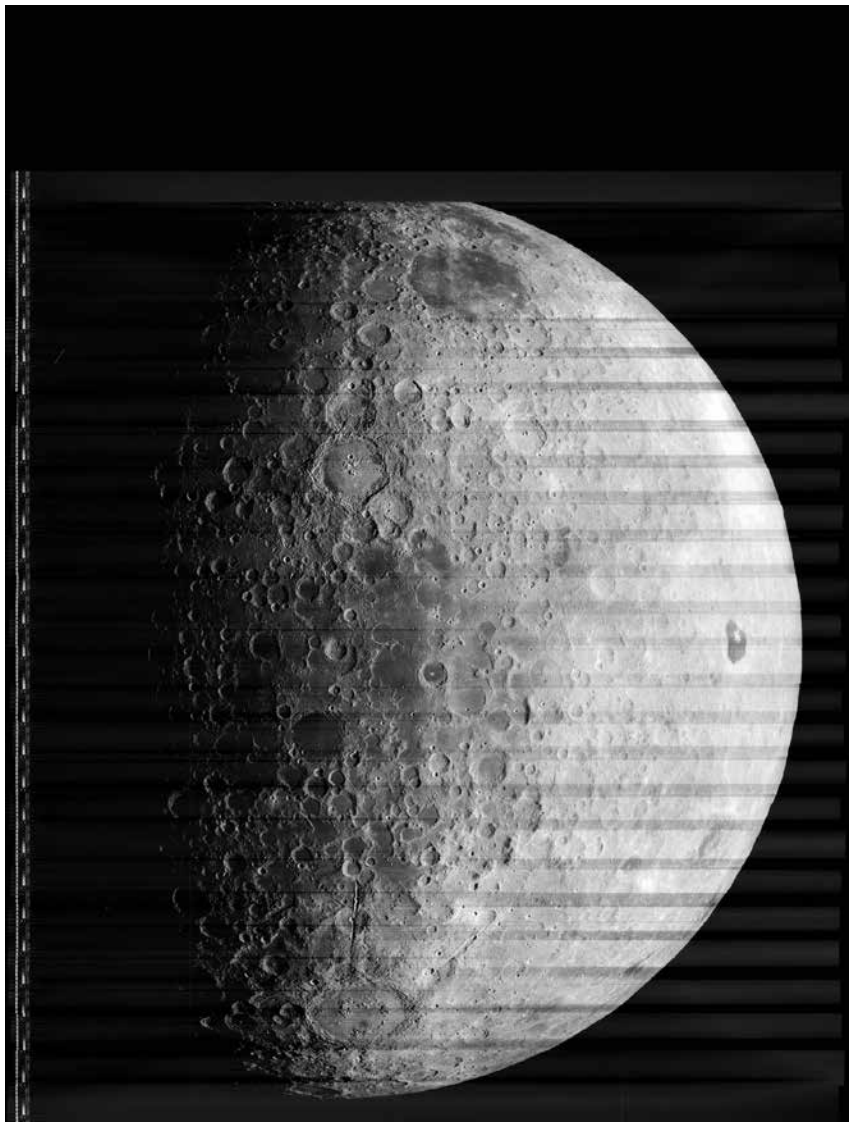

Figure 14.
A Lunar Orbiter image of the dark side of the moon
Image: NASA/JPL

12. Colleen Boyle, *Resolution: the Photographic Images of NASA*, unpublished Master of Art Thesis, The University of Melbourne, 2000. http://vcrc.esrc.unimelb.edu.au/bib/P00000893.htm

Chapter One: Imagination

Reason is the organ of truth, but imagination is the organ of meaning—C.S Lewis

Figure 16
Colleen Boyle
Digital photograph
2010

The problem of defining "imagination" has been a subject of discussion since Plato (perhaps longer), and yet its definition remains as elusive as the mental images of which it is constituted. The exploration of what the imagination is and the precise role it plays in human perception crosses the borders surrounding the discourses of art, philosophy, psychology, cognitive science, and physiognomy. But even as long ago as Aristotle, the imagination was firmly associated with *imagery*, his definition of the word being "how the object appears".[1]

The word "imagination", despite its everyday and frequent use, remains as ambiguous as the act itself. A current dictionary definition may describe it as "a mental faculty forming images or concepts of external objects not present to the senses"[2] which places it firmly within the realm of perception. However, imagination has also been

1. Mary Warnock, *Imagination*, (Berkeley: University of California Press, 1976), 38.
2. Australian Concise Oxford Dictionary, 1995.

Figure 17
Colleen Boyle
Digital photograph
2011

attributed with privileged links to the productive powers of creativity. Phenomenologist Edward S. Casey's account of 1976 points out that when it comes to philosophy, imagination has historically occupied all manner of places within an hierarchical structure of the mind and has been assigned a diversity of roles therein: subordinated by some (Plato), superordinated by others (the Romantics and the Surrealists), and placed squarely in the middle by more (Aristotle, Hobbes, Hume, Kant). Even psychology provides a muddy account as it seeks to explain imagination by associating it with sensation, memory, and imitation.[3] Casey ultimately lamented the lack of recognition of imagination as a particular and unique function of the mind and was disappointed that "imagining has almost invariably been relegated to a secondary or tertiary status in which it merely subtends some supposedly superior cognitive agency such as intellect or (more frequently) modifies some presumably more original source such as sensation".[4] Instead, Casey proffered a "multiplicity of the mental" with no hierarchical structure "only a proliferation of unforeclosable possibilities".[5]

Imagination is not a self-contained bubble of internalized images but something part of a broader process that is productive and affective, spontaneous and unstructured, intentional and controlled.[6]

And herein lies the difficulty of analysis. Pinning the imagination down to one mode of functioning or one particular step in a cognitive or perceptual process becomes problematic and it is perhaps for this reason that so few people have conducted a thorough survey of its place within philosophy or visual culture. Those few in the 20th century include Edward Casey in 1976, Mary Warnock also in 1976, and then Eva T.H. Braan in 1991. After these few surveys it seems that discourse split into either philosophical or psychological accounts, the former continuing to churn over ontological questions and the latter branching into cognitive science and mental imaging.

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3. Edward S. Casey, *Imagining: a Phenomenological Study* (Bloomington: Indiana University Press, 1976), 10–20.
4. Casey, *Imagining*, 19.
5. Casey, *Imagining*, 19.
6. Colleen Boyle, "Eyes of the Machine", in *On the Verge of Photography*, eds. Daniel Rubenstein et al.(Birmingham: ARTicle Press, 2013), 213.

This project tends towards the notion of the imagination playing some kind of intermediary role within perceptual processes, a role which functions well with the aim of understanding (as will be discussed) how imagination may work with a photograph in order to construct an idea of a reality/object that cannot be perceived directly. In explaining the position this project takes on imagination I would like to borrow from Robert Stalnaker's recent work, *Our Knowledge of the Internal World*, and claim to be "starting in the middle" for I am not going to take philosophical sides, so to speak. As Stalnaker points out, Cartesianism, which constructs knowledge of the external world via internal contents of the mind, has been the subject of much derision in the 20th century, the fashion being instead to examine the world from an external position in the common-sense world of concrete experience. Cartesianism, however, still has much to offer. Therefore he proposes a middle road:

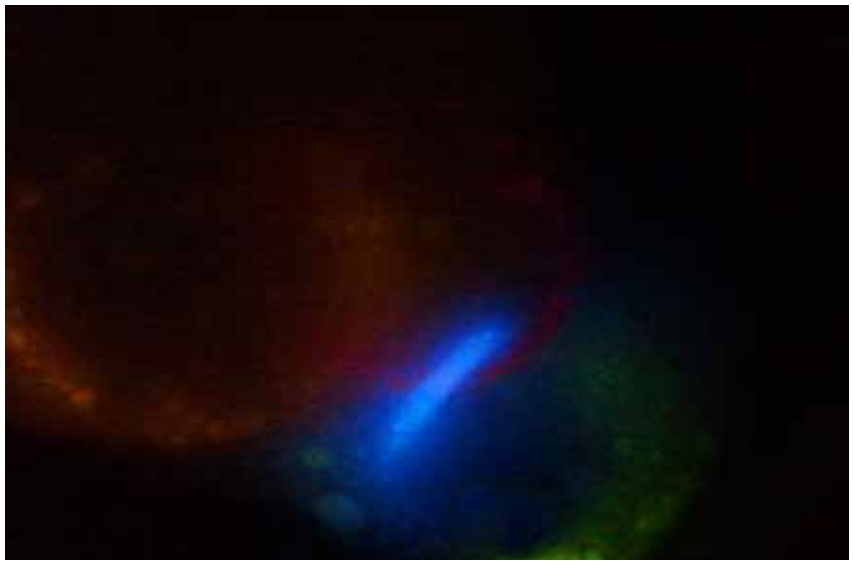

Figure 18
Colleen Boyle
Digital photograph
2013

> *Problems about knowledge and the mind have usually been posed, in recent times, in a way that presupposes the externalist starting point, but Cartesian and traditional empiricist ideas that presuppose an internalist perspective continue to influence the way we think about those problems, and some of the puzzles about our knowledge of our own experience and thought may arise from equivocating between internal and external perspectives… While internalists and externalists begin at different points, and formulate the central problems in different ways, both are aiming to provide a conception of the world as it is in itself.*[7]

Therefore, the following brief history of imagination or, really, its philosophical analysis, will focus on those "middle men": Hume, Kant, and also Sartre whom I believe have something to offer this project and its focus on the imagination as a threshold space between the external and internal worlds, the seen and the unseen. Hume shall take up the bulk of the chapter as it is upon his essential ideas about imagination that the work of others is built upon.

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7. Robert C. Stalkner, *Our Knowledge of the Internal World* (Oxford: Oxford University Press, 2008), 4–5.

A Brief History of Imagination:
Descartes and Beyond

According to British philosopher, Mary Warnock (1924–), René Descartes (1596–1650) was the first to turn his inquiring gaze inward in order to ask what we are aware of "in a general form, and of answering that we are aware of *the content of our consciousness.*"[8] After Descartes, however, the problem of philosophy then became how to differentiate between ideas of the mind and things that we *seem* to perceive in the external world. Descartes' dictum "I think, therefore I am" advocates that what we perceive is our own ideas.[9] Where, then, is the borderline between internal imaginings and perceptions of the external, 'real' world? This is where imagination may play a role.

Figure 19
Colleen Boyle
Digital photograph
2012

John Locke (English, 1632–1704), in his *Essay Concerning Human Understanding* (1689), describes the word *idea* as a term that he thought, "serves best to stand for whatsoever is the *object* of understanding when a man thinks. I have used it to express whatever is meant by *phantasm, notion species* or whatever it is that the mind can be employed about in thinking."[10] For Locke, having ideas and perception were the same thing: he classed anything that entered the mind as an "idea" whereas for George Berkeley (1685–1753), ideas came in three ways: by impressions made on the senses, by internal "passions" or "operations" of the mind, and finally, "formed by help of memory and imagination either compounding dividing or barely representing those originally perceived in the aforesaid ways".[11]

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8. Warnock, *Imagination*,13.
9. Ibid
10. Locke quoted in Warnock, 13.
11. Warnock, 13–14.

David Hume (Scottish, 1711–1776), however, went on to make a division between "impressions" and "ideas," beginning his important work, *A Treatise on Human Nature*, thus: "All perceptions of the mind resolve themselves into two distinct kinds, which I shall call IMPRESSIONS and IDEAS".[12] *Impressions* are made by direct sense perception through open eyes and "make their appearance in the soul 'without any introduction'" whereas *ideas* are the re-presentation of these impressions with the eyes closed, like "copies taken by the mind".[13] He also referred to ideas as "faint images… in thinking and reasoning" which, as Warnock describes, is an important distinction indicating that:

> *He regards imagination, the image-making faculty, as playing a crucial role in our thinking. At the very least it supplies us with ideas to think about. It is what reproduces impressions so that we can think about things in their absence. It is dubious, to be sure, how far the reproduced impressions are to be thought of as mental* pictures. *But the language of 'faint image' may be taken to suggest this. In any case, there is no doubt that sometimes, especially in Book I of the* Treatise*, Hume speaks as if ideas* were *pictures, and thus as if 'imagination' were being used by him in one of its most ordinary senses, as that which enables us to see things 'in our mind's eye'.*[14]

Hume made minor distinctions between memory and imagination but they were both essentially two ways by which we repeat our sense impressions to ourselves as ideas. For Hume, ideas presented by memory were "forcible" whereas via the imagination the "perception is faint and languid, and cannot without difficulty be preserv'd by the mind steddy and uniform for any considerable time."[15] Furthermore, the memory was forced to represent impressions in the order they were received but the imagination could mix and match as it pleased. Regardless of this freedom, the imagination had to work with previously received impressions: it could not work

12. Eva T.H. Braan, *The World of the Imagination: Sum and Substance*, (Lanham: Rowman and Littlefield, 1991), 83.
13. Ibid.
14. Warnock,15.
15. Ibid.

with nothing.[16] Hume's differentiation between memory and imagination is tenuous and as Brann points out, when the "direct reference to the actual presence or absence of external objects before the senses is out of play, there really is no mark by which to distinguish perception from imagination or memory except what one might call the impressiveness of the impressions."[17] Brann proposes that the only real way of distinguishing Hume's concept of an "impression from its idea as a cause from its effect" is chronological order.[18]

Nonetheless, the imagination, for Hume, played a key role in how we come to understand the world and its objects and it did so by joining ideas together. This was not necessarily random but more likely that one idea lead to another in a natural order. The way, in which ideas were bonded, Hume says:

Figure 20
Colleen Boyle
Digital photograph
2011

> *is not to be consider'd as an inseparable connexion; …nor yet are we to conclude that without it the mind cannot join two ideas; for nothing is more free than that faculty: but we are only to regard it as a gentle force which commonly prevails, and is the cause why, among other things, languages so nearly correspond to each other; nature in a manner pointing out to everyone those simple ideas which are most proper to be united into a complex one.*[19]

How exactly these strings of ideas were brought together was left somewhat vague by Hume, but he did describe three different qualities that ideas may contain that lend themselves to one another in connection: "resemblance, contiguity in time and space, and causal connection."[20] This attraction between ideas is akin to some kind of force, like gravity or magnetism, and its "effects are everywhere conspicuous; but as to its causes, they are mostly unknown, and must be resolved into original qualities of human nature which I pretend not to explain."[21] Thus, once again, the inner machinations of the imagination were to remain unseen and undescribed.

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16. Warnock, 16.
17. Braan, 85.
18. Braan, 86.
19. Warnock, 16.
20. Warnock, 17.
21. Warnock, 17.

Although there was much left to explain in terms of how one simple idea may become complex, the question still arose as to how we imagine something in the abstract when, according to Hume, all of our "ideas" are derived from impressions of particular things or objects. How then, could ideas be abstract? Hume tells us that an idea is capable of going "beyond its nature" by referring to things that are generally similar.[22] When we:

> *…have found a resemblance among several objects, that often occur to us, we apply the same name to all of them. . . After we have acquired a custom of this kind, the hearing of that name revives the idea of one of these objects, and makes the imagination conceive it with all its particular circumstances and proportions. But as the same word is suppos'd to have been frequently applied to other individuals, that are different in many respects from that idea which is immediately present to the mind; the word not being able to revive the idea of all these individuals only touches the soul… and revives that custom which we have acquir'd in surveying them. They are not really and in fact present to the mind, but only in power."*[23]

The imagination creates more images for us , which are based on the image of an object that first came to mind. But as Warnock discusses, without the "custom" version of the object the imagination has nothing upon which to build further images: "We must have the custom first, and then the image-forming faculty can get to work."[24] Nonetheless, it is evident Hume believes that it is resemblance between ideas that enables us to think of an object in *general* and not just a *specific* individual example of that object.

Warnock discusses this aspect of Hume's explanation of imagination by using our knowledge of cats as an example. In concurrence with Hume, when she hears the word "cat" she thinks of her cat Simpkin as a specific example, but she can also imagine a host of other cats related to that original idea of "cat" that are *generalized* images of cats linked together by resemblance. However, she points out that Hume does not ask us to use our imagination when we use the word "cat" in reference to an animal in front of us. He only speaks of the

22. Ibid
23. Warnock,17–18.
24 Warnock, 18.

use of imagination in regards to objects in absentia: but why? Why does he not go one step further and come to the conclusion that we also require a general concept, a generalized image of what a cat is, in order that we recognize *any* cat: seen or unseen. Instead, Hume does not elaborate on the workings of the "custom" rather claiming that to "explain the ultimate causes of our mental actions is impossible."[25] This particular explanation would be left to German philosopher Emmanuel Kant (1724–1804) who developed the concept of the *schema* in order to bridge the gap between subjective, internalized images, and the world encountered before our eyes and brought to us via sense perception.

Figure 21
Colleen Boyle
Digital photograph
2014

However, there was a role that Hume thought the imagination played when external objects were being received as sense impressions. This was very much related to his skeptical view of the senses and this in turn was driven by his empiricist view of reality. For Hume, perceptions were purely of the mind and were not reflections of external objects, "For philosophy informs us, that everything, which appears to the mind, is nothing but a perception, and is interrupted, and dependent on the mind; whereas the vulgar confound perceptions and objects, and attribute a distinct continued existence to the very things they feel or see. This sentiment, then, as entirely unreasonable, must proceed from some other faculty than the understanding."[26] Perceptions were internal and could not be relied upon as definitive proof of the existence of things in the world. Why, therefore, should we, the "vulgar", believe something exists when we cannot see or experience it? Warnock suggests that, according to Hume, it is the imagination that allows us to presuppose that, despite the fragmentary nature of perception, the objects of the world "have a continuous existence which is not interrupted each time that we blink, or turn away."[27] It is imagination that leads us to *believe* in the existence of a world independent of the senses.

Hume puts this down to the tendency of the imagination to fill in the gaps within a continuum. Although impressions are generally frag-

25 Warnock, 18-19.

26. Hume in Brann, 83.

27. Warnock, 21.

mentary we "ascribe continuous existence to things where we have collections of impressions", for example, with groups of objects encountered regularly or those that change on a regular basis. It may not be winter now, but due to my previous sense experience I know it shall be winter again, and the imagination "when set into any train of thinking, is apt to continue even when its object fails it, and, like a galley put in motion by the oars, carries on its course without any new impulse."[28] Imagination reassures us that the sun we see rise each day is, in fact, the same one when really all there is before our minds is a string of similar impressions. With the assistance of the more forceful impressions of memory a strong idea is formed and our belief in an external and independent world is cemented.

Negative connotations surrounding Hume's opinion of this aspect of the imagination are evident in the *Treatise* especially in his use of the words "feigned" and "fictitious". He claims to have no faith in his senses or imagination. Warnock goes so far to claim that in respect to reality, imagination "has turned out to be the deceiver, who gives us an altogether unwarranted sense of security in the world. It is like a drug, without which we could not bear to inhabit the world."[29] Thankfully those philosophers who later built on the work of Hume, such as Kant, saw the imagination in a more positive light.

Despite his skepticism regarding the power of imagination Hume did link it with emotions in so far that feelings or sensations originally associated with impressions could be recalled again in the absence of an object. The clearer an image the imagination could produce of the absent object the stronger the associated emotion would be.[30]

How vivid an image of the imagination can be is dictated by how close an object is to us in space and time, says Hume. The closer in time: the easier to remember. Likewise, something just outside the house is easier to imagine than something far away. These ideas can produce secondary (reflexive) impressions with a strong sense of

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28. Warnock, 23–24.
29. Warnock, 25.
30. Warnock, 37.

reality.[31] But Hume also allows for imagination at a distance and describes how the mind can become "excited by the necessity to overcome obstacles in thinking" such as space and time:

> *It is certain nothing more powerfully animates any affection, than to conceal some part of its object by throwing it into a kind of shade, which at the same time it shews enough to pre-possess us in favour of the object, still leaves some work for the imagination. Besides that obscurity is always attend'd with a kind of uncertainty; the effort with which the fancy makes to compleat the idea rouzes the spirits and gives an additional force to the passion.*[32]

The more distant an object is the further the imagination has to stretch. In order that the imagination "go the distance", so to speak, it must relate one idea to another, finally linking back to its present situation. In this sense the imagination is also *diffused:*

> *Now when any very distant object is present'd to the imagination, we naturally reflect upon the interpos'd distance, and by that means conceiving something great and magnificent receive the usual satisfaction. But as the fancy passes easily from one idea to another relat'd to it, and transports to the second all the passions excit'd by the first, the admiration which is direct'd to the distance naturally diffuses itself over the distant object.*[33]

This diffusion is, however, not a weakening or negative action that a general understanding of 'diffuse' might imply. It is more a sense of *extension* in that the mental excitement experienced in overcoming the distance is now applied, via extension, to the object imagined. Both time and distance seem to represent a pleasant challenge for the imagination and, according to Hume, "In collecting our force in order to overcome the opposition, we invigorate the soul and give it an elevation with which it would not otherwise have been aquaint'd."[34]

A key issue in defining imagination is ascertaining the difference between what is a perception and what is a mental image. Hume

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31. Warnock, 39.
32. Warnock, 39.
33 Warnock, 40.
34. Hume in Warnock, 40.

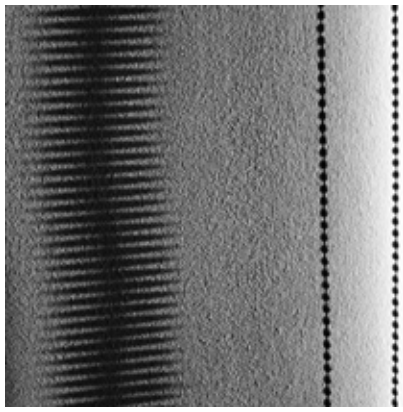

Figure 22
Colleen Boyle
Digital photograph
2015

tried by applying the criteria of the degree of force and liveliness claiming that although they seem very similar at first "Imagination operates in the region of ideas, and not of impressions" a conclusion made based on their difference in force and vivacity.[35] Then, in a somewhat contradictory manner, he believed that a complex idea can be formed from "a number of simple impressions, joining the elements together as they were never joined in actual experience."[36]

Again, in distinguishing memory and imagination Hume resorts to the criteria of degrees of vivacity, memory being more powerful than the imagined, but lesser than the original impression. Despite this weakness, the key feature of imagination is that it is *active* and that it can "transpose and change its ideas"[37] via a gentle force even over time, helping the individual to create a continuity of experience. Warnock uses the example of a tree that we may see everyday, whereby imagination allows us to "slide smoothly from like idea to like… so it comes about that we actually confuse many similar ideas with one identical idea" and we come to believe that "the tree is *one thing which we perceive*, even the back of it which we may never have seen at all except in the pale copy produced by the imagination."[38] Here, the task assigned to the imagination appears to me to be anything but "weak" as Hume is effectively describing it as the matter, the force, with which perceptual reality is held together.

Hume's method of discerning between impressions and ideas via assigned degrees of vivacity or power is, as many have pointed out, arbitrary and flawed. He uses it as a blanket theory to cover perception, ideas, memory, belief, fanciful thoughts as opposed to reason, and even the level of feeling to be had from a poem. And, he seems utterly contradictory when claiming that it is the string of weak impressions produced by the imagination that "feigns a continuity of existence which constitutes our acceptance of an independent world."[39] Certainly, imagination can aid in compounding disparate

35. Warnock, 132.
36. Warnock, 132.
37. Hume in Warnock, 133.
38. Warnock, 133.
39. Warnock, 134.

Figure 23
Colleen Boyle
Digital photograph
2014

visual images of the world into a belief in the existence of an external world but why would one believe in something so "weak"and when it is so easily placed as something unlike perception or reason? Furthermore, why would Hume elevate the imagination to a topic of philosophical enquiry when he so derided the "vulgar" for their insistence upon an external reality, a reality that was brought into a "continuity of existence" under false *imaginative* pretenses? There must be another aspect to imagination, something that can help satisfy Sartre's demand that a solid theory of imagination should include the clear and evident observation we make—by reflecting upon and trusting our own experience—that perception and imagination are different, and not only by degrees of intensity.

Aesthetics, Schemata, and Kant

Emmanuel Kant (German, 1724–1804), found the human imagination to be no more explicable than Hume, but he approached it quite differently within his *Critique of Pure Reason* (1781) and *Critique of Judgment* (1790). Kant's logic is incredibly detailed and systematized, but for the purposes of this project it shall suffice to focus upon the "fundamental axiom of the Kantian philosophy that our thinking depends for its objects on perception".[40] It is this focus on the connection between perception and thought that lead Kant to examine the imagination.

Kant conjectured that we are capable of having conceptual knowledge of the world due to our prior accumulation of images of objects like the one we are perceiving in the here and now. Our prior, objective, empirical understanding of something will be applied when we encounter a new, but similar perception, the former conferring

40. S.Körner, *Kant* (Harmondsworth: Pelican Books, 1987), 45.

"objective reference and general validity on the latter."[41] We come to know things—apply concepts—by unifying past presentations into a category and applying it to what is perceived. This is a conceptual act of objectification and not in itself imaginative.

Imagination plays a fundamental role in allowing the above process to occur, Kant holding that we cannot apply a concept to a perception without evoking *schemata*.[42] For example, I cannot look at my dog Sniffles and apply the concept of "dog" to my perception without producing a schematic representation of "dog" within my imagination. However, a schema must not be confused with a concept; it is much more essential:

> *It is not even a specific schematic image. It is 'the presentation of a general procedure of the imagination in procuring an image for a concept'. It is 'a rule for the synthesis of the imagination'. While the concept belongs to the understanding and its instance to perception, the schema has, so to speak, a foot in either domain. As* rules *for the production of images the schemata of 'dog' and 'geometrical circle' are linked to the understanding; as rules for the production of* images *they are linked to perception. It is in virtue of this two-fold connexion that they themselves can link the concept 'dog' to Pluto and the geometrical circle to a particular round saucer.*[43]

In the *Critique of Judgement*, Kant turns his mind to the role of imagination in aesthetic judgments. For Kant, an object (of art or otherwise) can provide pleasure in the viewer when its *finality of form* is discovered via the interplay of understanding and imagination. This "finality of form" could be described as a sense of completeness, or an inner quality of the artwork that is linked to its purpose: to display a particular form, and in that form we find satisfaction with order: beauty.[44] But how does the imagination reveal this "finality" within an artwork?

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41. S.Körner, Kant, 51.
42. S.Körner,70.
43. S. Körner,70–71.
44. Warnock, 46–47. Note: Kant also described this as working with that not considered beautiful, and that we gain pleasure in the act, not just the object. This pertains to his theories on the sublime.

The disciplines of science and art do not always have a specific aim in mind. Scientists and artists explore new intellectual territory and are not always sure what they seek, but when they do find it, it feels "right", as if it had been there all along just waiting to be discovered. In order for this to happen, one must assume that something is there to be discovered from the start and the mind to be predisposed to "discover" patterns. This is what Kant means by the "transcendental concept of the finality of nature", a concept that says nothing about the object itself (artwork or scientific "discovery") but much about how we view and construct the world. For Kant, this concept of finality is:

> *…the unique mode in which we must proceed in our reflection upon the objects of nature with a view to getting a thoroughly interconnected whole of experience, and so it is a Subjective principle or maxim of judgment.*[45]

Furthermore, as Warnock explains, it is via the form of the thing—the art object—that we make our judgment, "our perception, as it were, stops at the appearance of the thing, and it is within that limit that we discover its finality."[46] We do not connect with the artwork intellectually but do so "independently of concepts" through something that Kant called 'finality without end'.[47] In this instance, rather than relying on past experience or prior knowledge, the imagination is free to go where it will, setting its own limitations, without reference to a particular concept. Our imagination steps in where our perception stops and in doing so the object is brought under what Kant called an *indeterminate concept* of the understanding, but perhaps, this could also be viewed as just another way of describing a form of *intuition*?

Another aspect of Kant's aesthetic imagination is that it is reproducible. Without being able to concentrate on a single object, without being able to reflect upon the object as an image in the mind, there

45. Kant in Warnock, 44.
46. Warnock, 47.
47. Warnock, 47–49.

would be a stream of random sensations.[48] In this case, the order is not created via association with other similar images—as in "regular'"perception—but by the "internal orderliness" of the image, albeit without any external rule to produce such. So, as Warnock surmises:

> *Imagination, in its aesthetic role is still representational… still the very faculty which can create images. But it is free, and therefore, Kant says, is thought of as 'productive, and exerting an activity of its own'. It is when the imagination is exercised in this new creative way that we get full aesthetic pleasure from its harmony with undertstanding. We cannot conceptualize this harmony, but only feel it.*[49]

However, if the "rules" of such an interaction are to be taken on board, Kant's aesthetic theory of imagination becomes very limited in application. Indeed, Kant came to the conclusion that it was only pure forms "such as a spiral or a curve" that had the "completeness, the 'rightness', the pattern, we are looking for" in order that our imaginations come to 'finality without end'.[50]

Figure 24
Colleen Boyle
Digital photograph
2012

Kant's theories of the sublime extend upon his aesthetic concept of finality without end, but in this case the imagination is blocked by the mind's incapacity to form an adequate image. The object we perceive may suggest an idea but our mind's eye cannot match it and the gulf between the two becomes the unfathomable sublime. It is the act of knowing that our minds cannot attain the space to which our imaginations reach, the perfect knowledge that we fail at the task of representation, that is the true space of the sublime. Ultimately, for Kant, imagination was a synthesizing aspect of consciousness that could aid intellectual understanding to come closer to unveiling the true reality of appearances and whether we got there, or failed, it was worth the experience.

48. Warnock, 50.
49. Warnock, 50.
50. Warnock, 53.

Figure 25
Colleen Boyle
Digital photograph
2011

Jean-Paul Sartre (1905–1980) begins his 1940 book *The Imaginary* by claiming that the work "aims to describe the great 'irrealizing' function of consciousness, or 'imagination', and its noematic correlate, the imaginary"[51], and by doing so quickly alerts the reader to the essentially Husserlian phenomenological base from which his thoughts stem. Husserl posited that every act of intentionality[52] consisted of three parts: the object, the act directed at the object (*noema*), and then what was meant by that action—the 'noematic correlate'.[53] Indeed, Sartre's approach to the imagination is strictly phenomenological; he explores the topic by description and reflection alone for, according to him, passing from simple description to inductive claims is "passing from the certain to the probable"[54]. He acknowledges his intellectual debt to Descartes:

> *It is necessary to repeat here what has been known since Descartes: a reflective consciousness delivers us absolutely certain data; someone who, in an act of reflection, becomes conscious of 'having an image' cannot be mistaken… confusion is impossible: what is conventionally called an 'image' gives itself immediately as such to reflection. But this is not a matter of a metaphysical and ineffable revelation. If these consciousnesses are immediately distinguishable from all others, it is because they present themselves to reflection with certain marks, certain characteristics that immediately determine the judgment 'I have an image'.*[55]

For Sartre, this judgment is permitted by the act of reflection and this act of reflection is not the same as the act of having the image. In reflection there is the possibility of recognizing the essence of an image. Sartre asks the reader to look with him as he makes a phenomenological description of the act of perceiving a mental image,

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51. Jean-Paul Sartre, *The Imaginary: A Phenomenological Psychology of the Imagination,* translation by Jonathan Webber, originally published 1940 (London: Routlege, 2004), 3.
52. Intentionality is a philosophical term that refers to the ability of the mind to form representations.
53. Robert Solokowski, *Introduction to Phenomenology* (Cambridge: Cambridge University Press, 2000) 59.
54. Sartre, The Imaginary, 5.
55. Sartre, The Imaginary, 4.

of imagining: "The method is simple: we shall produce images, reflect upon them, describe them; that is, attempt to determine and to classify their distinctive characteristics."[56] Sartre's confidence in his methodology is infectious and amusing as is his dismissal of Hume's notion that the imagined form, the image, is somehow "in" consciousness and therefore that the object in question is "in" the image. Sartre puts this error down to our habit of thinking of things in their spatial context and due to this we erroneously "pictured consciousness as a place peopled with small likenesses and these likenesses were the images".[57] He labeled this misconception the "illusion of immanence" and stated that if we accept it "we are necessarily led to construct the world of the mind out of objects entirely like those of the external world, but which simply obey different laws."[58] Sartre is emphatic in our need to "rid ourselves" of this illusion in order to understand imagination.

In order to move forward Sartre asks that we once again pay close attention to our act of perceiving. When I look at a chair it can only be described as being outside of consciousness. To describe it as other, according to Sartre is "absurd". None-the-less "my perception is a certain consciousness and the chair is the *object* of that consciousness." I close my eyes and I can produce an image of that chair but that chair remains outside of consciousness. He continues:

> *Now—and this is what reflection teaches us above all—whether I see or imagine that chair, the object of my perception and that of my image are identical: it is that chair of straw on which I am seated. Only consciousness is* related *in two different ways to the same chair. The chair is envisioned in both cases… Only, in one of the cases, the chair is 'encountered' by consciousness; in the other, it is not… What we find here is not a semblance of the chair which suddenly worked its way into consciousness and which has but an 'extrinsic' relation to the existing chair, but a certain type of consciousness, a*

56. Jean-Paul Sartre, *The Psychology of the Imagination,* first published in English 1948 (London: Routledge, 2013), 2.
57 Jean-Paul Sartre, "Description" in *Images: a Reader*, eds. Sunil Manghani, Arthur Piper and Jon Simons (London: SAGE, 2006), 135.
58 Sartre, in Sunil et al., 135.

> *synthetic organization, which has a direct relation to the existing chair and whose very essence consists precisely of being related in this or that manner to the existing chair.*[59]

This image held within the mind is a "total synthetic organization" as a form of consciousness which exists "in and for itself and which can always occur to reflection without any intermediary."[60] The word "image", then, is perhaps one that needs reassessing in relation to Sartre's sense of the imagination, and indeed, he proposes such. He repeats that "an image is nothing else than a relationship", an imaginative consciousness, and that to confuse this "life of the imaginative consciousness, which lasts, becomes organized, and disintegrates, with the object of consciousness" would be a grave error indeed.[61]

Figure 26
Colleen Boyle
Digital photograph
2012

A Synthesis

Existentialist Mikel Dufrenne (1910–1995) claims that the "advent of representation occurs with the upsurge of space and time"[62] and likewise coming to terms with the form and function of imagination will be a topic of discourse until such time human consciousness can observe itself from a position that remains outside the manifold of perception. Rather than dismiss the task as impossible, however, it is important to apply what we may know. In this research project I intended to create artwork that acted as nodal points that bring together the main topics addressed in this exegesis: photographs, frames, geometry and representation, analogy, reality, the seen and the unseen. For these works to be successful they need to interact with the viewer's imagination in a way, that although I cannot control, I can foster and encourage by creating the right time, space and conditions in which it may flourish.

So what have I decided the imagination is? Like Kant, I believe there is a transcendental and an empirical version of this faculty that oper-

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59. Sartre, in Sunil et al., 137-138.
60 Sartre, in Sunil et al., 137.
61 Ibid.
62. Mikel Dufrenne, "Imagination", in *Images: a Reader*, eds. Sunhil Manghani, Arthur Piper and Jon Simons (London: SAGE, 2006), 138.

ate in analogous fashion to the infra-red and ultra-violet ends of the visual spectrum in that they are polar opposites of the same substance, illuminating the world in completely different ways. As Dufrenne says, the empirical imagination converts appearance into object and the transcendental imagination:

> *…prefigures the empirical, making the empirical possible. Transcendental imagination expresses the possibility of representation, while empirical imagination accounts for a given representation's meaningfulness and its integration into a total representation of a world. As transcendental, the imagination sees to it that there is a given; as empirical, imagination makes certain that this is given, enriched by possibilities, possesses a meaning.*[63]

Imagination allows sense to be made of the world in time and in space. It synthesizes sense data and experience, connecting events and images in order to create meaning. Imagination can take the chaotic and implicit, the unknown and the previously unseen and convert it into something knowable, visible, and tangible. But as Kant deducted, the imagination can also reach and fail and the intellectual understanding must step in to account for the discrepancy. This, so-called "mathematical sublime" is the sublime of the image of outer space, where our perceiving minds and sensing bodies have no previous experience. Dufrenne claims that the transcendental and empirical imaginations both strive for visibility, the "transcendental imagination having opened up the area in which something given can appear, the empirical imagination fills out this field."[64] To do this "images are elicited to form a quasi given" but these images are "not, strictly speaking, images of the visible. However, they put us en route toward the visible by continually appealing to perception for decisive confirmation."[65] The implicit knowledge that imagination layers upon the world is "neither perceptual nor conceptual."[66] Light is not solely infrared, nor ultra-violet, not anything in between, but it is something that illuminates the world and so too does the imagination. It is productive, reproductive, active and most importantly: *free*.

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63. Dufrenne, in *Images: a Reader*, 138.
64. Dufrenne, in Images: a Reader,139.
65. Ibid.
66. Ibid.

English artist, scholar, clergyman and keen walker, William Gilpin (1724–1804) describes these properties of imagination in relation to the sketch, or *non-finito,* as compared to a completed painting. Through publications containing vivid descriptions and evocative sketches of the *picturesque* English countryside Gilpin excited the imaginations of 18th–century armchair travelers. For Gilpin, a sketch was not just a preliminary event prior to a complete painting rather he proposed that the sketch in combination with the viewer's imagination could actively construct *a* reality. He recognized that a description of a scene, whether written or pictorial, could never match reality, but that a sketch could assist the imagination in realizing "it has the power, of *creating something more itself*" and that the force of imagination could "aid the poet's or the painter's art; exalt the idea; and *picture things unseen*".[67] These unseen landscapes and vistas would exist solely in the mind of the individual beholder, never matching the reality to which the sketch may refer but existing in their own contained state. Gilpin conceived of imagination as a powerful, self-aware force capable of adding to the incompleteness of a sketch, drawing on preconception and archetype—the footholds of visual analogy—and setting the viewer's imagination free to glow with "a thousand beautiful ideas"[68] in an infinite, non-linear string.

Figure 27
Colleen Boyle
Digital photograph
2012

Visual analogy is perhaps where many of the attributes of imagination put forward by Hume, Kant, Sartre and more, come to work together, adding where there is perceived absence, synthesizing where there is connection, and producing knowledge through an active and free play of objects within the mind.

67. William Gilpin, quoted in Wendelin A. Guentner, "British Aesthetic Discourse 1780-1830: the Sketch, the *Non-Finito*, and the Imagination" *Art Journal,* Vol. 52, No. 2 (1993) : 43.
68. Gilpin, in Guentner, "British Aesthetic Discourse 1780-1830", 44.

Why is a Raven Like a Writing Desk?

"Mad Hatter: "Why is a raven like a writing-desk?"
"Have you guessed the riddle yet?" the Hatter said,
turning to Alice again.
"No, I give it up," Alice replied: "What's the answer?"
"I haven't the slightest idea," said the Hatter"

— Lewis Carroll, Alice in Wonderland

Lewis Carroll's suggested connection between a raven and a writing desk may seem "mad" when subjected to logical analysis, but on another deeper, more intuitive and imaginative level, quite plausible if utterly inexplicable. Via the frustrating ramblings of the Mad Hatter, Carroll provides the perfect introduction to the power of analogy. Often overlooked, or even mistaken for other visual or linguistic means of making connection between ideas or things such as metaphor, analogy plays an important if subtle role in the workings of imagination.

From a strictly linguistic perspective it is simple enough to point out how Carroll's riddle is analogical in intent. He does not describe the raven as *being* a writing desk but merely suggests that it is capable of being *like* one. Furthermore, he does not prescribe just *how* the raven is to be like the writing desk, these connections are to be made within the mind of the reader: imaginatively and visually. Metaphor, on the other hand, would have described the raven as *being* a writing desk (or vice versa) and their relationship is fixed, both within the syntax of the sentence and the mind of the beholder. Analogy allows for an infinite string of connections that are neither contingent upon one another nor upon sequence.

Analogy—visual analogy in particular—is the focus of study of avowed "imagist" Barbara Maria Stafford. In the introduction to her book, *Visual Analogy: Consciousness as the Art of Connecting*, she described analogy as being "born of the human desire to achieve union with that which one does not possess" and that it is a per

ceived lack that leads us to "search for an approximating resemblance to fill its place".[69]

Analogy may have had its roots in Greek mathematics and inferential logic where number and phenomena could be predictably and proportionately linked, but as Stafford describes, its subsequent incarnations became entangled with "the mimetic vocabulary of similarity and dissimilarity" and that over the centuries this "hardened into a formulaic dualism or vanished within a lengthening scale of symbols."[70] However, regardless of its origins or subsequent alterations Stafford is most keen to point out that analogy is *visual* and she laments the diminution of visual analogy in favour of less fertile forms of representational connection, such as metaphor (essentially a form of dualism) or allegory (complex symbols) which are ultimately closed systems.

Early in this project I had proposed to myself that visual analogy must play some kind of role in the way the imagination engages with photographs and had, perhaps naïvely, included it in my project proposal as a technique I would use in my practical work. Simple as it may seem to make inferences and connections between disparate things, the effective use of visual analogy became one of the most difficult things to achieve and much like Alice in response to the Mad Hatter, I was quite ready to give it up.

Plaster, Paper, and Glass. Hands, Apples, and the Moon.

In retrospect, I can see that my early attempts at exploring analogical representation with photography were hindered by a misunderstanding of what analogy actually is. The work of German photographer, Thomas Demand (1964–) and his immaculate use of paper to create a scene provided the inspiration for me to try out something of my own. Taking the idea of a black hole as a conceptual starting point, I tried rolling printed paper into a cone and photographing it

69. Barbara Maria Stafford, *Visual Analogy: Consciousness and the Art of Connecting (*Massachusetts: Massachusetts Institute of Technology, 1999) 2.
70. Stafford, *Visual Analogy*, 2–3.

at close quarters. I wanted to explore the idea of a black hole because it is essentially something that has never been seen apart from the effects it produces in the space around it and, conceptually, it is very difficult to comprehend. Could light at the end of a paper cone provide me with an analogical representation of a black hole?

Figure 28
Thomas Demand, Archive 1995, silver dye bleach print face-mounted to acrylic, edition 4/5, 183.8cm x 238cm, Image: Solomon R. Guggenheim Museum, New York
Source: http://www.ngv.vic.gov.au/guggenheim/education/08.html

Ultimately, the answer was to be "no". The starting point was wrong. When imagining a black hole there is very little to build upon as it lies beyond our everyday frame of reference and visual experience and so I resorted to the closest and most literal iteration I could think of. To create an analogical reference to a black hole I needed to begin with something that is like a black hole, but not the black hole itself. Similarly, Demand's work is not truly analogical (Figure 28). Demand creates simulacra that refer to the mimetic seduction of photography whilst simultaneously declaring their falsity. His images do not provide the mind with a starting point that leads to a distant conclusion—he does not start with a raven and end up at a writing desk. By taking on Demand's technique in order to represent something I had inadvertently gone down the path of metaphor or illustration, my paper construction standing in for an unseen object in a literal sense. Instead of engaging in a "vision of ordered relationships articulated as similarity-in-difference" I had used a likeness of a black hole to represent a black hole[71]. Analogy must allow something to maintain its individual identity at the same time that it relates to something other. There is no immediate referent: the raven must be a raven and *connect* to the writing desk without becoming it. In this way, analogy has the power to connect the seen to the unseen.

The Moon: Considered as a Planet, a World, and a Satellite

In the early days of astronomical photography it was difficult to produce a clearly fixed image of an object made so readily visible by the telescopic lens. Even the closest object in the night sky—the Moon—

71. Stafford, *Visual Analogy,* 9.

Figure 29
Lunar crater as modeled and photographed by James Nasmyth
The Moon: Considered as a Planet, a World, and as a Satellite
Image: Public Domain

frustrated astronomers as they strove to map its surface. Lengthy exposures required a static subject and the cosmos is anything but static. The resultant images were lacking in detail and focus and required a discerning eye, trained by the more faithful telescopic image, to be made useful.[72]

In 1897, James Nasmyth, a Scottish engineer and accomplished amateur astronomer, teamed up with his business partner James Carpenter and published a remarkable book called *The Moon: Considered as a Planet, a World, and a Satellite.*[73] Within the covers lay the most detailed images of the lunar surface made at the time. They were clear, crisp, and detailed and had somehow managed to avoid the technical issues involved with tracking an object in the night sky (Figure 29). But these photographs were not of the Moon.

Like Thomas Demand, Nasmyth drew on sculptural skills, in this case; plaster modeling skills he had learned from his landscape-painter father.[74] After a process of careful telescopic observation and drawing, Nasmyth produced intricate plaster models of the lunar surface, effectively replicating what he saw through the telescope with his own eyes. These stationary models were then dramatically lit, photographed, and then immaculately printed using the latest photomechanical techniques and permanent, carbon-based inks.[75]

Like Demand, Nasmyth's curious images lie in a transitional region, somewhere between an internal and an external reality. They are not

72. Frances Robertson, "Science and Fiction: James Nasmyth's Photographic Images of the Moon," Victorian Studies, Vol. 48, No. 4, (2006): 595–623.
73. James Nasmyth, *The Moon: Considered as a Planet, a World, and a Satellite* (Memphis: General Books, 2011 print on demand). Originally published London: J. Murray, 1885.
74. Demand began his artistic career as a sculptor. He started to use photography primarily as a way of creating archival records of his sculptures. See p.63 of Susan Van Wyk's essay "Close Encounters with Recent History: the Photography of Thomas Demand" in *Thomas Demand,* National Gallery of Victoria, 2012.
75. Robertson, 2006..

truly observational or directly indexical, nor are they entirely fantastical or false—these images fall somewhere "between the telescope and the photograph, the copy and the real; and it is our mind that is asked to make the journey between the two."[76] But regardless of the ambiguity inherent in the images made by both Demand and Nasmyth, and despite their complex use of the viewer's imagination, I remain unconvinced that they are truly analogical. Certainly, the images of both Demand and Nasmyth are based on some kind of visual evidence—Demand upon a previously existing photograph, Nasmyth upon telescopic observation—but what they present to the viewer is an imaginative construct. In both cases we are asked to imaginatively reach, to "consciously connect" as Stafford would have it, but we do so only in predetermined directions that question the index of the image. Nasmyth offers reference to the Moon, its plaster model and then a photograph. Demand offers reference to a real scene, a photograph, a paper model, and another photograph. Where the allegiance of the image ultimately lies is left to the viewer's imagination. Perhaps, in these cases, analogy is present, but in a truncated version.

Figure 30
Analogical reference to lunar geological processes, James Nasmyth, *The Moon: Considered as a Planet, a World, and as a Satellite,* 1897.
Image: Public Domain

Where analogy is fully evident, is in the photographic images Nasmyth produced in order to provide the viewer with some understanding of the processes that he felt forged the physical properties of the Moon. These included simple images such as the back of a wrinkled hand, a shriveled apple, and a cracked glass orb (Figure 30). By postulating complex geological formations through these analogous examples, Nasmyth continued the perceptual construction of knowledge from the point at which the photograph left off. Rather than relying on any indexical relationship he tapped into the latent power of visual correspondences and presented the viewer with, as Stafford describes it, "real information in one sense [that] is accompanied by a perception in another

76. Colleen Boyle, "You Saw the Whole of the Moon: the Role of Imagination in the Perceptual Construction of the Moon" *Leonardo*, Vol. 46, No. 3, (2013): 249.

sense”[77]. Perception, here, is a process of imagination where analogy has the power to trigger an infinite string of association, from a wrinkled hand to the Moon’s surface.[78]

Abstract Association

Iranian-born artist Shirana Shahbazi (1974–) used the same method as Nasmyth but, in this case, she makes visual connection between images of landscapes and objects and images of what appears to be flat colored paper assembled into abstract geometric designs that feign a three-dimensionality. For example, in Figure 31, a rocky hillside is shown alongside layers of color that seem to emulate the diagonal fall of the rocks. Here, Shahbazi seems to be asking the viewer to look for the underlying structure of the photographs, the geometry that holds them together and presents them with visual coherency. Other objects compared with the abstract compositions of color include butterflies, faces, flowers and fruit and although the intitial analogical play may be with structure, these works go further, eventually leading the viewer to comparisons and connectins between art and the world. Knowledge that these images link back to Shahbazi’s home in Iran is not necessary for the analogical play to commence.

Figure 31
Shirana Shahbazi
Double spread from her photobook, *Then Again*, 2011
Image: https://www.youtube.com/watch?v=NYKDtCRCHSc.

Abstract photography has recently experienced a resurgance and younger artists such as Shahbazi, Canadian Jessica Eaton (1977–) and Australian Danica Chappel are building on past movements such as Constructivism and the Bauhaus, and looking to established artists such as American Barbara Kasten(1936–) (Figure 32) as they delve into questions of what photography itself is an analogon *for* or what it might be analogous *with*.

Figure 32
Barbara Kasten, Amalgam Series, *Untitled* 79/25, 1979
Silver gelatin print, 51x41cm
Image: http://barbarakasten.net/amalgam/#1.

These questions, too, are evident in my *Untitled* sculptural work of 2013 (Figure 33) where, like the work of Kasten, I was concerned with the primary contents of a photograph: light and shadow. A sim-

77. Barbara Maria Stafford, *Devices of Wonder: From the World in a Box to Images on a Screen* (Los Angeles: Getty Research Institute, 2001)16.
78. Boyle, “You Saw the Whole of the Moon”, 249.

ple image of light falling on the surface of a wall became once again part of light on a wall, this time reflected from the surface of the mirrored box on which the image was mounted. Light from a standing photographic lamp reinforced the concpetual connection to photography, but by focussing the work on light and shadow with a three-dimensional form the analogon to which the viewer was directed was the camera more so than the photograph. However, this camera was not a closed black box inside which the magic of the exposure of an image was closed off. In this case, the camera was inverted and the fundamental elements of its functioning put on display, the light and shadow cast upon the wall forming as much of the piece as any other element. When looked upon as a whole the

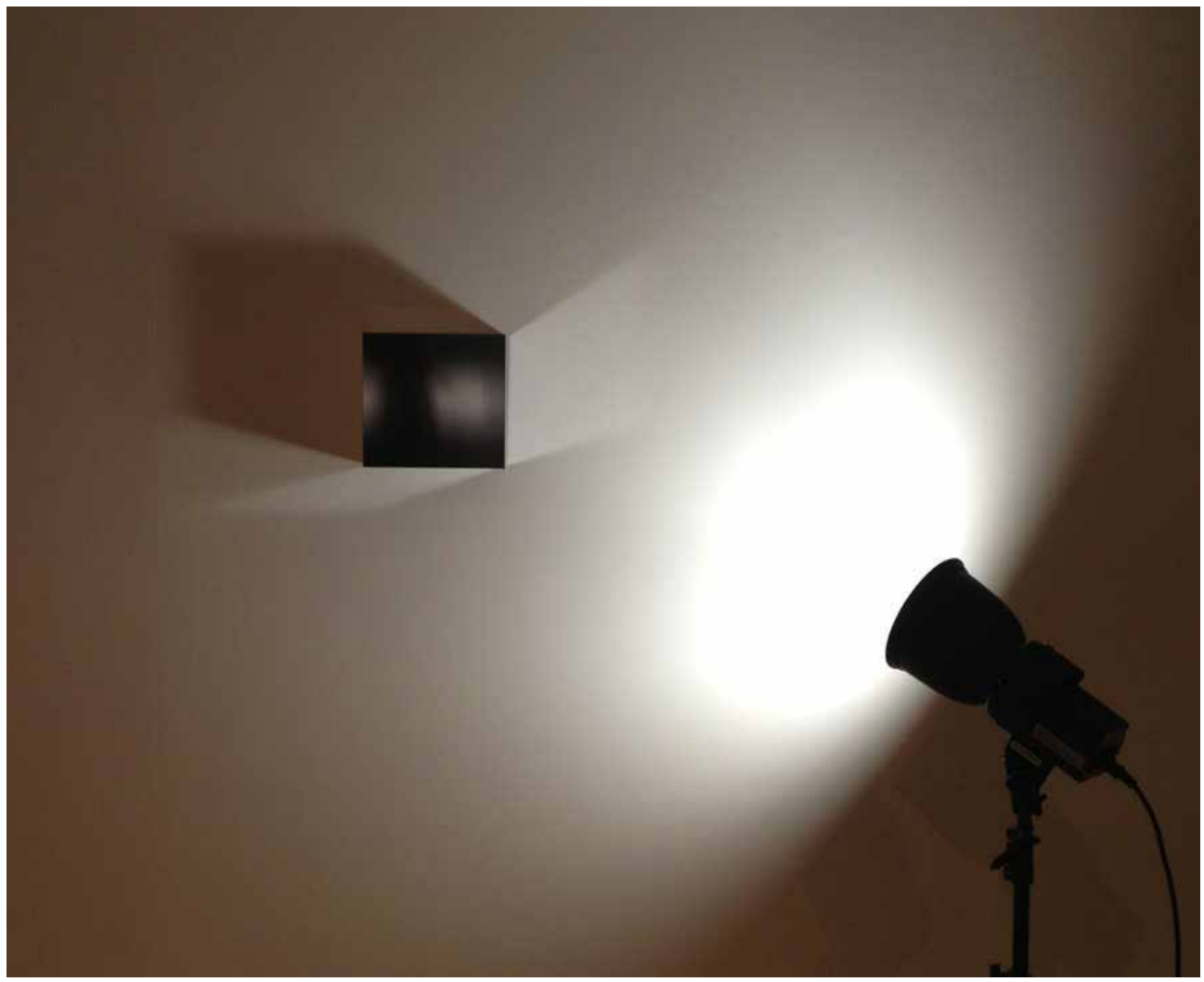

Figure 33
Colleen Boyle
Untitled, 2013
Mirrored acrylic, inkjet photograph, lamp.

work was neither image nor truly sculpture; it was not a photograph and yet it looked vaguely like one. Furthermore, it was emphatically *not* a camera and yet this was where the viewer's imagination could be taken through a process of association.

Chapter Two:
Portion of the Surface Never Seen

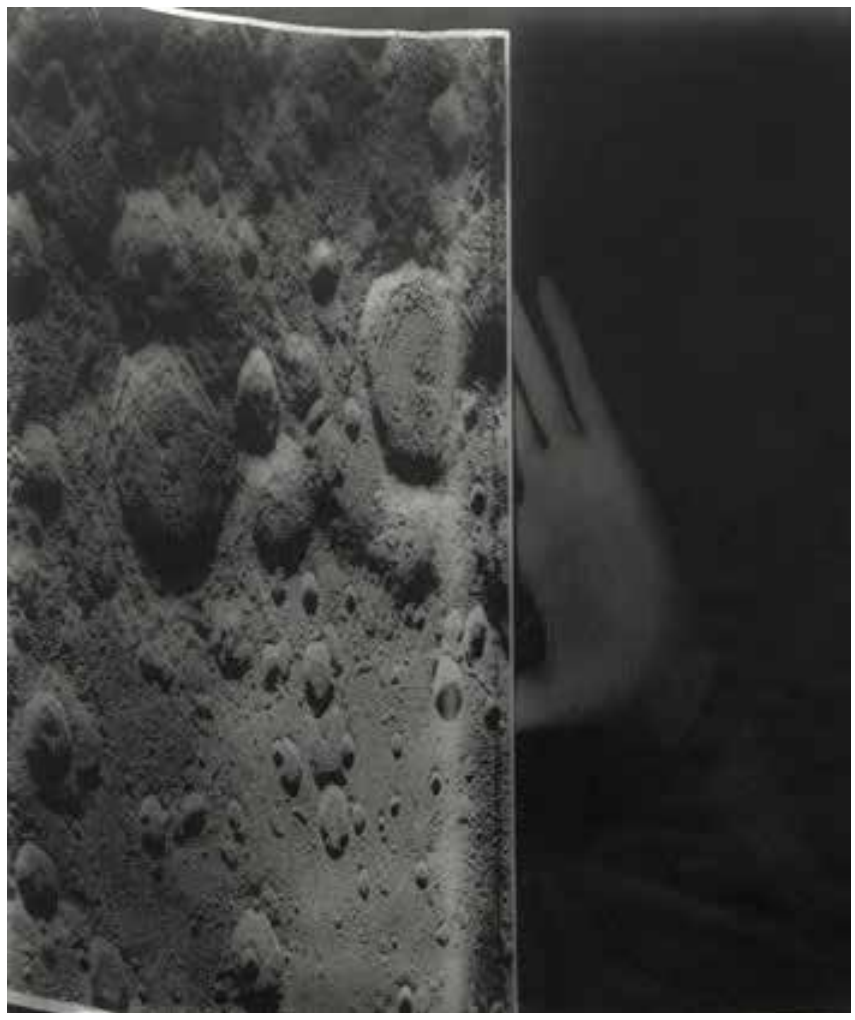

Figure 34.
Collen Boyle
Accidental photocopy
of my hand
with an image of
the Moon.
2012

The key objective of this project is to explore the perceptual construction of unseen realities by creating artworks that utilize the network of relations between image, viewer, knowledge, and imagination. The previous chapter outlined imagination from the perspective of past thinkers whom I believe best fit with the project and who see the imagination as part of an integrated process of perceptual experience.

In this chapter, I explore the premise that although technologically mediated images—in this specific case, photographs—*purport* to provide an objective "truth", the reality they disclose is, fragmented and selective, always leaving something unseen. Nonetheless, these gaps and occlusions provide fertile territory for the construction of a perceptual reality that begins with knowledge, is completed by the imagination, and which remains unseen.

Out on a Limb

I saw the crescent; you saw the whole of the Moon.—The Waterboys

A key subject of my research into perception and the unseen is the Earth's nearest natural satellite, the Moon. Despite its proximity, the Moon keeps secrets from our naked eyes, hiding half its sphere in perpetual darkness due to its synchronous rotation with the Earth. Everyday, phenomenological experience of the Moon is thus "one-sided", but when combined with pictorial experience of the Moon, this natural occlusion, or incomplete vision, can be circumvented by the imagination.[1]

Perceptual relationships to the Moon have changed dramatically over the course of history and can be traced through imagery.[2] Early in this project, I found a lunar topographic map from the 1950s with the curious title, *A Complete Description of the Surface of the Moon*, Containing the 300-inch Wilkins Lunar Map (Figure 35). However, the description, detailed as it was for its time, was anything but complete as it contained no information about the dark side of the Moon. Despite this obvious omission, the notion of "a complete description" piqued my curiosity. What would constitute a complete description or view of the Moon and how does the imagination come into play in achieving this?

Figure 35.
Hugh Percy Wilkins
Map of the Moon, 1951.
Image: http://www.theguardian.com/science/the-h-word/2013/jun/11/history-science-moon

1. Boyle, "You Saw the Whole of the Moon", 247.
2. Boyle, "You Saw the Whole of the Moon," 246-252.

As I later discovered, this map was one of the greatest pre-space-age maps of the lunar surface and was made by Hugh Percy Wilkins (1896–1960), a Welsh engineer and amateur astronomer, in 1951. Wilkins wasn't shy about promoting and praising his own work, regardless of the fact that some of the information he included was fictitious. He was also keen to leave his mark on the Moon by naming particular features, but doing so outside of the official system of lunar nomenclature.[3] Erroneous details aside, NASA went on to use a version of his charts as part of preparation for the Apollo missions, and matched his drawings of features in the "limb" area with photographs made of the Moon's dark side by the Soviet lunar photography mission, Lunar 3 (1959).[4]

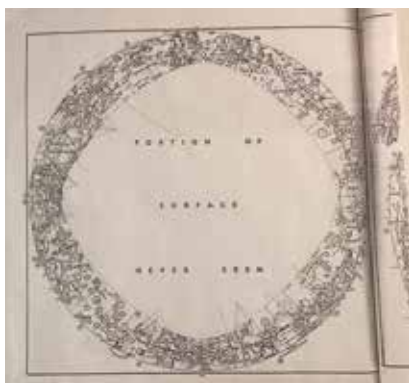

Figure 36.
Photocopy of Hugh Percy Wilkins' *Map of the Moon*, showing the "portion of the surface never seen".

The "limb" area is the very edge of the Moon's surface that is readily visible from Earth. The area of the limb shifts due to a phenomenon known as libration, whereby as the Moon orbits the Earth, the face it presents to us shifts in both latitude and longitude, the result being that over time we see approximately 59 per cent of the lunar surface. The caption to Wilkins' map of this area describes the effect thus:

> *Owing to the effects of libration, more than 50 per cent of the Moon's disk can be seen at one time or another. The formations at the limit of visibility are of course extremely foreshortened, and normal maps give no idea of their real shape. This special chart is, therefore, more truly representative of these features. It is also possible to detect bright rays coming over the limb from the far side of the Moon, and the positions of several 'ray-craters' permanently invisible to us have been inferred with fair accuracy.* [5]

I kept a photocopy of this map of the ever-shifting limb area on my studio wall for months (Figure 36). What intrigued me most about the image was the bold declaration across the central, blank area: "Portion of the Surface Never Seen". Dotted lines projected from limb features into this negative space, hinting at potential shadows, shapes, or light that—according to the map—were not available

3. Despite most of his names for lunar features being ignored, the Wilkins crater is named after him.
4. "Picturing Science: Mapping the Moon," Rebekah Higgitt, The Guardian,accessed 20/2/2015 http://www.theguardian.com/science/the-h-word/2013/jun/11/history-science-moon
5. Hugh Percival Wilkins and Patrick Moore, *The Moon: a Complete Description of the Surface of the Moon, Containing the 300-incb Wilkins Lunar Map*. (University of California: MacMillan, 1961), 48.

to see. But that was 1959 and this was 2010. In between these times, images of the Moon—including its dark side—have been made available in various forms and have become embedded within the cultural consciousness.

Figure 37.
Collen Boyle
Digital photograph of my studio wall.
2010

I began a process of collecting images of the Moon from different points in time and assembling copies of them on my studio wall (Figure 37). This physical process of collation became the externalized mirror image of my internalized knowledge of the Moon, knowledge that has developed over many years of exposure to both the Moon itself and its diverse representations. Images I had not previously encountered now added to my internal view of the Moon, enriching it with yet another layer of information inherently different from, but complementary to, what was already established. In this way, I was taking *a priori* ideas of the Moon as embodied in pictorial representation and connecting them to make a new, complex idea. I have grouped images connected by their resemblance to one another and, as Hume described, the name "Moon" is being applied to a group of individual ideas "that are different in many respects from that idea which is immediately present to the mind".[6] What is present to my mind, via immediate sense impression, is a group of disparate images but in my imagination they relate, as a whole, back to that original "custom" of the Moon which I already hold and which is perpetually built upon. In accordance with Hume, it is connection via resemblance that has allowed me to think of the Moon in a general rather than specific sense.

In my mind, the Moon is featured quite clearly and presented to me in multitudinous images, many of which I became very familiar with during my time as an image researcher working on planetarium productions within a state museum.[7] Part of the museum's holdings include hundreds of 8 x 10-inch black and white photographs received from the NASA Public Relations Office over the course of many decades. In the late 1990s, these photographs languished in a dusty filing cabinet as computer technology and the Internet

6 Hume, quoted in Warnock, 18.

7. I worked on three shows for Museum Victoria's Scienceworks planetarium from 1998 to 2000: *Tycho to the Moon, Journey to Jupiter, and Out of Darkness.*

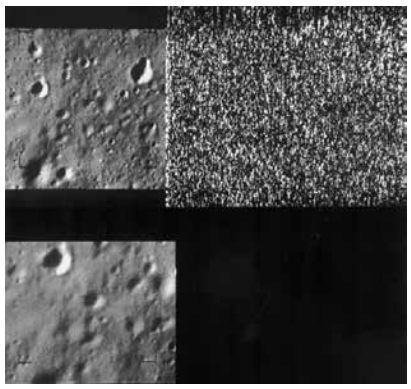

Figure 38.
The last frames taken by a ranger spacecraft
Image: NASA/JPL

Figure 39.
Scientists examining a large mosaic of Lunar Orbiter photographs
Image: NASA/JPL

took over the role of archiving and storage. I was fascinated with the dated materiality of these objects, right down to the stamp on the back that declared their NASA origins, a place that, for me, held more mystery than the Moon.[8] Two of these dusty photographs became permanently lodged in my imagination: the last frame taken by a Ranger spacecraft (Figure 38) and an image of scientists examining a large mosaic of Lunar Orbiter photographs (Figure 39). Both speak to the idea of the photograph as information that feeds the imagination, and both will be examined in relation to photographic theory regarding ontology in the coming sections.

Reality and the Photograph

> *To photograph is to appropriate the thing photographed. It means putting oneself into a certain relation to the world that feels like knowledge—and therefore, like power.—Susan Sontag*[9]

Photographs throw a mirror on the world and then prompt us to question the reality of that world. In her eternally relevant text, *On Photography,* Susan Sontag claims that the "revelatory character of photography generally goes by the polemical name of realism."[10] Even if Sontag had written her book in 2015 instead of 1977 I doubt that the introduction of digitally manipulated photography would have changed her opinion. Manipulated images, particularly the digital images of today, made by artists such as Jeff Wall or Gregory Crewdson, are powerful not only because they seamlessly manipulate pictorial imagery but because they manipulate our fundamental recognition of the photograph's indexical relationship to reality.[11] Sontag describes photographs as "mental objects" and throughout her book she reinforces their connection to the inner world of the

8. Oddly enough, these black and white photographs can still be ordered from NASA. I couldn't locate a suitable digital file of one of these images anywhere in the online NASA archives. After emailing many people I discovered that it could be ordered from the NASA History Office as an 8x10 black and white photograph!
9. Susan Sontag, *On Photography*, (New York: Farrar, Straus and Giroux, 1973), 4.
10. Susan Sontag, *On Photography*, 119.
11. It should be recognized here that photographs have been manipulated long before the arrival of digital technology.

viewer's imagination and perceptual perspective.[12] Photographs are as connected to the perception of reality as gelatine silver is to paper. Therefore, the study of photography and photographic images is important in establishing their role in the perceptual construction of unseen realities.

Seeing Scientifically/Seeing Photographically

Seen within the broader historical context of representation, the relationship between optical technologies and human perception is relatively young. However, it is a relationship that quickly became intensely co-dependent. From the first telescope onwards, the sciences, in particular, have found great use in the fact that lens technology can extend human vision and provide, as Sontag describes, "a unique system of disclosures" that shows reality as it has never been seen before.[13] The transgression of normative vision remains fascinating but it is perhaps photography's capacity to fix reality in time and space that is still held in awe.[14] Even in this digital age, photography maintains the power to assuage our fears of the unknown as it reveals those aspects of reality that had seemed beyond the limits of representation.

Modern photography arrived in the late 1820s to a world predisposed to the doctrine of logical positivism, cementing the association of the photograph with an indexical relationship to reality.[15] This link to reality was revered by the sciences, matching as it did the scientific rhetoric of objectivity, transparency, and veracity. However, as photography affirms and solidifies reality due to its footholds in logical positivism, it simultaneously and emphatically declares what is *not* seen. Or, as Sontag describes, "the photographer's insistence that everything is real also implies that the real is not enough."[16]

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12. Sontag,*On Photography*, 4.
13. Sontag,*On Photography*,119.
14. Colleen Boyle, "Eyes of the Machine: the Perceptual Construction of Unseen Realities via Photo-graphic Images" in *On the Verge of Photography: Imaging Beyond Representation*, Daniel Rubenstein, Jonny Golding & Andy Fisher, eds. (Birmingham: ARTicle Press, 2013), 204.
15. Boyle, "Eyes of the Machine", 204.
16. Sontag, *On Photography*, 80.

With one hand, photography provides ontological affirmation, but with the other it rips open a conceptual gap wrought by an ontological anxiety that has, as Susan Bordo points out, been with us since the time of Descartes' Meditations:[17]

> *…during periods in which long-established images of symbiosis and cosmic unity break down (as they did during the period of the 'scientific revolution'), may we not expect an increase in self-consciousness, and anxiety over the distance between self and world – a constant concern, to paraphrase Mahler, over the 'whereabouts of the world?'… Medieval 'participating consciousness,' for which the categories of inner and outer, self and world, human and natural, were not rigorously opposed, had ceased to provide viable models of knowledge for the more aggressive, progress-oriented science and technology of the seventeenth century. New models of knowledge had yet to replace them. It is in this gap that Cartesian anxiety wells up.*[18]

This new model of knowledge would eventually be based upon notions of objectivity, and within this photography would play an integral role. Ultimately, however, objectivity is a cultural construct, a mode of observing the world that has a complex history deeply embedded in Western forms of representation.[19] And as Daston and Galison point out in their comprehensive work, *Objectivity*, this mode of observation has changed from requiring an observer who stood stoically alone to requiring the subjective judgement of a specialist where scientific judgment was based on familiarity and experience. In this latter context, the mechanical image could no longer provide a basis on which to make knowledge claims. Galison emphasises this point by quoting the scientist Frederic Gibbs as stating: "Accuracy should not be sacrificed to objectivity".[20] Knowledge was now to be found (or, constructed) via the powerful combination of an objectively framed image and a subjective, if well

17. Descartes published his 'Meditationes de Prima Philosophia' in 1641 in Latin, and then in 1647 with the French title 'Méditations Metaphysiques'.
18. Susan Bordo, *Flight to Objectivity: Essays on Cartesianism and Culture* (Albany: State University of New York Press, 1987), 58.
19. See Jonathan Crary, *Techniques of the Observer: on Vision and Modernity in the Nineteenth Century*,(Cambridge MA: MIT Press, 1992).
20. Frederic A. and Erna Gibbs, 1950, quoted in Peter Galison, "Judgment Against Objectivity," in *Picturing Science, Producing Ar*t, Caroline A. Jones & Peter Galison eds. (New York: Routledge, 1998), 335.

trained, eye. Sontag also describes this revelation, that the photograph requires interpretation, as a process of learning to see photographically. In the early days of photography:

> *The photographer was thought to be an acute but non-interfering observer —a scribe, not a poet. But as people quickly discovered that nobody takes the same picture of the same thing, the supposition that cameras furnish an impersonal, objective image yielded to the fact that photographs are evidence not only of what's there but of what an individual sees, not just a record but an evaluation of the world. It became clear that there was not just a simple, unitary activity called seeing (recorded by, aided by cameras) but "photographic seeing," which was both a new way for people to see and a new activity for them to perform.*[21]

Cameras, it would seem, do not see. And photographs are not proof of what may be seen. Philosopher of science and epistemology, Marx Wartofsky (1928–1997), elaborated upon this dilemma in his 1980 essay, *Cameras Can't See*. He muses that although we all agree that cameras cannot literally see there is the metaphorical sense in which we all agree that they do, and this is not particularly problematic, it's based in common sense. The problem arises when we ignore the "hidden or tacit presupposition that the camera 'sees' what we would see, were we present; and that the photograph represents what is there for the eye to see, even when there are no eyes to do the seeing."[22] In this way, it is "assumed that the camera records 'objectively' the way things look," and that it duplicates the work of the eye.[23] But cameras do not operate alone. Even a space probe as it hurtles through the darkness is pre-programmed to take specific images—there is always a consciousness present within the process. (This has ontological implications that will be discussed in the next section.)

Like any technological tool, a camera and its artifact, the photograph, operate within a cycle that includes a human consciousness. John Berger made an apt description of photographs as "witness

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21. Sontag, *On Photography*, 88-89.
22. Marx Wartofsky, "Cameras Can't See: Representation, Photography and Human Vision", *Afterimage,* 7, 9, 1980, 8-9.
23. Wartofsky, "Cameras Can't See", 8.

to human choice", visual messengers that urgently declare: "*I have decided that seeing this is worth recording*".[24] This urgency is:

> *…equally true of very memorable photographs and the most banal snapshots. What distinguishes the one from the other is the degree to which the photograph explains the message, the degree to which the photograph makes the photographer's decision transparent and comprehensible. Thus we come to the little-understood paradox of the photograph. The photograph is an automatic record through the mediation of light of a given event: yet it uses the given event to explain its recording. Photography is the process of rendering observation self-conscious.*[25]

The act of photography enmeshes the photographer, the camera, reality, the photograph, and the viewer in a complex cycle of relationships.[26] This "self-consciousness" that Berger speaks of is present in Kant's schema, Gombrich's "making and matching", and within Wartofsky's idea that "we see by way of the models provided to us by pictorial representation."[27] The way we see is shaped by the images we produce. Seeing for Wartofsky is a cultural artifact: a praxis. One could dismiss Wartofsky's idea as a simplistic loop without any recourse for progress or change, but he redeems his theory via the introduction of imagination, stating that there is another factor at play:

> *…there is more in the image than what the photographer chooses consciously or deliberately to see. This is so not simply in the sense that the camera may record what escaped the photographer's notice, or what lies beyond his or her intention. There is the much more important sense in which the photographic audience (or 'visience,' to introduce a neologism) recreates the image by an act of imagination which is stimulated by the photograph. The viewer then creates a range of visual possibilities which can then become cues or suggestions for subsequent photography, in a sort of feedback loop. Or, even without*

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24. John Berger, "Understanding a Photograph" in *Selected Essays and Articles: The Look of Things,*(London: Penguin, 1972), 179.
25. Berger, "Understanding a Photograph," 179.
26. For a historical account of this see Jonathan Crary, Techniques of the Observer.
27. Wartofsky, "Cameras Can't See", 9.

this, the viewer can then introduce this achieved mode of vision suggested by a viewing of the photograph into his or her perception of the visual world.[28]

My method of everyday photography demonstrates this "feedback loop" (Wartofsky) and how a photograph can render observation "self-conscious" (Berger) but most importantly it provided examples of Wartofsky's assertion—and Berger's subsequent proposition—that part of the unique power of a photograph is that it highlights what we *do not see.* For Berger, this lay in the photograph itself, that it may inadvertently "point" to what is external to itself, to a "quantum of truth which is generally applicable" and which is referred to in various ways such as "an expression, an action, a juxtaposition, a visual ambiguity, a configuration."[29]

Figure 40.
Colleen Boyle
Moon-Pixel-Bubble
(Detail), 2010

In 2010, I pointed my digital camera at soap bubbles that my son was blowing into the dusk sky of our back yard. Attracted as I had been to the glistening surface of the bubbles themselves, the photographs revealed another presence: a just risen and brightly shining Moon. The chosen moment of my photographs had included an unseen presence that upon subsequent viewing revealed itself to be the true subject of the images. The photographs revealed more than I had been consciously aware of and provided a literal reflection of my perceptual choices from which I could then distance myself enough to see the previously unseen.

Figure 041
Colleen Boyle
Moon-Pixel-Bubble,
Digital Inkjet Prints
Installation approximately
1200mm x 1010mm
2010

I went on to creatively build upon these "accidental" observations of the Moon in a photographic triptych. *Moon-Pixel-Bubble* (Figure 41) is the result of subtle digital manipulations and appropriated imagery that eventually segued with the theoretical concerns of this chapter:

In the central image the Moon was digitally removed by "pixelating" the area it occupied and then a new "moon" in the form of a white ring was digitally

28. Wartofsky, "Cameras Can't See", 8.
29. Berger, "Understanding a Photograph," 180.

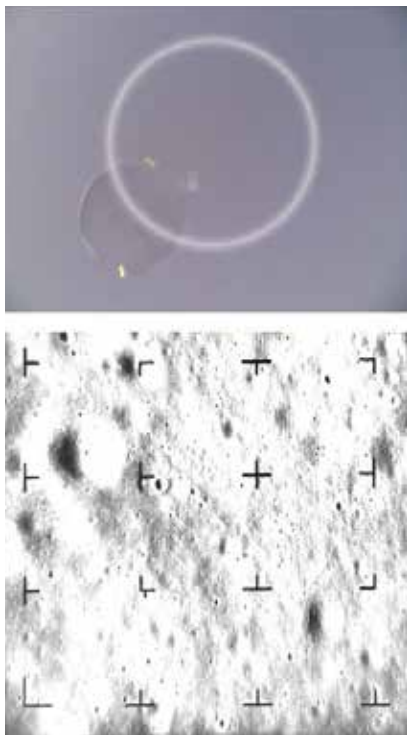

Figure 42.
Colleen Boyle
Moon-Pixel-Bubble
(Detail), 2010

drawn back in. Artificial and constructed, this moon spoke to the blindness of a mechanical vision without the interpretive faculties of the subjective viewer. The first image contained a solitary, tiny, white Moon; and the last depicted a motion-blurred Moon and bubble, and an ambiguous pixelated section that hinted at something hidden or absent from the picture. These additions to the original photographs were explorations into the perceptual construction of the images, and became suggestive of the possible realities inherent in any photograph. For indeed, within the domain of art practice, what we are dealing with is not a paradigm of knowledge interested in proving certainties via a fictive pure perception – which is, as Chris Jenks once stated, the "fundamental canon of empiricism"[30]—but one that proposes the creation of possibilities.[31]

The idea of a fictive "pure perception" may still linger on the edges of empiricism, particularly within the sciences. Images of outer space, which are often made without a human eye behind the lens but by a radically dislocated, blind machine, hurtling through the darkness of an infinite void, are susceptible to this naïve realism. As I will touch upon again in later chapters, and have discussed in past papers, it is to these images of science that my inner eye—my imagination—turns when it encounters the "real" Moon in the sky.[32] Thus, I paired my manipulated bubble/moon images with three stark black and white photographs made by NASA's Ranger series of spacecraft in the 1960s. In juxtaposing my own photographs with these mechanically made images, I had attempted to "capture the multiplicity of the frames of reference with which we come to understand the Moon, whether they be scientific, historic, or personal"[33] but more specifically—and, if Berger is right in his assessment of the ability of photographs to point to the unseen—I had also referred to not the immediate visual content of the image but to the hidden schema we all hold (quite differently) in our minds of what constitutes *the moon*.

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30. Chris Jenks, "The Centrality of the Eye in Western Culture: An Introduction," in *Visual Culture*, Chris Jenks ed. (London: Routledge, 1995), 1-25.
31. Colleen Boyle, "Take(s) One to Know One: Photography and Practice-led Research", *The International Journal of the Image,* Vol. 5, December (2014): 27.
32. See Boyle, "You Saw the Whole of the Moon"..
33. Boyle, "Take(s) One to Know One", 27.

Photography, therefore, is an important part of this research project in various ways. The process of everyday photography has provided a method of analysis that has assisted in revealing my unseen perceptual and creative choices. The resulting body of images has become akin to a sketchbook of ideas, a collection of "proof" of concepts, some of which have become completed works. The images also provided a reference book of the behavior of light: the fundamental element a photograph records and a word often used in metaphorical reference to the workings of consciousness. The broader notion of photography provides this project with an apt analogon of imagination, where two sides of perceptual consciousness meet in a representational space that holds an imperfect mirror to the world.

Seeing the Unseen

> *Nature shows us only the tail of the lion. But there is no doubt in my mind that the lion belongs with it even if he cannot reveal himself to the eye all at once because of his huge dimension.*
>
> *—Einstein in a letter to H. Zangger, 1914*

Photography polemicizes perception and seems to confirm a dualistic view of reality and consciousness, demanding that we engage with it in a twofold manner involving mediation between object and subject. Lambert Wiesing, and much earlier Edmund Husserl, touched on this when he referred to the difference between image carrier (the substrate on which an image is made) and image object (the thing depicted as representation): the former is of the world but the latter remains an object only for the consciousness.[34] The photograph as physical object is framed and contained, present and visible, but the photograph as perceptual subject is delimited by the consciousness that engages with it. Looking at an image is a twofold perceptual process whereby we see the content/subject of the image but also the medium/surface in which it is presented. British philosopher, Richard Wollheim (1923–2003), labelled this process as "see-

34. Lambert Wiesing, *Artificial Presence: Philosophical Studies in Image Theory*, (Stanford: Stanford University Press, 2010), 80-86.

ing-in"[35] and raised the difficult question of *where*, exactly, the act of perceiving an image is located: *where* the image is seen.

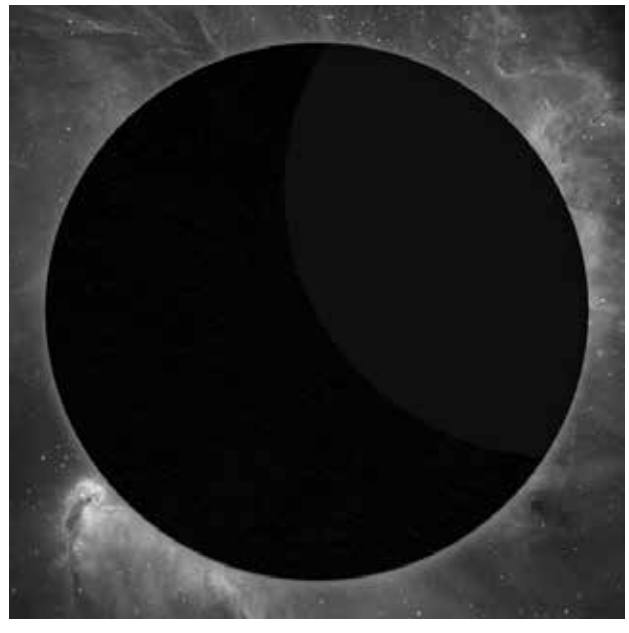
Mikael Pettersson of Stockholm University explores this theory in relation to the seen, the unseen, and how our imagination traverses the two. By examining visual occlusion and quasi-occlusion (for example, one object obscuring another, a cat half behind a tree, or perhaps Einstein's lion, with its tail behind) Pettersson is able to describe how this can lead to a *non-localized* experience of seeing-in, or what he describes as a "non-localized pictorial experience".[36] If I look at a picture of a cat in a garden and I cannot see half of the cat because it is hiding behind a tree, I cannot say that I see the entire cat *in* the picture. The perceptual experience I have of the cat is in a non-locatable and intangible space. In simple terms, when the viewing consciousness is presented with gaps and occlusions the imagination steps in.

Dark Enough to See the Stars

Ralph Waldo Emerson once pondered that, "When it is dark enough, men see the stars," and indeed without darkness there would be no light, and vice versa. Within the darkness, light gets its chance to literally shine before once again becoming invisible in the diffusing light of day. The concepts of light and darkness, visibility and occlusion were early concerns of my research that I initially explored pictorially.

Figure 43 shows two images with the idea of an eclipse at their conceptual and pictorial core. An eclipse is an extraordinary event. A lunar eclipse occurs when the Sun, Earth and Moon are aligned and the full Moon passes into the shadow (umbra) of the Earth and turns an eerie shade of red due to the refraction of light particles in the atmosphere. A solar eclipse is the moment when the new Moon passes between the Sun and the Earth causing the Sun's light to be

35. See Richard Wollheim, *Art and Its Object (* Cambridge: Cambridge University Press, 1980).
36. Mikael, Pettersson, "Seeing What is Not There: Pictorial Experience, Imagination and Non-Localization" *British Journal of Aesthetics*, Vol. 51, No. 3 (2011): 280.



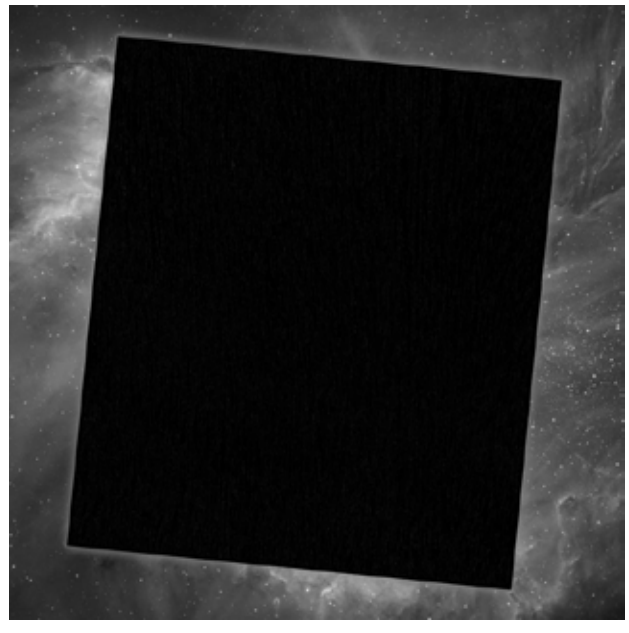


Figure 43
Colleen Boyle
(Left) *Umbra* (Right) *Referent*
Digital inkjet & woodblock prints,
65cm x 65cm, 2010

Figure 44.
Example of a
solar eclipse from 1919
Image: Unknown

either partially or fully occluded (Figure 44).[37] These are the spectacular events that draw eclipse chasers from around the globe, armed with special viewing glasses, filtered camera lenses, and pierced pieces of cardboard through which to safely "view" the event. Tempting as it may be to look at such an unusual sight, the energy of the Sun's corona (ironically only visible without instrumentation at this time) would burn the retina. I experienced the 1976 total solar eclipse as a seven-year-old child and due to constant parental reminders about the dangers of the eclipse, spent much of it with my eyes shut, listening to the birds confusedly bedding down for the "night". Nonetheless this act of not seeing, whether through the tight shut eyes of a child or the secondary vision of shadow cast through cardboard—or a photograph—has the curious effect of opening the mind. In the introduction to *Glorious Eclipses*, theoretical astrophysicist Jean-Pierre Luminet poetically describes the effect of an eclipse:

> *These few minutes in which time seems suspended, create the almost palpable feeling of being, transiently, part of the invisible harmony that rules the universe. It is as if a sudden opening in the opaque veil of space allows our inner vision to reach into the otherwise hidden depths of the cosmos, giving us humans …an all-too-brief instant to see the other side of the picture. To me, the invisible is not restricted to dark objects that our telescopes cannot detect.*

37. The Moon manages to fully occlude the Sun due to a serendipitous ratio between their diameters and distances apart.

It is also, and in particular, the secret architecture of the universe, the insubstantial framework of our theoretical constructs.[38]

Darkness and obscurity, it seems, can have a remarkable affect on one's inner vision: the imagination. My print, *Umbra*, is a curious work in that it is neither lunar nor solar eclipse but a combination of the two that is then located in a place that an eclipse, as we know it on Earth, would never occur: the space of a nebula. It is entirely imaginary; even the vague presence of a coronal glow is more optical illusion than real, a product of the contrast between the light and dark aspects of the image. The half-moon effect of the shadow across the disk is difficult to perceive and asks the viewer to look closely. Its twin image, *Referent*, speaks more to a conceptual blindness; recognition that the inhabited world is so suffused with images that the idea of an adhering referent becomes nonsensical and all images are rendered mute. An eclipse thus comes to represent reality itself—intellectually I cannot know it, visually I cannot know it. I can only know it through the conduit of my imagination.

The Absent Referent: a Resolution

[t]he camera's rendering of reality must always hide more than it discloses.
—Susan Sontag[39]

For Czech philosopher Vilém Flusser (1920–1991), "technical images" such as photographs are "computed possibilities (models, projections onto the environment)" that break all contractual obligation to indexicality.[40] They are as Gilpin's sketch or *non-finito*: a threshold of unfinished information upon which the imagination builds. Contemporary experience of photographic images is such that there is a myriad of images upon which to draw in order to fill the gaps in our direct experience of the external world. Reality itself

38. Jean-Pierre Luminet, in the introduction to Serge Brunier and Jean-Pierre Luminet, *Glorious Eclipses: Their Past, Present and Future*, Storm Dunlop trans. (Cambridge: Cambridge University Press, 2000), 7.
39. Sontag, On Photography, 23.
40. Vilèm Flusser, *Writings*, Andreas Ströhl (ed.),Erik Eisel trans. (Minneapolis: University of Minnesota Press, 2002),129.

has become fragmented by pictorial duplication, dispersed amongst what Siegfried Kracauer once described as a "blizzard", a blizzard that has now become an all encompassing "torrent".[42] In order to see anything nearing a degree of totality or wholeness, we must adapt, casting aside our craving for the assurance of a concrete reality reinforced through the relentlessly monocular view of the traditional perspectival, isolated image. Artist Penelope Umbrico recently went so far as to state that the "image torrent is actually alive, emergent and perhaps more indexical than photography has ever been in the past", and that all images "function as a collective visual index of data that represents us—a constantly changing and spontaneous auto-portrait. The index has shifted from visually descriptive truth to accumulative visual data".[43] We now construct our concept of reality upon this accumulated visual data, each fragment of information scaled and aligned by the editing software of the imagination.

In the early 1960s, NASA sent a series of six *Ranger* imaging spacecraft to photographically map the lunar surface. In Figure 08 (see page 13), the Moon's surface is seen at the closest proximity and therefore the greatest detail the *Ranger VIII* imaging system could produce before it crashed into the lunar surface and ceased transmission. A thin strip of noise and static provides evidence of the spacecraft's demise, and it is here within this incoherency that I imagine not only the Moon, but also the death throes of a blind machine in the service of scientific vision. The (non)information or, as Pettersson would say, "occlusion", provides fertile ground for the imagination, affirming that "although the photograph may be considered indexical, it is not isomorphic. The photographic image, like the sketch, is not a window on an external reality but an aid to our capacity to realize another: one contained within our minds."[41]
A photograph acts as a secondhand perception, in this case one made by a blind machine of an event not witnessed. Hume would have thought it "vulgar" and "unreasonable" to "attribute a distinct continued existence" to the Moon that is *not* represented in this image, but this is precisely what occurs. The absent Moon and

41. Boyle, "You Saw the Whole of the Moon", 250.

the photograph that *would have been* are both present within the imagination and as real as the paper upon which the image is printed.

Figure 45.
Colleen Boyle
Resolution
Digital inkjet and woodblock
65cm x 65cm, 2010

I tracked down each of the last frames shot by the Ranger spacecraft because I was curious to see how and if they varied. Each contains varying degrees of static, lunar surface, or empty black. The Ranger image used in my print *Resolution* (Figure 45) shows full frames of each including a perfectly black frame where all systems on the spacecraft had ceased. Nothing comes through, not even "empty" telemetry. And yet, something seems to be emphatically there. Bruno Latour (1947–) wrote a "meditation on mediations", *How to be Iconophilic in Art, Science, and Religion?*, exploring the absence to which the index finger of the scientist and the deictic hands of an angel may both point.[42] In each case, Latour states that the act of pointing is misleading, as what they point to is buried within intermediary steps of mediation. Science and religion "point" to an absence, but do so in very different ways. He describes a photograph of a botanist pointing at a photograph with her index finger:

> *Although the reality of the place she wants to reach is absent, she points at 'it' as firmly as if she wanted to refer to the table on which the documents are spread. 'Here it is,' she says, and her colleagues nod approvingly: 'I* see.*' Since there are so many intermediary steps to reach the destination, the student of visual culture could doubt that this scientist refers to anything, and yet she has collapsed those steps into one, to the point where a deictic gesture can be used unproblematically to refer to the site. So do these scientists see something? No, since what is designated is absent; yes, since they can relate to their field site through a long series of intermediary steps.*[43]

These intermediary steps are not to be seen within the content of the image in an iconoclastic way where the image is "freeze-framed" in order that the iconoclast fulfills their dream of "an unmediated access to truth, of a complete absence of images".[44] Instead Latour

42. Bruno Latour, "How to be Iconophilic in Art, Science, and Religion?" in Jones and Galison (eds.), *Picturing Science: Producing Art*, (London: Routledge, 1998), 418 - 440.
43. Latour, in Jones and Galison, 419.
44. Latour, in Jones and Galison, 421.

Figure 46
Colleen Boyle
Digital Photograph
2010

insists that we "follow the path of iconophilia" and "pay even more respect to the series of transformations for which each image is only a provisional frame. The image is indeed a carrier of information and to travel over a distance that information must be encoded or *trans-formed*. If not, "the only way to know something is 'to be there' and to point at features silently with the index."[45] But in doing this the reference is altered. It can no longer be what it was when it was "locally and materially present"; the information is radically "trans-formed from one medium to the next" therefore paying a heavy price for its transport."[46] The referent disappeared a long time ago and just as Kant states the thing in itself will never be known, Latour states that "the maintaining of a constant through transformation has nothing to do with the carrying over of the things themselves, as in the naïve scenography of realism, since the things have to be abandoned" in order that they be known at a distance.[47]

The referent is not stationary: it circulates[48]. An image must therefore belong to more than one frame and the space within that frame is constantly in flux—a shifting nodal point of mediation from which reality is radically absent. For me, this radical absence is embodied in photographic images of outer space and the final Ranger images are no exception. In them I see a dematerialization that is more pronounced the closer the spacecraft got to the Moon. The closer it came to "touching" the object of its pre-constructed gaze, the more in danger it was of destroying itself, the moment of contact and of perfect vision resulting in a final state of blindness. "Telescoped" and "embedded", as Latour would say, within this image is a history of a disappearing referent that has been escaping the grasp of representation ever since the first shadow was traced upon a wall. Within *Resolution* I have layered the Ranger image over a pixelated and distorted version of the *Ideal City* (Figure 47). The artist is not known and for this purpose, not important, but the notion of an ideal, constructed version of reality made visible via the

45. Latour, in Jones and Galison,424.
46. Latour, in Jones and Galison, 425.
47. Ibid
48. Bruno Latour, "Circulating Reference" in *Pandora's Hope: Essays on the Reality of Science Studies*,(Harvard: Harvard University Press, 1999), 24-79.

Figure 47
Ideal City, Artist Unknown
Image: Public Domain

order of linear perspective, is. For *this* is the unseen reality from which the authority of the scientific image stems. And it is nothing but surface and illusion.

Surfacing Ontologies

> *The ultimate wisdom of the photographic image is to say: 'There is the surface. Now think—or rather feel, intuit—what is beyond it, what the reality must be like if it looks this way.' Photographs, which cannot themselves explain anything, are inexhaustible invitations to deduction, speculation, and fantasy.—Susan Sontag*[49]

Vilém Flusser thought that the photograph blinds us to what we wish to see, putting itself in front of the object. He refers to a "programming imagination" (Einbildungskraft) that hungers for code, and he recognizes that although "the last vestiges of materiality are attached to photographs, their value does not lie in the thing but in the information on their surface".[50] The examples I have examined thus far would seem to corroborate such a proposal and espouse the concept of a photograph as simultaneously occluding an *a priori*, external reality and yet providing a threshold to an infinity of possible realities of the mind. Photographs ask that we accept their encoded surface in place of the real, diverting our line of sight and blocking access to the external reality we so desire. They simultaneously occlude what they present, literally arresting our gaze as we attempt to "see in" to the reality of the image. This occlusion forces us to internalize the image and thus render the world

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49. Sontag,*On Photography*, 23.
50. Vilem Flusser, *Towards a Philosophy of Photography, (*London: Reaktion Books, 2000), 51.

imaginable. Each image we encounter adds to an internal mosaic of our subjective reality in a manner as imperfect and as incomplete as Figure 39 (see page 49). In this image of the Moon made by Lunar Orbiter IV in 1967, two scientists tread tentatively across the slippery surface of photographs, pointing at geological features, but all the image yields is the superficial information encoded in its surface. Instead of pointing their index fingers at "the" Moon, these men are referencing frames within frames within frames of information, code that will form the building blocks of an infinitely re-presented and true Moon that is more than the sum of its mosaicked parts. Through the surface of these photographs the viewer can stand in the soft dust of the lunar surface and look out into the blackness of space.

Photography is now as difficult to define as it is to contain; its practices are fluid and its physicality near to invisible. As the blizzard of the 1920s became the image torrent of today, a subtle shift occurred in how we use photography to relate to the external world. We may never stand in the soft dust of the Moon or see Earth's blue disk from space with our own eyes but we can construct our own perception of this, via a multitude of images presented to us in both print and electronic form. I wonder what aspects of reality are not brought to me via photographs; what truths remain untold, what parts remain unseen in the gaps between the images. The photograph can no longer hold us with naïve realism; no longer tempt us with the seductive powers of positivism.

The photograph may bring us the world in pieces, but it is via the photograph that we are able to "imagine" ourselves into a broader field of reality. The photograph can only ever be a surface of code or a model, a sketch, a *non-finito*, or a fragment. We add to this seductively incomplete rendering of reality with our own experience, drawing on existing schemata, other images, and visual impressions to construct an unseen reality within our minds. In some cases the foundations upon which we build these internal impressions may be shaky, our visual schemata may be lacking, and this is a problem inherent in any concept of reality based solely upon the photograph. To use the parlance of space image processing: there will always be

"data gaps" or "hot" or "dropped" pixels. However, it is in these inconsistencies, absences, and occlusions that we find the potential to see through the eyes of the machine in a truly imaginative and human way.

Chapter Three:
The Thing in Itself

Figure 50
James Turrell
Afrum (White)
Cross Corner Projection 1966
Image: Florian Holzherr

I don't know what's right and what's real anymore,
And I don't know how I'm meant to feel anymore,
And when do you think it will all become clear?
'Cause I'm being taken over by the fear.
—Lily Allen

Barbara Maria Stafford uses the relationship between visual instrumentation and the mind, or as she describes it, the "cognitive significance of immersive technologies", to link Enlightenment parlor tricks to Minimalist art. Using the example of James Turrell and his light-sculptures of the late 1960s (see Figure 50), Stafford makes an analogous connection between the way both Turrell's work and early Modern devices seemed to project spirits/forms into the air around them.[1]

1. Barbara Maria Stafford, *Echo Objects: the Cognitive Work of Images*, (Chicago: University of Chicago Press,2007),128.

Extrapolated as this link may seem at first, there is something in it, but I think Stafford missed an opportunity to elaborate upon the continuing notion of an *ideal*. As Stafford explained, phantoms projected by convex mirrors into a darkened parlor were not mere trivial games but a "sophisticated world of 'idealist' imaging devices" that played upon the Enlightenment viewer's desire to be reunited with loved ones killed in conflict.[2] In this sense, devices such as the fantoscope[3] functioned as an "ontological instrument" and as a cognitive device it:

> *…performed the work of memory, making the absent present. But what was recalled was not the same someone or some thing that had once been known in the life-world. Rather, and akin to cyberspace, entities were accessed somewhere 'out there,' in a realm beyond our normal dimensions…*[4]

Just as a spirit resides in a realm—a portion of reality—that is removed from our everyday perceptual experience so too does an asteroid, the surface of a comet, a giant gas planet, an ovum, a sperm, phytoplankton, an atom or a quark. They shall remain untouched, never laid upon by the eye in a true sense, forever locked within an ontological *ideal*. And, just as Kepler claimed that the essence of a form shall remain untouched, remain *ideal,* so too does the work of Turrell's mode of Minimalism. Turrell may present a floating geometric form to all our senses (if the viewer were present with the work) but he also alludes to an absent form; one that is as ephemeral as light itself and as unreachable as the vanishing point within a painting, to remain hidden behind the veil of representation and approached only via the window of the image.

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2. Stafford, Echo Objects: the Cognitive Work of Images, 128.
3. "Fantoscope" was the name Etienne-Gaspard Robert (1763–1837).gave to his patented projec - tion device with an adjustable carriage (for scaling the image), adjustable lenses, and multiple glass sliders to allow more than one image to be projected at a time.
4. Stafford, *Echo Objects: the Cognitive Work of Images,* 129.

Ideal Real

The idea that "we" are located in our minds and that everything else is physical matter of the external world is popularly known as Cartesianism. This division cast all that was received by the senses into doubt, the only certainty being that of a metaphysical mind. Subsequent interpretations of Descartes' dictum, "I think, therefore I am", have cast a heavy shadow over the notion of a reality that exists independently of the senses, that remains *unseen.* Whether or not this unseen reality, external to sense data, exists is a debate that has raged within philosophical discourse for centuries. Even Albert Einstein sat on the ontological "fence", so to speak, when he said: "The belief in an external world independent of the perceiving subject is the basis of all natural science. Since, however, sense perception only gives information of this external world or of 'physical reality' indirectly, we can only grasp the latter by speculative means."[5]

Immanuel Kant made it quite clear that he thought Descartes indulged in "manifest idealism".[6] He agreed that our senses "never and in no single instance enable us to know things in themselves, but only their appearances,"[7] but he could not agree that these things did not exist at all:

> *I say on the contrary: things are given to us as objects of our sense situated outside us, but of what they may be in themselves we know nothing; we only know their appearances, i.e. the representations that they effect in us when they affect our senses. Consequently I do indeed admit that there are bodies outside us, i.e. things which, although wholly unknown to us as to what they may be in themselves, we know through the representations which their influence on our sensibility provides for us, and to which we give the name of*

5. Albert Einstein, quoted in Antony Flew, *An Introduction to Western Philosophy* (London: Thames and Hudson, revised edition 1989), 334.
6. Kant in Flew, 348.
7. Ibid.

bodies. This word therefore merely means the appearance of that for us unknown but none the less real object. Can this be called idealism? It is the very opposite of it.[8]

However, as Antony Flew points out, Kant's theory is still placing a wall of sense data around the viewing consciousness who must remain trapped inside her Cartesian "black box" awaiting signals from beyond. By "removing all knowable public reference points" we are robbed of the "possibility of communicating with one another in a common, public language; and knowing that we are doing so";[9] and become part of a world that is riddled with a kind of hyper-subjectivity and the Cartesian longing for an "inexpugnable guarantee of knowledge" remains.[10] Paradoxical or inconsistent theories aside, I would like to make use of Kant's idea of the *noumenon* as a way of extrapolating the allure and importance of Minimalism to this project.

Figure 51.
Colleen Boyle
Digital photograph
2013

Ontological Observables and Specific Objects

For Kant, space and time were fundamentally and empirically real. Within space and time we perceive objects and these are then objects of our experience. Since these exist, "there must be things in themselves; and that since we apprehend objects of experience we cannot possibly apprehend things in themselves."[11] Kant was an "empirical realist", a position that philosopher S. Körner (1913–2000) explains as being "based on an examination of empirical situation involving introspective self-consciousness"[12], Kant stating: "I am conscious of my existence as being determined in time".[13] Existing in time, Kant says, means being aware of permanence and change and having "immediate consciousness of the existence of other things outside me."[14] But Kant also thought this empirical concept of reality could

8. Kant in Flew, 348-9.
9. Antony Flew, 349.
10. Flew, 370.
11. S. Körner, 92.
12. Körner, 93.
13. Kant in Körner, 94.
14. Ibid.

be transcended and thus he introduced the Greek term *noumenon* (plural *noumena*) as a way of distinguishing an ideal reality from an experienced or phenomenal reality.[15] *Noumena* are constructed in a negative sense: noumena are *not* phenomena; they are *not* objects of experience. Kant then construed a "positive" version via the following logic:

> *If we understand [by a* noumenon*] an object of* a perception which is not sense-perception, *then we assume a special kind of perception, namely intellectual perception, which is not our kind . . . and this would be the* noumenon *in the positive sense of the term.* [16]

Figure 52.
Colleen Boyle
Digital photograph
2013

This concept of *noumena* could be superficially compared to Plato's concept of the *ideal* or could be interpreted as things-in-themselves existing in a distinct reality from its correlating phenomena, but what is most important is to understand that Kant proposes that we can *think* of things as existing apart from our phenomenal experience of them. We don't have to experience that: we can know it intellectually. We can transcend our experience. The notion of transcendence is basic to Kant's philosophy *in toto*, indicating that just like Descartes—and quite possibly all philosophers dealing with perceptual ontologies—he could not accept the possibility that we *are* locked inside a "black box" of sensory input and that it is impossible to see beyond it. Reality, if it exists beyond sense experience, shall remain elusive. Kant, like Descartes before him, felt the fear of the unknown, the untouchable, and the unseen.

If it is the role of the philosopher to make logical sense of the world then it is the role of the artist to visualize its idiosyncrasies, and Minimalist artists were no exception. In a society full to the brim of consumerist junk and visual pollution, artists such as Frank Stella, Donald Judd, and Robert Morris attempted to transcend representational illusion and produce artworks that spoke to their own objecthood. In describing Judd's installed boxes at Marfa, Texas, art critic Robert Hughes states:

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15. It must be acknowledged that Kant was building on the work of others, namely George Berkeley and that *noumena* was a term used in the same vein by others.
16. Kant in Körner, 95.

> *This temple of esthetic fanaticism epitomizes Judd. His work was hard to like because the reduction he sought was of a kind that most people don't want in sculpture. No figure, no parts. No relationships, except the accidental ones produced, at Marfa, by mutual reflection of light. No movements, no metaphors, no secrets: just the thing in itself, and a completely inexpressive thing at that… It is in the world but it tells nothing about the world.*[17]

Figure 53
Donald Judd
Collection of the Art Institute of Chicago.
Image: Colleen Boyle
2013

Minimalism asks that we transcend aesthetic judgement, and observe the object as "the thing in itself", to look upon a work of art and view it as Judd suggested in his 1965 essay "Specific Objects", as neither painting nor sculpture. It just *is* what it *is*.

Experiencing a Minimalist artwork is no longer an analogue of visual experience in that one is not asked to "see in" to the picture plane at all, but to take in the object all at once. In abandoning the illusion of reality, Minimalist artworks simply became objects within reality. Works by Stella and Judd that used glossy or factory-finished surfaces became "literalised: hard and flat; only a skin; without *interiority*."[18] One could say that such surfaces, particularly Judd's aluminium or acrylic, deflect the imagination and force the viewer to attend to the space which they inhabit with the object (Figure 53). The lack of articulated parts within the work also denies the potential for movement; no part is given more emphasis than another and thus there is no mental recourse to association or connection.

For Morris, however, the gestalt form of unitary objects "makes them a function of space, light, and the viewer's field of vision",[19] and they become something that, as in the case of his *L-Beams* of 1965 (Figure 54), relies on the conditions of perception. In an essay titled "Kant's 'Free-Play' in the Light of Minimal Art", art critic Thierry de Duve applies Kantian concepts of perception, imagination and aesthetic judgment to Morris' *L-Beams*. Like De Duve, I agree that in Kantian terms, "imagination is precisely the faculty of presentation… (which) unifies the manifold of empirical experience into a gestalt,

17. Robert Hughes, *American Visions*: *The Epic History of Art in America* (London: the Harvill Press), 564.
18. David Batchelor, "Of Painting and Sculpture", in *Minimalism* (London: Tate Gallery, 1997),17.
19. Batchelor, "Of Painting and Sculpture", 23.

which presents it to the understanding"[20] and this is precisely what the viewer does with *L-Beams*. Each piece asks to be played with in the mind of the beholder, to be turned upside down and round and round like some kind of room-sized puzzle and to do this, imagination in the guise of mental imaging is employed. These mental images are then turned over to the understanding and the viewer quickly comes to know that, although they may seem different at first glance, these three shapes are in fact identical. This then leads to the moment of "free-play" between the imagination and the understanding where one wrestles with the other in an attempt to "rescue" one from the other rather than remaining with the feeling that we have been manipulated by the artist. De Duve suggests that this is a moment of free-play "inasmuch as the feeling yielded by the perceived images cannot be accounted for by the concept of identical volumes, but it is also felt as forced or contrived",[21] leaving the viewer with a feeling of discontent. However, if the viewer moves on to reflect on this feeling and interpret why this has occurred, they may discover that although their perception and cognition of the piece do not coincide, this is in fact what the work is about.[22]

Figure 54
Robert Morris
L-Beams
1965
Image: http://www.wikiart.org/en/robert-morris/untitled-l-beams-1965

I can understand that my knowledge of a thing and my perceptual experience of a thing do not coincide and therefore Kant's *noumena* are entirely possible objects. They *can* exist beyond my experience of them. I can remain in my "black box" of sensory perception but through the potent combination of my imagination and my understanding I can transcend that phenomenal space and conceive of an external reality that I shall *never see*. For me, the work of Minimal artists plays with our cognition of this untouchable, unseeable, and

20. Thierry De Duve, "Kant's 'Free-Play' in the Light of Minimal Art", in *Aesthetics in Art History and Art Theory*, eds. Francis Halsall, Julia Jansen & Tony O'Connor (Standford: Stanford University Press, 2009),90.
21. De Duve, 92.
22. De Duve, 94.

yet somehow *knowable* reality. For me, their logic is as aesthetically pleasing as any color or form. These artists give the world "the thing in itself" by showing the viewer its logical model. Through sense perception, Minimalism exhibits an intellectual perception, and Kant's *noumenon* becomes a positive entity.

As Flew points out, having a perceptual experience all in one's mind "does not preclude but is instead a precondition" to perceive anything at all. Even scientific investigation becomes paradoxical. It relies on direct observation and yet its investigations "appear to show that there can be no such thing."[23] And thus competing concepts of how perception works or what perception may be can exist simultaneously and are at the same time self-refuting. We shall never perceive how we perceive: it shall remain *unseen* and like the ouroboros we shall eat our own tail.

The Object-Photograph

American artist Sara Vanderbeek (1976–) is well accustomed to dealing with the paradoxes of perception and its relationship to reality. Vanderbeek came into prominence for her still-life assemblages that she photographed, printed and then exhibited as photographic prints. These often included photographs as part of the sculptural arrangement, making it unclear where the sculpture began and the image ended. Vanderbeek acknowledges the influence of her experimental film-maker father and sculptor brother and also pays evident homage to artists of the past such as László Moholy-Nagy (1895–1946) and the Constructivist, sculptural tendencies in his work.[24] Moholy-Nagy is well known for his experiments with photograms (Figure 55) where objects are exposed directly upon photographic paper, eradicating the camera from the photographic process and collapsing the mediated space between reality and image. Vanderbeek picks up not only on this more direct and immediate connection with the world of objects

Figure 55
Lazlo Maholy-Nagy
Photogram, 1926
Ford Motor Company
Collection,
Image: http://www.
metmuseum.org/toah/works-
of-art/1987.1100.158

23. Flew, 367.
24. Sara Vanderbeek, Artists Profile, Saatchi Gallery, http://www.saatchigallery.com/artists/sara_van-derbeek.htm, accessed 22/2/2015.

but also Moholy-Nagy's eye for the structural play between light and shadow which he implemented in his photography and also his work designing stage sets. But perhaps one of the most concrete connections between Moholy-Nagy and Vanderbeek is their sculptural work: Moholy-Nagy with his *Light-Space Modulator* of 1930 (Figure 56) and Vanderbeek with her structures for and of photographs.

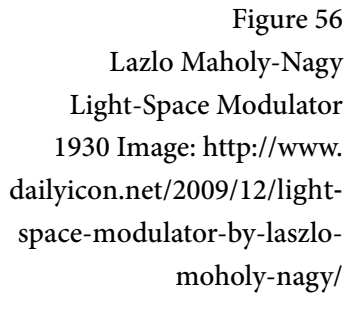

Figure 56
Lazlo Maholy-Nagy
Light-Space Modulator
1930 Image: http://www.dailyicon.net/2009/12/light-space-modulator-by-laszlo-moholy-nagy/

In her 2006 piece, *A Different Kind of Idol* (Figure 57),Vanderbeek combines light, shadow, sculpture, image, staging, and history into an image that speaks of the ephemeral quality of light, time, and reality. In this and all her early works, her photographs invite the viewer to consider the temporary nature of reality and how it may only be held momentarily within a frame. Some of her structures, mostly destroyed after being photographed, appear particularly flimsy, again implying that the reality contained within a photograph and any relation it has to an external reality is as tenuous as the strings from which the images and objects dangle in *Calder and Julia* (Figures 58).

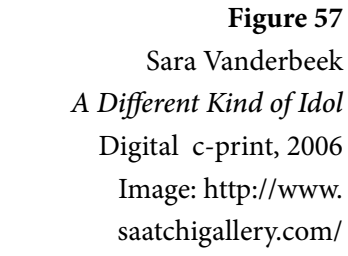

Figure 57
Sara Vanderbeek
A Different Kind of Idol
Digital c-print, 2006
Image: http://www.saatchigallery.com/

Vanderbeek's interest in sculpture and photography has continued into more recent work but its critical reception has been somewhat disappointing, a critic for the New York Times claiming her room of large abstract photographs framed in tinted glass to be "almost funny if it didn't take it itself so seriously. It's as if the grandchildren of Mark Rothko and Barnett Newman, their heads stuffed with postgrad-seminar theories, were collaborating."[25] Scathingly witty comments aside, Vanderbeek is, I believe, attempting to expand her knowledge of the relationship between image and form within the context of Minimalism. The abstract photographs behind semi-transparent mirrored glass are difficult to see "in" to, reflecting the white

Figure 58: Sara Vanderbeek
Calder and Julia
Digital c-print,
Image: http://www.saatchigallery.com

25. Ken Johnson, http://www.nytimes.com/2013/05/10/arts/design/sara-vanderbeek.html?_r=0 accessed 22/2/2015.

columns in the centre of the room and showing the viewer an image of themselves within the space of the room. It is a subtle and unashamedly beautiful installation that speaks to the nature of a photograph as a threshold between the real and the imagined—a threshold that according to Roland Barthes, we see straight through to the object beyond; yet to others it is nothing but surface and occlusion. Therefore Vanderbeek's chosen material of semi-transparent glass seems appropriate. Vanderbeek has been brave enough to explore the "thing-in-itself-ness" of the photograph and she has found it to be enmeshed with the reality of objects (Figure 59).

Figure 59.
Sara Vanderbeek
Installation, Metro Pictures, New York , 2013
Image: http://www.aperture.org/blog/interview-with-sara-vanderbeek/

A Perceptual Practice

Danish-Icelandic artist Olafur Eliasson (1967–) builds and expands on many of the concerns of Minimalism. Although Eliasson's work is undeniably aesthetically pleasing, his key aim is not that the viewer merely look at the work but that they become an inextricable part of it, an aim that is evident within many of the titles of his work which include the possessive "your", as in *Your Spiral View* (Figure 60), or, *Your Now is My Surroundings*, etc. Although this nomenclature sounds as if it were the product of a corporate marketing department, it rings true with both the artist's intent and the impact of the work, which is to facilitate an interaction between the artwork, the viewer, and the space they both inhabit. As with the Minimalist artists such as Judd, Stella, and Morris, Eliasson understands that an artwork is not an isolated object to be admired by a detached onlooker but that the perceptual process is one of internal engagement and interaction occurring within a viewer within space and time. Minimalism aimed to let:

Figure 60
Olafur Eliasson
Your Spiral View
2002
Image: http://olafureliasson.net/archive/artwork/WEK101093/your-spiral-view

> *…the perceptions and the emotions of the viewer become more apparent… Eliasson builds on and extends this tradition. Where he stands out from the rest is in his interpretation of what it means to perceive. Perception, he*

believes, is not a dispassionate, neutral act, but the product of cultural and historical conditions. As distinct from the sculptors of the 1960s, he does not regard space as a naturally occurring substance but as a completely cultural product, which changes as time passes and as it is used in different ways.[26]

Eliasson's use of space differs markedly from the Minimalists in that he has taken the idea of an object in space to its architectural extreme, often constructing complex geometric forms that enclose the viewer or which the viewer moves through. Many of his well-known works are architectural interventions such as the installation in the Tate Modern Turbine Hall, *The Weather Project*, of 2003 (Figure 61). Eliasson also works collaboratively within a large studio of specialists, without whom such large architectural projects would be impossible, and like artists such as Judd he relies on the skills of others to fabricate the work in an industrial environment. But, regardless of the scale or complexity of the work externally, the *real* space of Eliasson's art is within the mind of the beholder.

Figure 61
Olafur Eliasson
The Weather Project, 2003
Image: http://www.tate.org.uk/whats-on/exhibition/unilever-series-olafur-eliasson-weather-project/olafur-eliasson-weather-project

Eliasson's "thing-in-itself" is perception. In fact, it's *your* perception. Just as Kant realized that he could never experience a reality outside sense experience, Eliasson understands that how I perceive the world is mine alone and how someone else perceives his or hers is his or hers alone. In this case, the world of the *noumenon* is in our minds, it is how we individually and subjectively perceive the world.

26 Philip Ursprung, "From Observer to Participant: in Olafur Eliasson's Studio", in *Studio Olafur Eliasson: an Encyclopedia* (Köln: Taschen, 2012),12.

My *noumena* are your perceptions and your *noumena* are my perceptions. I can intellectually know that someone else sees and perceives the world, perhaps as I do, but I will *never* be able to experience that. Individual perception will remain the unseen "thing-in-itself".

To perceive how others perceive may be an impossible task, but artists such as Eliasson, Vanderbeek, Judd, and Morris can make us aware of the complexities of our own perception by allowing us to experience it in rich and unexpected ways.

Chapter Four:

Fractured and Framed

Figure 62
Piero della Francesca, 'Madonna and Child with Two Angels' (detail)
1464
Image: Public Domain.

Therefore have I brought it to the window of thy senses, and doors of thy imagination.—The Angel Uriel speaking to John Dee[1]

When I was 20 years old, I had a vivid dream where an angel with flaming hair, blue robe, and a shining sword came crashing through the ceiling above me. Its face came right into my vision and as it did so I noticed that its skin was like that of a classical stone statue and that its eyes, though open, were like blank lids: as if the pupils had not yet been painted in. As its terrifying face came right up to mine it said without speaking: "Open your eyes, Colleen. Open your eyes!" Needless to say, this dream has stayed with me all my life and when I began this project I was reminded that the role of an angel and the

1. John Dee was an advisor to Queen Elizabeth the 1st. He was astronomer/astrologer, alchemist/chemist, philosopher and mathematician at a time when magic and science still coexisted to some degree. He devoted much of his study to communication with angels through "shew-stones" (mirror-polished obsidian). See Chapter 2, "Magic Visions", of Mark Pendergrast's, *Mirror/Mirror: a History of the Human Love Affair with Reflection* (New York: Basic Books, 2003), 29-52.

role of an image are very similar, in that, they both act as messengers between this world and another.

In Figure 62, an angel stands with crossed arms in the back of a painting by Piero della Francesca. Its wings are just visible, matching as they are in color with the silvery blue of its robe. It stares out of the image in a confident and decisive manner, quietly asserting its presence behind the Madonna. What is of particular interest is how it stands within a doorway, not quite in the room of the Madonna but not quite out, literally upon the threshold. The room from whence the angel may have come is clearly visible and immaculately rendered in linear perspective the rules of which Piero della Francesca has used with precision in order to cast light from an inset window onto the rear wall. The effect of this is to place the angel in a heavenly light that is nonetheless brought to our attention by domestic architecture, the window and the door becoming threshold spaces for a being who is never seen save for in images, dreamed or rendered.

The threshold space of the frame comes in many guises and its simplicity belies a complexity that deserves attention. At first glance, the purpose of a frame would appear to be to make something visible, but as I will discuss, its function is manifold, and as the prologue of the angel hints, has as much to do with the unseen as the seen.

The Seen and Unseen Realities of the Representational Space

French philosopher, historian, and semiotician Louis Marin (1931–1992) begins an essay on the frame by looking at the basic definition of the verb "represent" in a late 17th century dictionary. There he finds the definition most of us are familiar with, i.e. "to substitute something present for something absent".[2] He calls this a "mimetic economy" whereby a similarity of the present to the absent validates the exchange. But, says Marin, to represent is also to display

2. Louis Marin, "The Frame of Representation and Some of its Figures," in *The Rhetoric of the Frame: Essays on the Boundaries of the Artwork*, ed. Paul Duro (Cambridge: Cambridge University Press, 1996), 79.

something that exists in the here and now and it is the act of presenting that alerts us to the fact that something is being re-presented. Representation then signifies "to present oneself representing something else"[3] and it is the mechanism of the frame that enables this action.

Just as Roger Kemp asserts that the fundamental unit of Western representation is the cube,[4] Marin too reminds the reader of the fact that representation within a frame (in the sense of a designated space) creates a field "much more forgotten in that it is perfectly transparent—the fourth frontal wall of the scenographic cube",[5] the Western preference for illusionistic image-making implying a depth of space behind and within. In this sense, to frame is to take a chunk out of space, or at least, to create the illusion behind that theatrical "fourth wall" of delineated space.

Yet another aspect of the act of framing is the actual artifact, the structure which, as Marin stipulates, is put around the edges of an image and which:

> *Renders the work autonomous in visible space; it puts representation into a state of exclusive presence; it faithfully defines the conditions of visual reception and of the contemplation of representation as such…[the image is articulated] transformed by the frame into an opposition where representation identifies itself as such through an exclusion of any other object from the field of sight. Through the frame, the picture is never simply one thing to be seen among many: it becomes the object of contemplation.*[6]

In order to be an object of contemplation, the image must be framed for a viewer, for a contemplating consciousness. The image is "re-presented" within the frame—projected if you will from another space and time—to be yet again projected into the ambiguous space of perception, or as Marin states: "the frame will furnish one of the privileged spaces of producing 'knowing,' 'believing' and 'feeling,' of the instructions and injunctions that the power of representation,

3. Marin, "The Frame of Representation and Some of its Figures," 79.
4. Kemp, Seen/Unseen, 13-54.
5. Marin, "The Frame of Representation and Some of its Figures," 80.
6. Marin, "The Frame of Representation and Some of its Figures," 82.

Figure 63
Nicolas Poussin
Self-Portrait, 1650
Image: Public Domain

representing, address to the spectator-reader."[7] The frame asks to be addressed and draws us into its space purposefully.

In describing the layered hidden frames contained within a self-portrait by Nicolas Poussin (Figure 63), Marin evoked the more contemporary example of a work by Thomas Demand: *Vault* (Figure 64) The picture frames of these images "jostle, lean up and interrupt one another regardless of the represented object they frame" and in their imbricated and layered state they "articulate a very narrow, super-slim space that can be reduced almost to the superimposition of fields."[8] But Demand's work goes further than a superimposition by closing the image field off from the viewer, turning the fourth wall of each represented space inwards. The room is a veritable treasure trove of visuality and yet Demand provides us with nothing but anticipation of what *may* be seen. Furthermore, the significance of Demand's title must be taken into account. A vault is generally something contained deep underground. It is inaccessible, made available to a few trustworthy individuals with security clearance. Demand shows no access into this secretive room whereas Poussin provides the viewer with what appears to be a door at the very back of the stacked frames.[9]

Figure 64
Thomas Demand
Vault, 2012
C-print, 220 x 277cm
Image: http://www.berlinartlink.com/2012/10/02/thomas-demand-at-spruth-magers-berlin/tde_vault_19195_mail/

7. Marin,"The Frame of Representation and Some of its Figures," 82–83.
8. Marin, "The Frame of Representation and Some of its Figures," 90.
9. I say "appears" to be a door because we cannot tell for sure. However, the doorframe is not a typical 17th century picture frame. It is not gilt, or decorative. It is more akin to a doorframe in height and adornment.

Poussin and Demand both understand the significance and meaning of what it is to frame an image and, I would suggest, both understand how this relates to a perceiving consciousness and imagination. By showing the viewer a "superimposition of fields" within a contained space both artists allude to the space of the imagination. Poussin shows us a jumbled and tightly packed space that is occupied by the image of the artist himself. The viewer is asked to enter the work via the fourth wall, or image plane, to encounter and admire the artist's *effigie* and his numerous works and then to exit via the frame at the back: the door. We can move within the Poussin, use the frames in their conceptual mode as portals, as thresholds to another space. When we enter the frame as portal or door we literally enter a *sublimated* space of the mind and here Poussin gives us hints at the spaces our mind can inhabit by giving us partial glimpses of a handful of completed works. This is what Poussin the artist can give us if we so desire, if we dare to enter under (sub) the lintel (limen).[10]

Conversely, Demand denies us access to the worlds within the frames locked inside this vault. Again, the viewer enters through the fourth wall of the image "cube" but in this case is blocked, and indeed *locked* within the vault. The eyes have nowhere to go; each framed image turns its back and denies us the pleasure of entering its threshold. The vault itself locks us within, pressuring the viewer with a sense of intrusion as five to six visibly descending lintels force themselves upon our "head space". It seems as if Demand is taunting the viewer with the possibility of entering the infinite space of his imagination, here literally sublimated in a vault, only to bar us entry with a curtly turned back and crossed arms. We can go no further and are forced to retreat out of the cube of illusion and back into our own perceptual realm.

Another consequence of artists such as Poussin and Demand showing multiple frames within a frame is that it highlights the fractured nature of representation, a fact that holds with any framed image but is most strikingly apparent when one considers the act of taking a

10. Philip Shaw, *The Sublime*, (London:Routledge, 2006),1.

photograph. Art theorist Rosalind Krauss once described Alfred Stieglitz's photographic series of clouds, *Equivalents* (1923–31) as a "pre-eminent example of the fact that if photography duplicates the world, it does so only in pieces", highlighting that as a camera crops out a slice of reality to represent, it simultaneously implies the presence of something left behind.[11] This absence implied by presence is the inherent rhetoric of the frame, a visual device that discloses one of the paradoxes of seeing. Regardless of the clarity with which a frame may distill its contents from reality, there is always a "portion of the surface never seen". This visual trade-off occurs in all lens-based media—from photography, to microscopy, to cinema. All rely on the power and the limitations of the frame. In order to represent the world, the world must be contained—framed—and there must always be that which remains behind and remains unseen. And, as the title of Stieglitz's series *Equivalent*s suggests, one piece of the world, in his case the sky, must be equal to all others when there is an infinite number of frames to be taken from that cloudy continuum.

Leaving the Capsule, if You Dare

In his text, *Cinema 1: The Movement Image*, Gilles Deleuze refers to "what is never seen nor understood, but is nevertheless perfectly present" as the "out-of-field".[12] He "offers an exhaustive, alternative reading" of this, most pertinently to this project as a "spatialized open system" that constantly shifts.[13] A frame divides up the content of a field and this "divisibility of content" means:

> *…that the parts belong to various sets, which constantly subdivide into sub-sets or are themselves the sub-set of a larger set, on to infinity. This is why content is defined both by the tendency to constitute closed systems and by the fact that this tendency never reaches completion. Every closed system also communicates. There is always a thread to link the glass of sugared water to*

11. Rosalind Krauss, "Stieglitz/Equivalents," *October*, 11 (1979): 133.
12. Gilles Deleuze, *Cinema 1: The Movement Image*, trans. 1986 by The Athlone Press, (London: Continuum,1992), 16.
13. Gregory Ferris, *Every Time I Leave the Room: Image, Time and Metadata in Off-Screen Space*, unpublished thesis (Sydney: The University of New South Wales, 2012),10.

> *the solar system, and any set whatever to a larger set. This is the first sense of what we call the out-of-field: when a set is framed, therefore seen, there is always a larger set, or another set with which the first forms a larger one, and which can in turn be seen, on condition that it gives rise to a new out-of-field, etc. The set of all these sets forms a homogenous continuity, a universe or a plane (plan) of genuinely unlimited content. But it is certainly not a 'whole' although this plane or these larger and larger sets necessarily have an indirect relationship with the whole.*[14]

For Deleuze, a frame does not only define a binary relationship between the seen and the unseen where the imaginary space of the out-of-field becomes concrete as it shifts within the frame and vice-versa. Rather he describes a complex field of relations where a shifting frame has repercussions across time and space and where the closed system of the frame implies infinite connection. He defines two cases of the out-of-field: one "designates that which exists elsewhere, to one side or around; in the other case, the out-of-field testifies to a more disturbing presence, one which cannot even be said to exist, but rather to 'insist' or 'subsist', a more radical Elsewhere, outside homogenous space and time" and that these two types of out-of-field "intermingle constantly".[15] Despite the overtly metaphysical tones of Deleuze's concept of the out-of-field its inner workings are evident within both still and moving images of space exploration.

The possibilities of what lies beyond the frame can be exploited within the moving image, a media that lends itself to an exploration of the spaces out-of-frame due to its use of time and narrative.[16] For example, characters within a film can walk in and out of view, implying another space beyond, that is just as real for the viewer as anything contained by the frame. In the case of the 16mm footage of NASA astronaut John Glenn, it is a simple play of changing light upon his face and the shifting direction of his gaze that takes the viewer's imagination out of the framed space, out of the capsule and

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14. Deleuze, *Cinema 1: The Movement Image*, 16.
15. Deleuze, *Cinema 1: The Movement Image*, 17.
16. For a detailed examination of the out-of-frame and the moving image, see Gregory Ferris, *Every Time I Leave the Room: Image, Time and Metadata in Off-Screen Spac*e, unpublished thesis (Sydney: The University of New South Wales, 2012).

Figure 65
Stills from 16mm footage of NASA astronaut John Glenn aboard the Friendship 7 spacecraft in 1962
Image: NASA/JPL

into outer space. Figure 65 contains stills from 16mm footage that shows Glenn surrounded by equipment in a cramped capsule as he orbits the Earth on his *Friendship 7* flight in 1962. Confined and immobile as he is, his eyes move around the capsule, perhaps checking meters and equipment, but these remain out of shot and it is up to the viewer to decide what these might be. As the light from the capsule window moves across Glenn's face he shifts his focus to the view outside and the viewer's imagination goes with him: what does he see? At one point, a reflection of the capsule window becomes clearly visible in the visor of Glenn's helmet and the viewer is given a tantalizing if ambiguous glimpse of the scene out the window. In this way, the reflected spacecraft window becomes a frame within a frame, a threshold space into which the viewer's imagination is invited to shift; the closed system of the pictorial space is opened up and we enter Deleuze's "radical Elsewhere".

Once the sheltered space of Glenn's capsule is left and the frame is shifted to another slice of the Elsewhere the task of representation becomes insurmountable. If an external reality is to be imaged the task can only be attended to piece by piece, frame by frame, photograph by photograph, and the out-of-field—the unseen—can only be defined by the framed and the seen in an eternal play of opposition.

The Mosaic Effect

Space photography, particularly that taken by unmanned exploratory missions, provides another accessible example of the Deleuzian concept of how the closed system of a frame creates infinite sets of the out-of-frame. The cosmos is quite literally of an astronomical scale; even the planets of our solar system are so large that if they are to be imaged in any detail it must be done in pieces. Mercury is one of the most difficult planets to observe through a telescope and likewise to photograph. Due to one Mercury day being longer than its year, observers on Earth rarely get a glimpse of more than one half of the planet's surface, and its proximity to the Sun ensures that it is bombarded by high levels of radiation as both

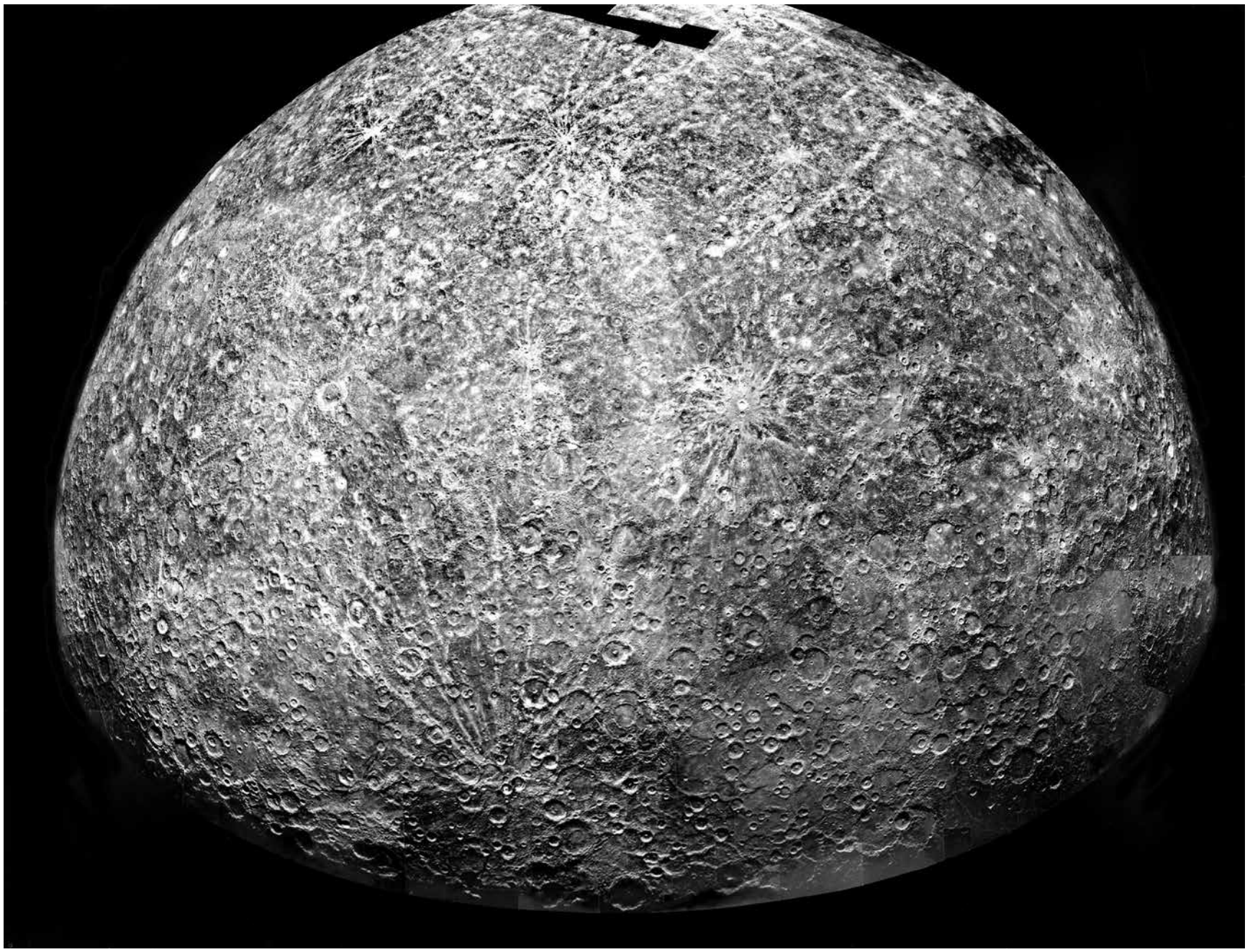

Figure 66
Mosaic image of Mercury compiled of photographs taken by NASA's Mariner 10 spacecraft between 1974 and 1975.

heat and light which can damage optical systems.[17] Between 1974 and 1975, NASA's *Mariner 10* spacecraft completed three fly-bys of Mercury by conducting gravitational "sling-shots" around the Sun.[18] It made photographs of the sunlit side of the planet on each approach but this still meant that a maximum of only two-thirds of the surface was imaged. Each frame was transmitted back to Earth and finally stitched together by scientists and image specialists to produce mosaics such as Figure 66. Even though Mariner provided the first ever detailed images of Mercury, there are gaping holes in the data, indicating that as complete as each frame may seem, there is always another to be filled. In the act of *becoming* complete, as each section or *set* is completed, the empty frame moves on: on to an infinite amount of the out-of-field—of the unseen—and never to

17. See Dava Sobel, "Mythology (Mercury)" in *The Planets* (London: Harper Perennial, 2005), 33–50.
18. http://nssdc.gsfc.nasa.gov/nmc/spacecraftDisplay.do?id=1973-085A, accessed Monday, 19 January 2015.

the ultimate ideal form: a complete represented reality. But furthermore, in mosaic images such as Figure 66, the gaps left by unfilled frames imply the shape of every other frame of which the image is composed, and as much as the broader picture invites the viewer to imagine it as whole, our minds can simultaneously sense the integrity of each individual image. As viewers we use our imaginations to "actively participate in the act of deception that the mosaic asks us to complete internally", recognizing that it is ultimately the sum of its parts.[19]

Stella: Frame-Object/Object-Frame

The late Robert Hughes (1938–2012) describes Frank Stella (1936–) as the artist who "launched Minimalism", as an "idea cruncher", and his work as "polemical and argumentative";[20] and in one of Stella's early "frame" works of 1959, *Zambesi* (Figure 67), all of the above is evident. In these "frame" works Stella presents a deductive structure, driven by the borders of the canvas. Stella has turned the idea of the image plane on its head and let the physical structure of the canvas become the driving force behind both the shape and content of the work, resulting in an object that can no longer be referred to as just an image, and likewise, not just an object: it becomes both. By turning his "idea crunching" attention to the problem of the frame in representation—its inner and outer dynamics, its rhetoric of presentation—what Stella "attempts to represent, is precisely the process of framework."[21] In coming to terms with Stella's objects/images one is faced with the infinite void of paradox so inherent in concepts of representation. Marin states it thus:

> *If the frame is one of the means by which representation presents itself representing something, Stella's picture represents its own presentation. The painting is entirely reflexive; its transitive dimension consists of representing its*

19. Boyle, "Eyes of the Machine", 220–21
20. Robert Hughes, *American Visions,* 560–561.
21. Marin, "The Frame of Representation and Some of its Figures," 93.

reflexive dimension… we are witnessing the iconic mise-en-abime[22] *of the opacity of the representational sign in its transparency; or conversely, an iconic* regressus ad infinitum *of the frames of presentation to their representation and of representation to presentation.*[23]

Stella, dismissing the concept of "out-of-frame", turns to the image plane and gives it its marching orders too. There is no image "cube" here. There is no illusion. There is no frame. Of his work he states: "My painting is based on the fact that only what can be seen there *is* there. It really is an object."[24] There is nothing beyond the physical object of the "painting", no imaginative space to enter, no representative space to leave out. The viewer must stand alone in their own phenomenal and perceptual space, in relation to the work.

Figure 67
Frank Stella *Zambezi*, 1959
Enamel on canvas
230.51cm x 200.03cm
Image: Collection SFMOMA
Gift of Harry W. and Mary Margaret Anderson
© Frank Stella / Artists Rights Society (ARS), New York
Source: http://www.sfmoma.org/explore/collection/

A Space Within—A Space Without: the Frame and its Shadow

Frames appeared within my collection of everyday photography early in the project and upon reviewing those images it becomes apparent that I was drawn to what the frame delineated external to its structure and not the content within. Shadows cast by acute light sources such as a reading lamp across a wall or multiple light sources of a candle and lamp etc. proved to be long and shapely but still prescribed by the shape and proportion of the frame. This cast shadow-shape is directly related to Kemp's cubic unit and Marin's scenographic space of representation because the frame *is* essentially a

22. 'Mise-en-abyme' is a French term meaning 'placed into abyss'. 'Regressus ad infinitum' is a French term for 'infinite regress' which is a philosophical term referring to a series of propositions, the truth of which requires the support of another proposition, and so on into infinity.
23. Marin, "The Frame of Representation and Some of its Figures," 93.
24. Frank Stella quoted in David Batchelor, "Of Painting and Sculpture," in *Minimalism* (London:Tate Gallery, 1997),185.

Figure 68
Colleen Boyle,
Digital photographs
2010

Figure 69
Colleen Boyle
Untitled
Mirrored acrylic and laminated inkject print
2013

cube but in very low relief. When put under scrutiny by inquisitive light, the object has given way and revealed its true form. Furthermore, the shadow reveals the secretive function of the frame in presenting an illusionistic space and casts it out upon the flat surface of the wall for all to see. "Here!" it cries, "Here is your illusion: nothing but flatness, optics, and geometry!" In the *Untitled* work of Figure 69, I inverted the entire role of the frame, placing the image (a distorted lunar surface) on the outside and making the representation into an idealized shadow, at once referencing the continuum from whence an image is "taken" and alluding to the Platonic problem of perceived reality being nothing but a play of shadows upon the wall. The inner surface of the "frame" was mirrored and this created a shallow, infinite, blank space. If the viewer were to look into one side of the inner frame they would see nothing but continuous wall: an infinite space of nothingness in all directions. The act of perceiving and representing never ends, a fact aptly explored by Michel Foucault in his well-known analysis of Velasquez's painting, *Las Meninas,*[25] where he outlines the phenomenological 'fold of vision' as "an ontological Visibility, forever twisting itself into a 'self-seeing' entity, on to a different dimension from that of the gaze or its objects."[26] The more, it seems, that we look at our own act of looking the more we understand that we will never truly see.

Another consequence of a pure, phenomenological state of "self-seeing" is that if *all* is in a perpetual state of visibility we face the problem of never being able to tell the real from the represented, the shadow from the light, the one from the other. Seeing how dynamic lighting cast different types of shadows from one object encouraged me to explore it in relation to these ontological concerns.

When Peter Pan lost his shadow he lost a part of himself without which he was less "real", less effective, less "Peter". Importantly, it was but one, singular shadow that Wendy had to sew back onto the form

25. Michel Foucault, *The Order of Things*, (London: Routledge Classics, 2002), 3–18. First published in 1966 as Les Mots et les Choses.
26. Deleuze on Foucault, quoted in Martin Jay, *Downcast Eyes: the Denigration of Vision in Twentieth-Century French Thought*, (Berkely: University of California Press, 1993), 398.

Figure 70
Colleen Boyle
Untitled
Acrylic, inkjet print, plastic
2013

from which it escaped. Author J. M. Barrie understood the proprietary quality of a shadow but also its propensity to move and deceive, Peter Pan's shadow relishing its freedom as it leapt upon the nursery walls, an action indicative of a flickering light source such as a candle or oil lamp.[27] In Figure 70, more than one shadow falls from a small black "frame", in fact, five shadows compete for relationship with the object, ranging from the very dark and obvious to the lightest and softest. Only one of them is artificial and yet when this work was shown at First Site Gallery at RMIT it caused concern in the minds of many viewers, a concern that was evidenced by their need to test the veracity of the shadows by interrupting the light source(s) with their hands in order to see which shadows stayed and which disappeared. It seems that the introduction of *one* false shadow on the wall immediately put into question the reality of *all* the shadows on the wall. Here, *the* shadow took a leaf from the book of Peter Pan and delighted in deceiving the viewer with its variations. Shadow may be ultimately sewn to the hem of its object but it is also undeniably legion.

Multi-dimensionality and the Frame

A frame marks off space and re-presents it for a viewer, and it would thus appear sensible to say that this is done in order to seek clarity and avoid ambiguity. Stella demonstrates the concept of a frame within a frame as a self-referential singularity—an object that is all representational space and therefore none—no room for ambiguity there. But what if that space within the frame were of a mixed reality? What if there could be multiple, interconnected and yet separate frames, either physical or conceptual?

The work of artists Vija Celmins (1938–) and Jacky Redgate (1955–) is concerned with our relationship to technologically mediated images; in particular, the photographically reproduced image. Celmins' 1983 etching, *Constellation—Uccello,* and Redgate's 1989 sculpture/photograph *Untitled, Vase Shape #1–5,* make powerful use

27 J.M. Barrie, 'Peter Pan and Wendy', was the 1911 novel adapted from his original stage play 'Peter Pan, or the Boy Who Wouldn't Grow Up' of 1904.

of art-historical imagery to explore the relationship of the reproduced image to reality. Celmins' meticulously rendered work implies there is no material reality and that only through images does the world *become* seen. In referring to the Uccello drawing, she states: "I had never seen the real drawing of course; only in the book did it exist for me... So actually I was drawing the reproduction of the Uccello, with all its reproduction qualities, and the secondary subject was the Uccello."[28] The constellation, too, belongs to a distant reality, and by pairing it with the Uccello, Celmins makes visual play between two modes of the unseen: the spatial and temporal. By tapping into the silent rhetoric of the frame, Celmins has ripped her twin images from the space-time continuum and locked them within a permanent field of perception. This field, Celmins reminds us, is contingent upon the constant interplay of two and three—but now *four*—dimensions: the two-dimensional space of the picture-plane, the three-dimensions of form, and now the unseen but ever present dimension of time. Under the physical exterior of these simply re-presented images Celmins demonstrates a complex understanding of a frame's capacity to capture space and time, as it simultaneously exists within it.

Figure 71
Vija Celmins
Constellation–Ucello,1983
Aquatint and etching
76 x 65 cm
Image: http://www.tate.org.uk/art/artworks/celmins-constellation-uccello-ar00606

This play upon space and time is also evident in Redgate's *Untitled, Vase Shape #1–5* (Figure 72) where five matt-black recreations of vases from art-historical images are placed in front of five matte-black infinity screens and photographed. Just as Celmins' historical Uccello is brought to a contemporary reality via image making, so too are the vases by an astute comparison of human and machine vision. The painted vase *may* have existed historically but, as Redgate states, "in a photograph we know it has been there".[29] The frame of the photograph contains a verisimilitude that is denied other forms

28. Samantha Rippner, *The Prints of Vija Celmins* (New Haven: Yale University Press, 2002), 23.
29. Jacky Redgate, quoted in Michael Desmond "Imagining Space" in *Jacky Redgate: 1980–2003* (Parkside: Contemporary Art Centre of South Australia Inc., 2005) 19.

of representation. Redgate has transposed the image of the vase from the ambiguous frame of two-dimensional painting to a three-dimensionality, which she has then verified by the act of taking a photograph. The placement of the vases in front of an "infinity screen" implies that this act of re-presentation, of re-framing the object, is potentially an infinite act, representation feeding upon itself like the Ouroboros and its tail[30].

In recent work, Redgate again indulges her interest in the unique space of the photographic frame. in 2011, Figure 73 was touted by the then director of the Monash Gallery of Art as "virtually flawless as a photograph" and that it "challenges many of the expectations we have about what a photograph is."[31] Technical perfection aside, this image is at first perhaps challenging to the viewer for the artist's choice of subject: an eclectic collection of plastic lids and plates that one might find in any kitchen cupboard. Indeed, in conversation with Redgate, she informed me that the photograph (and others in the series) were taken in her kitchen at home using a simple set-up of items arranged on a wall in front of the lens and highly reflective items such as silver trays and mirrors arranged on the opposite side, behind the lens. Light was then bounced off the reflective items, casting a hazy and superficial illusion of another dimension upon the wall mounted items. I use the word *superficial* because the effect creates little depth but it is enough to pull the viewer's eye in and out of the wall, the motion of which sets the plastic plates in motion towards the forefront of the picture plane. But, the allure of the shadowy wall of reflection is too great and our contemplative gaze now turns to the status of the potential reality of these unseen objects.

Figure 72
Jacky Redgate, *Untitled* (Vase Shape #1–5) 1989, Art Gallery of NSW
Image: http://www.artgallery.nsw.gov.au/collection/works/51.2006.a-k/

Figure 73
Jacky Redgate
Light Throw (Mirrors) #4
2011.
Chromogenic print
126 x 158 cm
Image: http://www.artcollector.net.au/JackyRedgatewinsBownessPrize

30. The Ouroboros is an ancient symbol showing a serpent-like creature devouring its own tail and represents cyclicality, the 'eternal return'.
31. Shaune Lakin, http://www.artcollector.net.au/JackyRedgatewinsBownessPrize, accessed 14/2/15

With such a simple technique and rudimentary props, Redgate has managed to pull the viewer's attention out of the "image cube" altogether whilst keeping our eyes fixed upon its inner space. By opening out the frame in two directions, the world of the viewer and the world of the photographer—the time of viewing and the time the shutter was opened—are brought together. The viewer stands as if in Redgate's kitchen, our backs turned to the unseen arrangement of reflective objects that impose themselves upon the space of representation. Plato's cave never had so much Tupperware.

However, it is not only photography or contemporary art that is equipped to manipulate the inner—and outer—workings of the frame. In around 1488, Italian Renaissance artist, Giovanni Bellini (c.1433–1516), painted a *Madonna and Child* otherwise known as the *Alanzo panel* after the site at which it first held pride of place within a chapel altar. As in many other Venetian paintings of the time, the Madonna and Christ Child (Figure 74) are presented within a rather curious zone that is a mix of fact, fiction, time and space. The first curiosity of note is that Bellini has transported the mother and child through time and space and seemingly placed them in an Italian Renaissance landscape populated with a city, a castle, and figures engaged in various activities. The central, perspectival vanishing point of the painting is hidden from view behind what Jaynie Anderson has called a velvet curtain but to me seems rather like a wooden panel. Regardless of what it is made of, it acts as a divider of the pictorial space that allows the Madonna and Child to be at once *in* the landscape of the then contemporary Italy whilst remaining decidedly detached from it. The effect is one of simultaneous absence/presence that speaks to the spiritual nature of the work—Christ being here in the world via a virtual presence—he is everywhere but he shall remain unseen. The Madonna and Child are placed in front of this dividing panel and also behind a parapet of marble designed to embed the painting into the physical space of the altar and increase the illusion of depth within the pictorial "cube". However, the parapet also reminds us that we are entering a representational space: it makes us self-conscious of the fact that what we see before us is an *image* of the Madonna and Child in a time and a

Figure 74
Madonna and Christ Child
Giovanni Bellini, 1488
Image: http://nga.gov.au/exhibition/renaissance/Default.

place in which they have never existed. Bellini has also added a pear to the parapet that Anderson claims is in "allusion to the Virgin and her role as the new Eve who, together with Christ, redeems humanity."[32] But was not Eve the temptress who had Adam partake of the fruit of consciousness, who made him aware of his nakedness? Could not this pear be of a similar ilk? Perhaps Bellini offers it to the viewer as temptation?

As Morpheus said to Neo in *The Matrix*:

> *I imagine that right now you're feeling a bit like Alice tumbling down the rabbit hole…You have the look of a man who accepts what he sees because he is expecting to wake up. Ironically, this is not far from the truth… The matrix is everywhere, it is all around us… it is the world that has been pulled over your eyes to blind you from the truth… You are a slave, Neo. Like everyone else you were born into bondage, born into a prison that you cannot smell or taste or touch. A prison for your mind… You take the blue pill, the story ends… You take the red pill, you stay in Wonderland and I show you how deep the rabbit hole goes.*[33]

As most film buffs of the late 1990s know, Neo took the red pill and the veil of representation was lifted and he tumbled down the rabbit hole of an unfiltered reality. For the time being, however, until science catches up with science fiction and there is a pill or pear to break us out of our perceptual bondage, we'll have to stick with a mixed reality of frames, reflections, representations, shadows, and veils.

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32. Jaynie Anderson, http://nga.gov.au/exhibition/renaissance/Default.cfm?IRN=202356&BioArtistIRN=36999&MnuID=SRCH&ArtistIRN=36999&ViewID=2 Accessed 11/2/2015
33. Excerpts from the dialogue of Morpheus in the 'Red Pill Blue Pill' scene of 'The Matrix' a film written and directed by the Wachowski twins. Released in 1999, the film is laden with philosophical concepts such as Descartes's First Mediation, Plato's Cave Allegory, and Kantian concepts of freedom.

Chapter Five:
The Persistence of Geometry

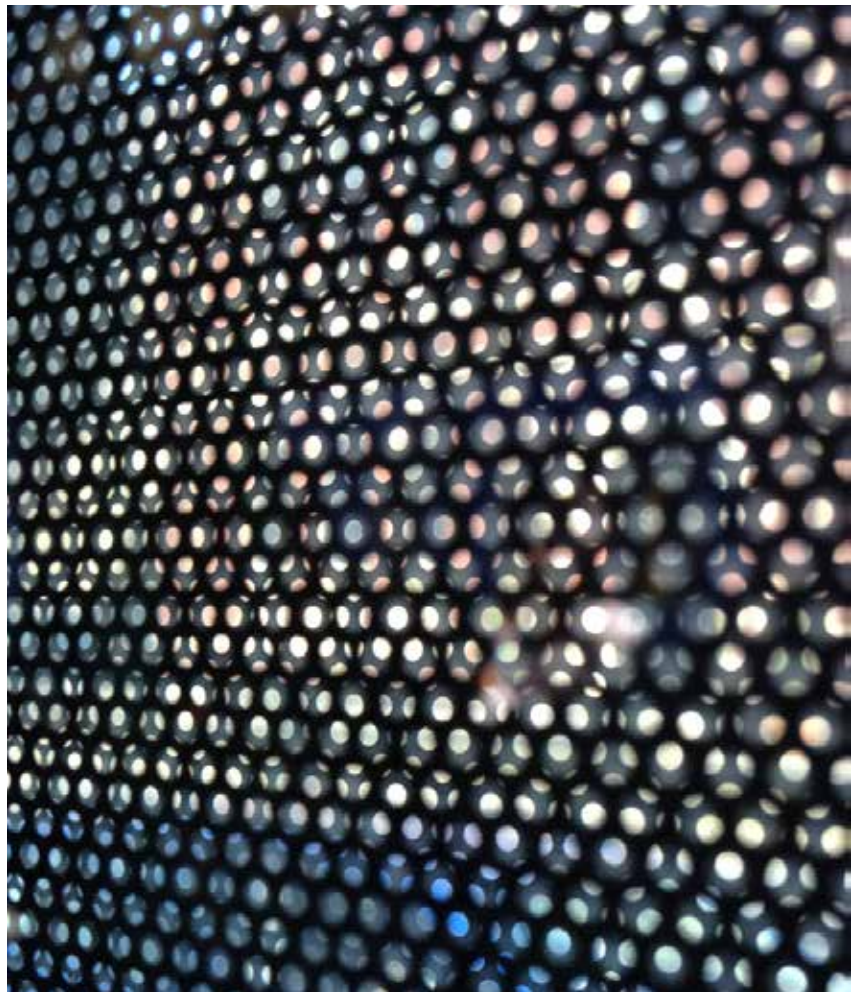

Figure 75
Colleen Boyle
Digital photograph
2014

There is geometry in the humming of the strings, there is music in the spacing of the spheres.—Pythagoras

Pixels are not little squares, or, so I was told by Alvy Ray Smith in a darkened university auditorium and, along with the rest of the audience, I was not about to argue. After all, how could a man who was there at the formation of Pixar and Lucasfilm not know what he was talking about? This man lives and breathes pixels and he was here to tell me that they are, most emphatically, not the little squares I see on my screen. This fact goes totally against the popular consensus that digital images are composed of little squares and that—in a similar fashion to a painting—the closer we get to or the further "into" the image we look, the clearer and bigger these little squares become. The truth is that these misunderstood squares are a mere surface visualization. Just as the word-processing software I use to type these words provides a visual interface between my self and the inner,

binary workings of the computer, so too does this little square visually mediate between my self and the inner workings of the digital image. There is, quite literally, more to this so-called "pixel" than meets the eye. That "more" is geometry.

The Shape of Things to Come

Art historian Martin Kemp made a detailed study of the unseen ways in which we render space visually in his publication *Seen/Unseen* of 2006. He proposes that the "dominant schema of visualization" is a cubic unit, a legacy of Western architecture. He states that this unit gained dominance via the spread of perspectival depiction but that this dominance:

> *…has been more pervasively and insistently affected by photography, the universal art, and subsequently by film, television and, most recently, by computer imaging. The basic parameters for the construction of space in a computer, utilizing the X, Y, and Z axes to define the three dimensional coordinates, are precisely those established by the Renaissance perspectivists: up and down, in and out, from side to side. The boundaries of the screen of a computer, displaying the results of a computer-aided design programme, are in effect transformed into a kind of frame or window through which we view an illusionistic slice of measurable space.*[1]

Kemp takes a decidedly historical standpoint as he makes connections between perspectival representation and how the sciences, particularly astronomy, came to re-envisage space. Throughout the text, he is careful not to make a causal connection between perspective and how we *actually* see and represent: the physiology and psychology of sight is left out of the discussion. In a manner similar to philosopher of science Marx Wartofsky (1928–97) and, recently, American philosopher of science Ronald Giere, Kemp describes perspectivism as something like visualization software loaded onto the biological seeing-machine of the body. In this respect, perspectivalism remains distant from reality; it is merely a rhetorical device,

1. Kemp, *Seen/Unseen,* 13.

albeit a particularly pervasive one that is so entrenched as to be unseen. Perspective is as transparent as glass: it is quite literally there to be looked *through*. Indeed, it is by reiterating Albrecht Dürer's explanation of perspective that Erwin Panofsky begins his influential text *Perspective as Symbolic Form*:

> *"Item Perspectiva ist ein lateinisch Wort, bedeutt ein Durchsehung"*
> *("Perspectiva* is a Latin word which means *'seeing through'").*[2]

Figure 76
Dürer looking through his projection grid.

Dürer was fascinated by this new tool of representation that allowed him to *see through* the clutter of the world around him and applied himself to its study in a manner that befits a scientist of today. Methods of foreshortening, studies of the human body in space, the application of grids and frameworks through which to view an object: his fascination with this is well documented (Figure 76). The "invention" of linear perspective is often attributed to architect Filippo Brunelleschi (1377–1446) and its description and dissemination to polymath Leon Batista Alberti (1404–1472), but it must be remembered that this took place against a backdrop of intense interest in the achievements of the ancient Greeks and the rediscovery of important texts that had been disregarded by Western culture through the Dark Ages. Like other artists of the time, Dürer dedicated his time to learning how this new representational tool 'worked' and in order to do so he turned his attention to the long-standing (and yet, until the early Renaissance, long forgotten) spatial convention from which it stemmed: geometry.

In 1507, Dürer purchased a copy of the works of Euclid, the mathematician of Greek antiquity who devised the postulates that defined the nature of geometry for centuries.[3] Serendipitously, at the beginning of this project, the first book to which I was drawn was an entertaining and enlightening book by Leonard Mlodinow called Euclid's *Window: the Story of Geometry from Parallel Lines to Hyperspace*. At the time, it was an intuitive purchase and I was

2. Albrecht Dürer as quoted in Erwin Panofsky's *Perspective as Symbolic Form* (New York: Zone Books, 1991), 27.
3. The copy of this book and the receipt of purchase still survive. Peter Strieder, *The Hidden Dürer,* English translation by Vivienne Menkes (Bay Books, 1978), 17.

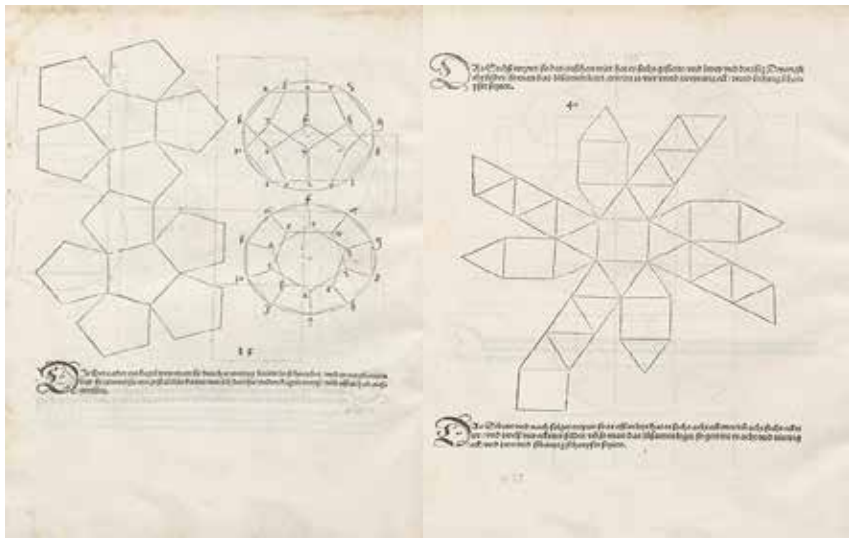

Figure 77
Dürer's drawings of polyhedral forms. 1525
Image: http://www.matematicasvisuales.com/english/html/geometry/space/volcuboctahedron2.html

unsure of how a "pop science" paperback could influence my research. Nonetheless, this book outlined a history of geometry that made it clear to me that the development of linear perspective in the Italian Renaissance is just a point in time amongst many other radical developments in our perception of space, all of which stem from the simple and yet profound "concept of space removed from the ground we walk upon".[4] Geometry is space in the abstract, a system of describing the world that became extremely useful once linked to mathematics.

Dürer's interest in geometry encompassed the construction of polyhedral 'nets', which are the two-dimensional diagrammatic (planar) form of a three-dimensional geometric solid. In his own publication on geometry, *Four Books on Measurement* (1525), Dürer illustrated the planar forms of various Platonic and Archimedean solids (Figure 77) but he had made early explorations of such solids in his artistic work, one prevalent example being the enduringly intriguing form in the engraving *Melencolia I*, of 1514 (Figure 78).

Figure 78
Albrect Dürer
Melencolia I
Engraving, 1514
Image: Public Domain

Even today, mathematicians and geometers cannot quite work out the details of "Dürer's Solid", as it is now known, but believe it to be some kind of truncated rhombohedron. The fact that the details of this form remained obscure intrigued me as it indicated that this was a solid of Dürer's imagination and not one that could ever be readily identified in reality. It came *close to* an accepted form of reality but never quite got there. Within the confines of the engraving itself, the form is as solid, as sharp, and as real as any form I have encountered in my spatial and physical reality and yet simultaneously it *is not*. It discloses its reality as it conceals it. It declares its likeness to what I might already know but simultaneously alienates me with its difference.

4. Oddly enough, Mlodinow completely ignores Alberti and perspectival representation and goes from the collapse of the Roman Empire and the Dark Ages straight to René Descartes.

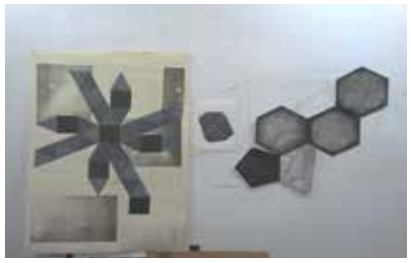

Figure 79
My studio wall, 2011, Containing various proofs using the work of Dürer.

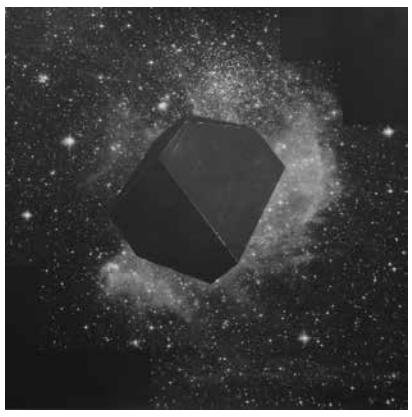

Figure 80
Colleen Boyle
Melencolia, 2010
Collograph on inkjet
65cm x 65cm.

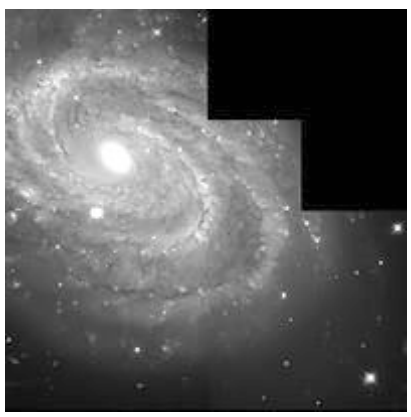

Figure 81
Hubble Space Telescope
Wide Field Planetary Camera
image of NGC 4603
Image: NASA/JPL

In order to explore Dürer's solid I looked to images that, I felt, operated in a similar way: the jewel-like celestial objects imaged by the Hubble Space Telescope (Figure 81). At the same time, I looked further into polyhedral forms and their "nets" and came across Carbon Sixty (or C60), the three-dimensional form of which is commonly referred to as a "Bucky Ball" after Buckminster Fuller. C60 particularly interested me because it has been detected in outer space and the idea of something existing in reality whilst I only encounter its 'pure' geometric form intrigued me. At this early stage of the research I utilized basic print methods such as collograph and photocopy transfers in conjunction with digital print. Cardboard printing plates loaned themselves to linear geometry of two dimensions and with digital printing and transfers I could inexpensively incorporate appropriated imagery.

The printed, two-dimensional nets of polyhedra provided me with an opportunity to explore three-dimensional form. Retrospectively, I recognize that this was a major turning point in the project where I began to understand how my imagination may work with a photograph just as it does with a polyhedral net: moving from an abstracted description of an object to a discreet reality. None of the resulting artwork was thoroughly resolved, but the conceptual seeds it planted in my mind were strong and led to subsequent, more substantial iterations of my conceptual concerns with Dürer's work in the form of the folding aluminum piece, *The Melencolia Project* (2015), which is detailed in the Project Pages following this chapter. .

Geometry also allowed me to follow the threads between science and art, between the Earth and the Heavens. Kemp makes strong conceptual and visual links between pictorial perspective of the Renaissance and the scientific mode of viewing the universe that was put forth by Nicolaus Copernicus (1473–1543) and published as *On the Revolutions of the Heavenly Spheres* just prior to his death in 1543. He does this by pointing out that both systems allow for "plural positions of the spectator in relation to our perception of reality, with corresponding consequences for the appearance of things seen and

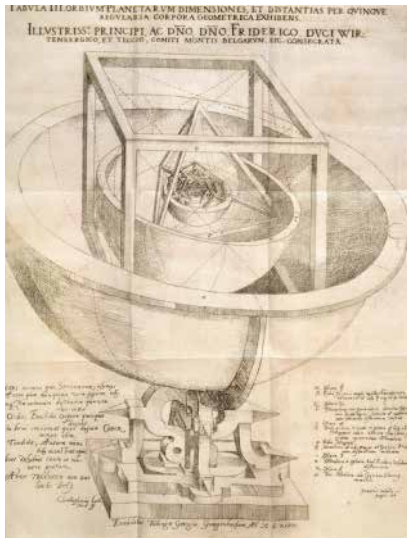

Figure 82
Johannes Kepler
Model of the Planetary System from Mysterium Cosmographicum
1596

Figure 83
My studio wall displaying explorations of connections between images including a Voyager image of Saturn a folded-up net of C60 and a printed collagraph Dürer's Solid, 2011.

their images in representation."[5] Perspective may assume a single observer in a 'sweet spot' but it still works from other observing positions. Due to frustration with inadequate theories of the cosmos that relied too heavily on contingencies Copernicus removed the observer from the privileged position in the heliocentric model and placed them instead on a mobile Earth. The view, nonetheless, from this mobile Earth was resolutely perspectival and was later exemplified in Johannes Kepler's (1571–1630) solar system model (Figure 82) in which the orbits of the planets nest within one another as polyhedral babushka dolls.[6] Whatever observational position the viewer takes, the form remains ideal and proportionate.

Kepler indulged in the concept of a Platonic ideal because it matched his desire to find harmony in God's creation. Of the Platonic Solids he states:

> *Shapes are in the archetype prior to their being in the product, in the divine mind prior to being in creatures, differently indeed in respect of their subject, but the same in the form of their essence.*[7]

An ideal form is just that: *ideal*, a perfection that exists only in idea and entirely dependant upon the mind of the beholder. Note however that, as Kepler says above, the idea will differ in the mind of each person but its essence remains untouched. One could assume from this that perspective is all about subjectivity as opposed to the objectivity that it is generally associated with (and this is discussed by Panofsky) but the emphasis here is on the *a priori*, underlying, and essential structure of reality. The real thing, if indeed it does exist, must remain as Kant's "thing in itself": untouchable and resolutely unseen in order to maintain its presence. Reality remains present by being absent. This, perhaps, is what I sensed in Dürer's Solid as it seems to oscillate between an absent ideal form and one that I can hold in my mind. It is both absent and present; out there and in here; real and imagined.

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5. Kemp, 33
6. Apparently, Kepler had imagined that it would be run by clockwork and filled with alcoholic beverages. Kemp, 36.
7. Kepler in Kemp, 26.

Figure 84
Colleen Boyle
Digital photograph
2014

A Sense of Perspective

Linear perspective, like the pixel, is a tool, an instrument of visualization that draws upon this system. Remove the veil of visualization and all we have is raw, muddy, unobtainable reality devoid of abstract relationships. In his *De Pictura* of 1435, Alberti drew attention to the idea of the image as a window:

> *First I draw on the surface to be painted a quadrangle of right angles, of any size, that for me is an open window* [aperta finestra] *through which the process* [istoria] *is being looked at.*[8]

The "window" creates an imaginary space in which to view an alternate world, a reflection of the world that is both of the world and entirely separate from it.

Linear perspective and "windows", in the form of frames, are the most invisibly persistent visual instrumentation that has survived transitions across media and across time. As has been discussed in a previous chapter, a frame is not only a mediator it is a demonstrator. More easily recognised forms of instrumentation such as the telescope, microscope, or computer screen play this same role of demonstration. As Hankins and Silverman explain in their text *Instruments and the Imagination*, as a mediator, visual instrumentation imitates a function of human sight. On another level, visual instrumentation displays an object or phenomena. It literally shows us the object or phenomena in question by placing it within a demarcated terrain: a sort of contained and artificial visibility. Prior to the Scientific Revolution (mid 16th century), instrumentation was used in the service of "natural magic" where it could, "like the magician's words, reveal nature's secrets" by revealing what had previously remained unseen.[9] Moreover, instruments could show phenomena without disclosing their cause. The magic was maintained.

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8. Lambert Wiesing, *Artificial Intelligence: Philosophical Studies in Image Theory*, (Stanford: Standford University Press, 2010), 80.
9. Hankins and Silverman, *Instruments and the Imagination*, (Princeton New Jersey:Princeton University Press, 1995), 11.

Hankins and Silverman go on to explicate a third level on which instrumentation was to work during the Scientific Revolution *and* onwards: that of demonstrating theory. In this period of time, phenomena were to be seen and explained: to be used in the acquisition of proof. This is how visual (and non-visual forms of) instrumentation is still used today. However, the sense of wonderment that accompanied natural magic was carried through into the transition to "natural philosophy" and finally to "science". It has survived La Tour's "transformation" from one format to another with certain fundamentals remaining in place. Images, particularly those that are the product of a mediating technology create, as philosopher of science and technology Don Ihde has suggested, fascination in the viewer by placing the act of observation back in partnership with the mind, removing it from its connection to direct sensory input.[10] It is here, within the mind, despite any reference to objectivity that instrumentation may imply, that fascination, wonderment, and the imagination thrive.

Figure 85
Colleen Boyle
Digital photograph
2014

In the 20th century and beyond, constructivists—most notably within the humanities and social sciences—questioned the simplistic notion of a "pure" act of scientific discovery. This was pitted against a more traditional realist and objective view of science where instruments such as telescopes or microscopes where mere 'transparent veils' which brought the unseen into view. Philosopher of science, Ronald Giere, cuts a middle road between these waring factions and introduces the concept of *perspectivism* as a way of recognising that "scientific claims may be in part socially constructed" and that "the practice of science itself supports a perspectival rather than an objectivist understanding of scientific realism."[11] Giere is emphatic in explaining that his variety of perspectivism is not related to "silly relativism" whereby every point of view is given the same weight, pointing out that "scientific objectivists like to portray their enemies as holding such a view, thus making *perspective* a dirty word"[12], a reference, I believe could very easily be directed to Bruno

10 Don Ihde, *Post Phenomenology: Essays in the Postmodern Context*, (Evanston: Northwestern University Press, 1993), 43.

11. Ronald Giere, *Scientific Perspectivism* (Chicago: University of Chicago Press, 2006), 4.

12. Giere, 13.

Figure 86
Colleen Boyle
Digital photograph
2014

La Tour and his followers. Instead, Giere offers *perspectivism* as "viewing objects or scenes from different places, thus producing different visual perspectives on said objects or scenes. Visual perspectives possess an intersubjective objectivity in that there is roughly a way something looks from a particular location for most normal viewers."[13] Giere goes on to use human color vision as an example of how something may exist in a perspectival sense and then applies this same theory to the use of instrumentation in scientific observation. Instruments are tuned in to "discover" a particular kind of "truth", they are "sensitive to a particular kind of input" and are "blind to everything else."[14] Like Hankins and Silverman, Giere takes his working model of observation and then applies it to scientific theorizing, explaining that every demonstration of theory via instrumentation, every model created based on the evidence revealed by an instrument, is also necessarily perspectival. Observations are specific, skewed by instruments that are tuned to "see" in specific ways and therefore "all theoretical claims remain perspectival in that they apply only to aspects of the world and then, in part *because* they apply only to some aspects of the world, never with complete precision."[15] If this idea is then related back to perspective as it pertains to visual representation, it seems an apt fit.

A definition, therefore, of what constitutes "perspective" is complex. It is rhetorical device of representation and of seeing but also a distinct mathematical process. It is a way of constructing knowledge through observation but also a way of theorizing about that knowledge. Importantly, perspective must not be taken in isolation for it is nothing with out relationship, without difference, and without comparison. Perspective is powerful: it can bring together disparate elements within a frame and make order and sense amongst them that is of relevance to many viewers who are already, *a priori*, versed in its particular language that is so closely related to and contingent upon the frame. However, in making a section of the world so visible and so clear, it must necessarily leave out so much.

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13. Giere, 13.
14. Giere, 14.
15. Giere, 15.

Mirrors should think longer before they reflect.—Jean Cocteau

The mirror—above all, the mirror is our teacher.—Leonardo da Vinci

Mirrors have long been valued for their power to present the world unto itself. Both mystical and mathematical, mirrors tease those who gaze upon their surface with a near perfect copy of reality. Perfect, accept for the fact that the image within the mirror is reversed, an optical artefact that is perhaps the reason why the mirror is so often depicted in literature or film as containing another world within and beyond.

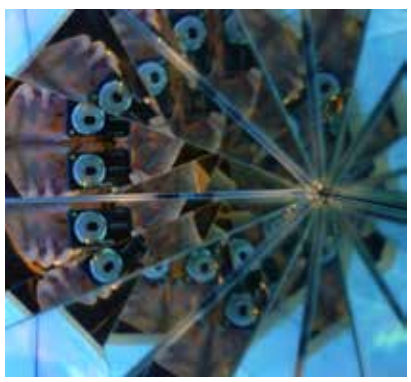


Figure 87
Colleen Boyle
Digital photograph
2013

In his remarkable film of 1950, *Orphée,* Jean Cocteau (1889–1963), makes masterful use of rudimentary filmic special effects in combination with mirrors. In this film, and the other two with which it makes a trilogy,[16] Cocteau uses mirrors as a threshold to another world. Just as Alice entered Wonderland for the second time "Through the Looking Glass", Orpheus must walk through the deceptive reflection of the mirror and enter the unseen realm it hides beneath: the underworld. This theme is taken up again—almost too obviously—by the Wachowski twins in their 1999 film *The Matrix*, where the character Neo accompanies *Morpheus* into a world that underlies the one represented to him. The mirror, in all these stories, is not a revelatory space, but one that deceives, hides and disguises, pushing the gaze away with its sleek surface and only yielding to those capable of seeing *through* the illusion.

The fact that the mirror reverses the known world did not prevent Fillippo Brunelleschi from conducting art history's most well known experiment, in fact, he used it to his advantage. On a visit to Florence he painted a picture of the Baptistery of San Giovanni using a mirror (possibly gridded) that was set up in the doorway of the cathedral opposite. The resulting panel is, as David Hockney, reiterates "regarded as the foundation of Western perspective".[17]

16. The "Orphic Trilogy" consists of: *The Blood of a Poet* (1930), *Orpheus* (1950), and *Testament of Orpheus* (1960).
17. David Hockney, *Secret Knowledge: Rediscovering the Techniques of the Old Masters*, expanded edition (London: Thames and Hudson, 2006), 204.

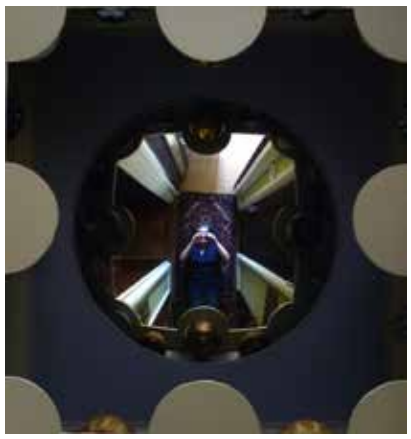


Figure 88
Colleen Boyle
Digital photograph
2012

Figure 89
Colleen Boyle
Digital photograph
2013

Perspective was described by its most vehement advocate, Alberti, as a window through which one looked upon the world, but as Hockney queries, if one "is looking out of a window, where are you? Are you in the world or distanced from it?"[18] As I discussed earlier, in the analogy of a window the window becomes a frame, it contains a scene and isolates it from the chaos of reality. However, Hockney has a point. A *mirror* allows for a complete re-presentation of a scene external to the viewer. It shifts the reality of the scene from one site/sight to another (notably, bringing us one step closer to the image world of the photograph). In order to demonstrate how seamless the re-presentation of his scene was, Brunelleschi asked that the viewer look through a small hole drilled in the painting at the vanishing point whilst holding a rectangular mirror at arms length. Because the viewer was peeping through from the verso of the painting they saw the painted image of the baptistery reflected in the mirror in their hand. The perspective was apparently so realistic that it blended seamlessly with the real view of the baptistery. However, even here, at the legendary beginnings of modern, Western representation, Brunelleschi couldn't help but add in a little stage-craft in order to complete the deception. Where other painters would have *painted* in the sky, Brunelleschi laid reflective metal that mirrored the real sky and its passing clouds. [19] This demonstrates the capacity of mirrors to disappear into their context in a seemingly magical way.

As Hockney and others have detailed, many artists have been seduced by the power of a mirror to turn reality into an image: Giotto, Dürer, Da Vinci, Bellini, and Titian, amongst others. The convex mirror too, had its own allure for the likes of Jan Van Eyck and Parmagianino, the later of whom in 1524 made the decision to paint a self-portrait with the device but to not correct its distortions resulting in a particularly curious image that heralded the coming fascination with anamorphic imagery.[20]

18. Hockney, 206.
19. Mark Pendergrast, *Mirror/Mirror: a History of the Human Love Affair with Reflection* (New York: Basic Books, 2003), 133.
20. Pendergrast, 143.

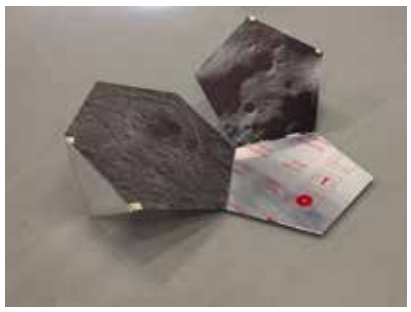


Figure 90
Colleen Boyle
Digital photograph of *The Melencolia Project* in development
2014

Many centuries later the mirror came to be a valued material for artists working within movements such as Minimalism or Conceptualism. Mirrors could be used to highlight the precarious foundations upon which the real is designated, could include the viewer in the work, entrap vision or push it away. As Ann Stephen states in the catalogue for the recent exhibition, *Mirror Mirror: Then and Now* (2010), the "mirror is the surface *par excellence* of late modernism. Its paradoxes confound the illusion of transparency—indexing the instabilities of perception, while offering the possibility of reflexivity."[21] Many artists valued the mirrors capacity to 'disappear', to leave a hole or blank space, as it deflects vision away from its surface.

The mirror is also valued for *what* it reflects: light. Light is so intricately connected with representation, particularly photographic representation, that it is sometimes difficult to know just where light ends and representation begins, or *vice-versa*. As I developed my major piece, *The Melencolia Project*, I became acutely aware of the connection between the reflector and the reflected and as with every other apparent dualism in this project decided that they could not be separated. Any reflection—and likewise any shadow—had to be considered as much a part of the physicality of the work as any material. A mirror transmits light, holds light, distorts light, and is light. Nowhere is this more apparent for me than in the box work of Donald Judd which are all surface and form to a point that they almost avoid being looked at (Figure 92). When these are made from plexiglass instead of aluminium the viewer is offered a rich perceptual experience where she can gaze simultaneously in the depths of and on the surface of the form, geometry and optics coming together to create an experience not easily forgotten.

Figure 91
Colleen Boyle
Digital photograph of *The Melencolia Project* in development
2014

21. Ann Stephen, "Jumping Through the Mirror", in *Mirror Mirror: Then and Now*, Institute of Modern Art (2010): 5.

Figure 92
Donald Judd
Art Institute of Chicago
Image: Colleen Boyle

A reflective surface provides a physcial manifestation of contemplation and imagination, and like photography, questions the ontological status of the reality around us. The optical properties of mirrors link them to geometry and place them within the narrative of perspective and Western representation, culminating in the photographic image and its digital offspring.

Geometry is the unseen reality of the image, it is the conduit by which form becomes planar and *vice versa.* The idealized structure that geometry affords representation is, however, as tenuous as it is academic and inherent errors or gaps are overlooked in favour of its latent power to describe reality. As long ago as the time of Pythagoras, problems within geometry made themsleves present within mathematical "proofs". The majority of these methods for proving hypotheses were reliable and connected with the world in concrete and evident ways. Yet, when it came to proving the square root of two, Pythagoras could find no way to do so. The number *had* to exist, but there was no way to show it, no way to bring it forth into the world. The geometric description of this number remains an object for the imagination, its image yet to be called forth to the space of representation.

Project Pages

Figure 93
Colleen Boyle
Digital photograph
Infinity room experiment
2014

For the things we have to learn before we can do them, we learn by doing them. —Aristotle

Athough my final exhibition, *Portion of the Surface Never Seen*, is the culmination of research conducted for this project, it could not have occured without a considerable amount of development. This development took place in the studio by a process of small experiments and minor projects that were sometimes lead by concept, sometimes by an image, sometimes by material etc. Whether these activities resulted in an exhibited piece of work was, for me, unimportant. Rather, I valued the opportunity to follow an initial idea along as many tangents as possible. Not everything has remained relevant and not everything was followed through to compeltion, but every little paper model, box, projection or photograph has in some way contributed to the main themes covered in this exegesis. The following six sections provide a snapshot of these studio activities

Frames and Perspective

Figure 94
Colleen Boyle
Untitled
2013

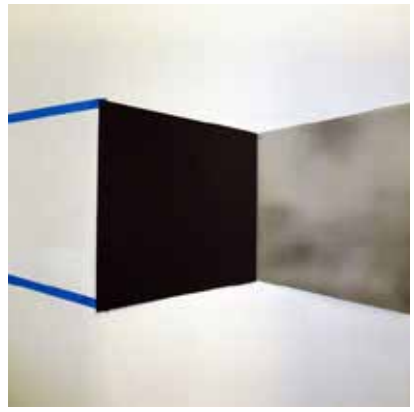
As I outlined in previous pages, the rhetoric of frames, and both the representational and conceptual versions of perspective, are fundamental to this project. In inititial image-making I explored framing and perspecive in two dimensions and became fascinated by their illusory qualities. Thus began a series of "blue tape experiments" where I tried out various linear illusions by applying blue masking tape to the studio walls. Photographing these for documentation made me aware of the camera's propensity to isolate, flatten, and enforce a particular perspective upon the viewer. I finally encorporated video projection and three-dimensional form.

Concurrently, I was taking photographs of the curious shadows cast by the framed pictures on my walls at home. Lamp-light, candle-light, ceiling-light—each one cast a different shadow, and a combination made multiple shadows of varying intensity. I took this into two-dimensional print but the results seemed too simplistic, literal, and flat. Meanwhile, the illusory blue-tape wall work segued into cubes and finally I could see that *this* was the shape of the frame's shadow. Here was Kemp's cubic unit of Western representation and it was as fickle as a shadow on my wall. Suddenly, the world of frames had opened up before me and I explored them with enthusiasm: floating frames, flat frames, box frames and finally "inside-out frames" where the image became the shadow and the frame became an empty space.

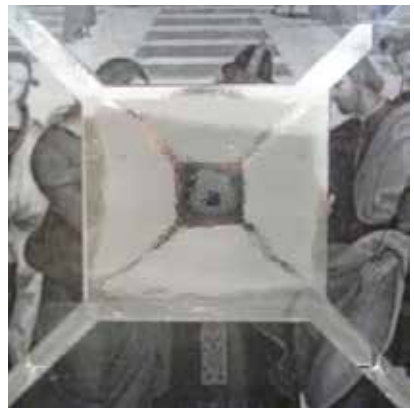
Raphael's *Marriage of the Virgin* of 1504, provided me with a near perfect example of the clarity and force with which linear perspective delivers an image. I explored the constuction of this extraordinary image by photocopying it at various scales and then attempting to reconstruct the image by using, not one, but multiple figures and sections of architecture in multiple scales. The result surprized me. Even with the addition of all this information at the incorrect scale, the image held tight, linear perspective holding it together with a coherence that was testiment to its power (and Raphael's skill).

Later in the project I experimented with illusion and the shadows cast by three-dimensional forms. Inspired by Robert Morris' *L-Beams* and the curious architectural features of 15th century Venetian painting such as parapets and windows, wondering what it would be like to "explode out" the layers inside Giovanni Bellini's *Madonna and Child* and to invite the viewer to experience them as Morris intended for his beams.

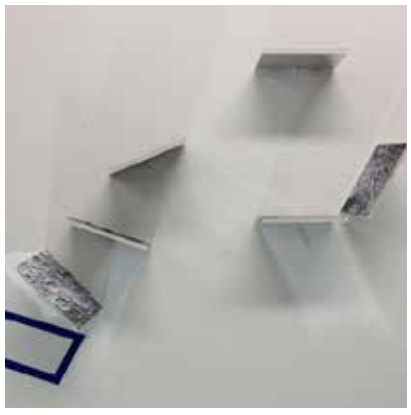




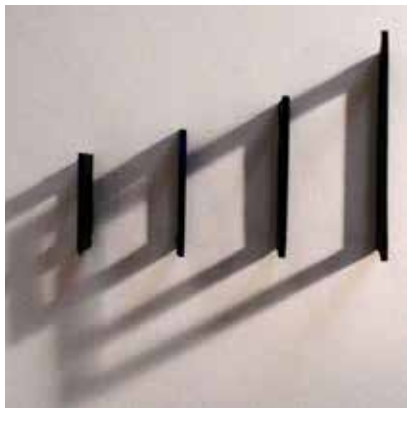


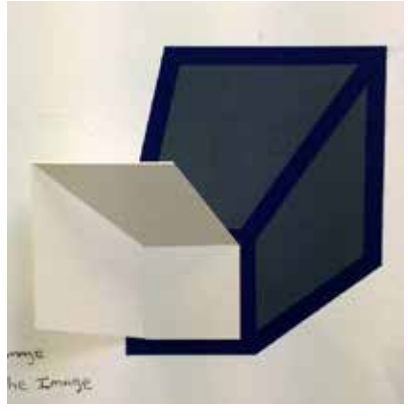










he Image


Interference and Blocking

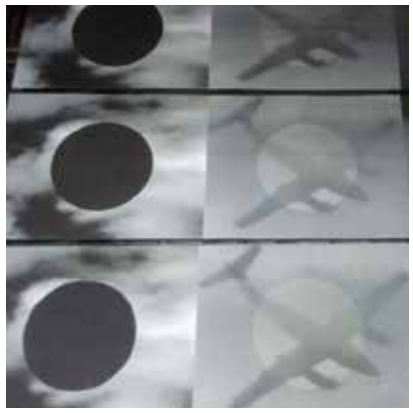
Figure 95
Colleen Boyle
Digital photograph
2012

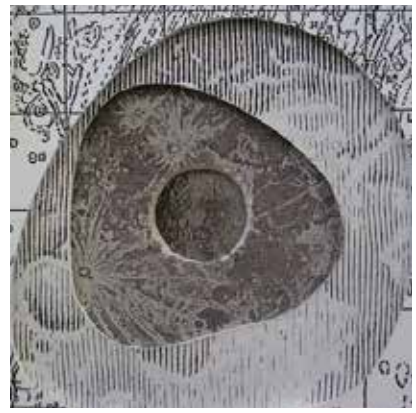
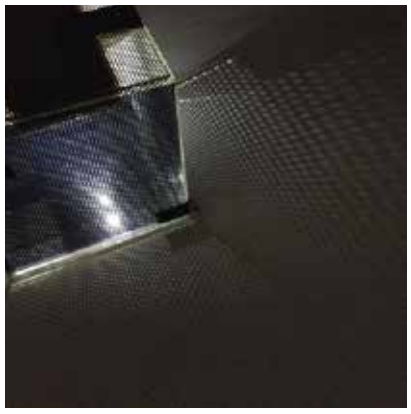
Interference can occur in many ways, depending upon the phenomenon involved, such as electricity, sound, radio signals, or light waves etc. From a basic, physics perspective, interference is the redistribution of energy when two or more wave motions clash, are displaced, and cause another wave. Simple interference can be seen in ripples in a pool of water or, as in Figure 95, when a transparent dot screen image is off-set with its shadow. Even the colours seen in a soap bubble are a form of interference as light waves reflect off both the front and back surfaces of the sphere.

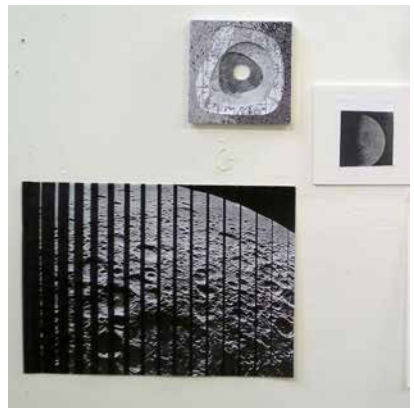
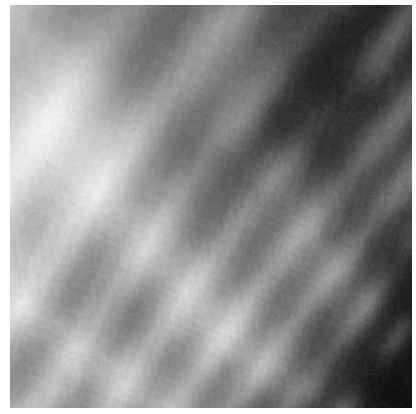
In this project I was interested in the idea that when there was interference, something was being either transformed or left behind and I found these ideas matched theoretically by Bruno LaTour when he wrote about layers of images and absent or circulating referents. Images, it seemed, could interfere with one another, displacing the reality they were originally attached to, relegating it unseen.The concepts of interference and displacement were explored alongside those of blocking or eclipsing. A solar eclipse was an ideal metaphor for something unseen, indeed, something more extreme than that for if one were to dare look directly at a solar eclipse one would risk blindness. In this case, the object is not just unseen due to remoteness or scale, but it *cannot* be looked at without a mediator.

Early experiments with blocking involved woodblock printing over digital imagery but this led me nowhere conceptually. A more effective phenomenological experience was to be gained by experimenting with light and shadow directly and foregoing their pictorial representation. Again, my process of everyday photography provided me with many examples of the evoccative properties of light and shadow in the most basic of situations such as sun through glass, on curved surfaces, and “eclipses” cast in empty frames.

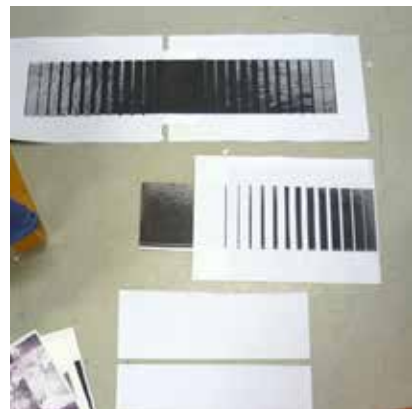
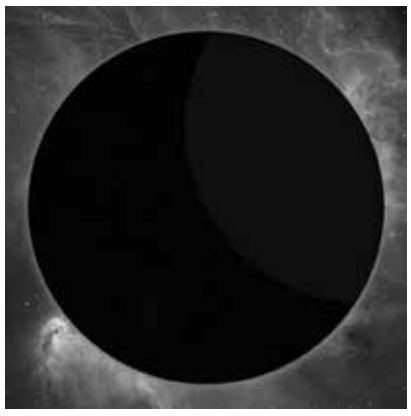
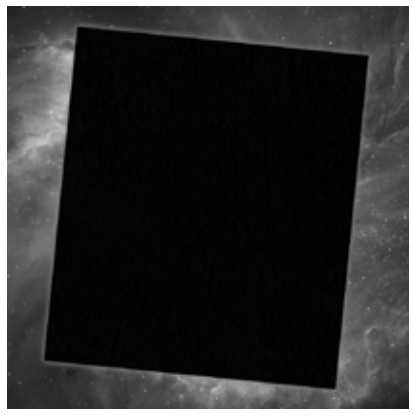
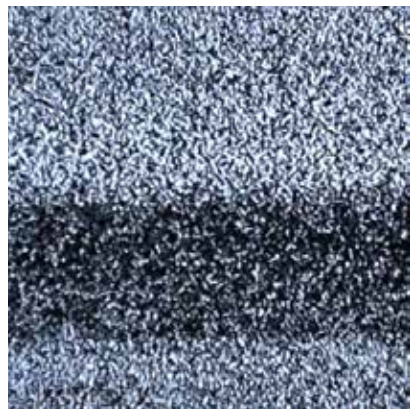
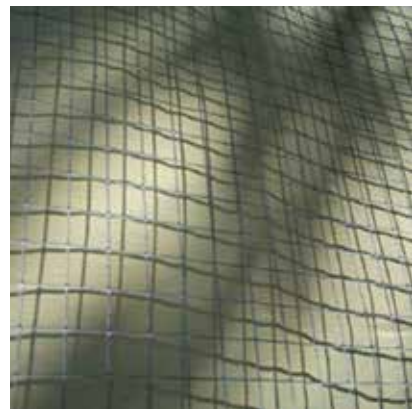
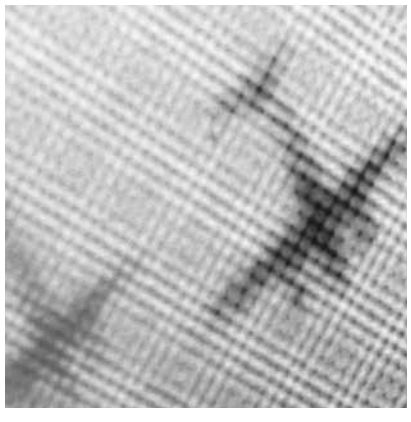
Lorenzetti’s “Lost Wheel Map”, mentioned in the prologue, provided me with a visual sounding-board, a starting point for thinking about absence, interference, and blocking. The lost map has been made unseen through a curious combination of, or interference between, images and time. It can never be retrieved in its original form: the displacement is permanent.

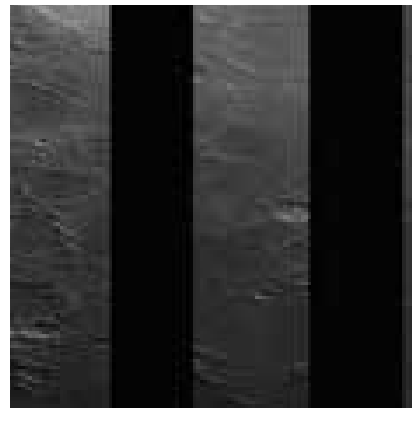





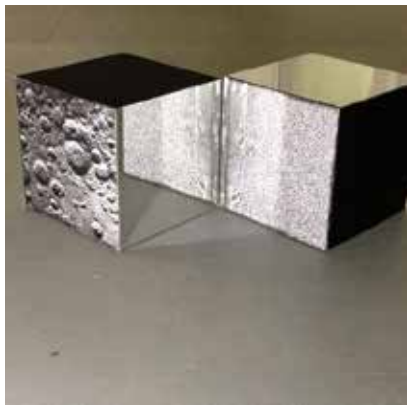
Boxes and Mirrors

Figure 96
Colleen Boyle
Digital Photograph
2010

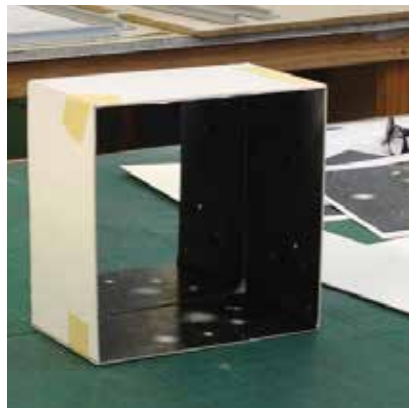
Mirrors have been present within my studio activities right from the start of the project. Their combination with boxes was perhaps an economy of scale as I attempted to plan larger installations, but the result was an undeniable reference to optical technologies such as the camera obscura, Claude glass, camera, telescope etc. An interest in illusion and magic tricks also prompted me to experiment with what mirrors could do in relation to one another and with images. Thus, I tried out miniature infinity rooms, the completion of shapes via their reflection, or allowing an image to be seen only in the mirror. However, similarly to Thierry de Duve and his opinion of Robert Morris' *L-Beams*, I felt a little "duped" by the trickery and disappointed in its finality. There was little for my imagination, and therefore a future viewer's imagination, to do.

In the meantime, my method of everyday photography had encouraged me to pay attention to my immediate surroundings. At RMIT I am lucky enough to have a studio into which glorious shafts of sunlight fall at particular times of day. Other walls and floors within the building would also be subject to pools of light as it was refracted through glass in the old factory windows. A chance placement of a mirrored box on a wall at the right time, combined with my pre-programmed schema, allowed me to shift my use of mirrors into a more complex mode that relied on the simplicity of light upon a surface. I then added the ironic play of an image of light on a wall (a photograph taken in the studio) placed on the front of a mirrored box and my "inverted camera" came into being.

However, the idea of an infinity room was not entirely left behind as it came to be, albeit in a very shallow form, in the pieces based on the shadows of frames (Figure 00). As I had chosen to place the image on the outside of the frame and in the form of a shadow, I now had the opportunity to turn the inner space of the frame into a paradox of nothing and everything by mirroring the inner sides of the frame. This created a shallow but infinite space where the white of the gallery wall seemed endless. Mirrors would come into use in other work, particularly in *The Melencolia Project* where they open up the space of the floor and also reference the aesthetics of space exploration and its use of reflective materials.

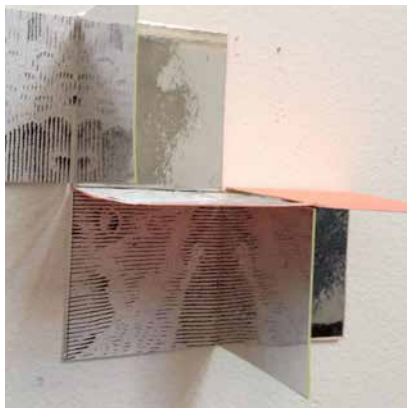
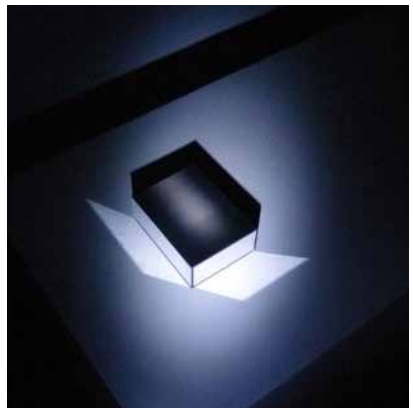




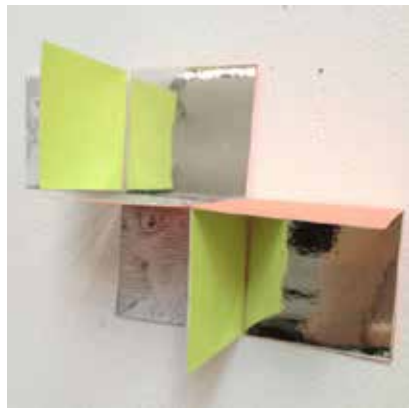



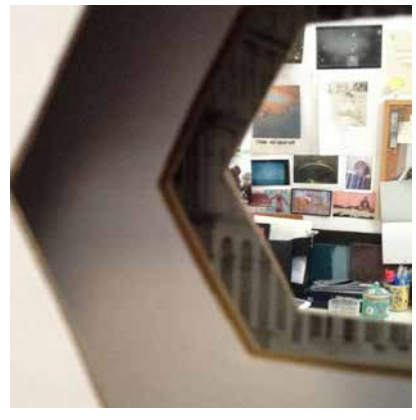










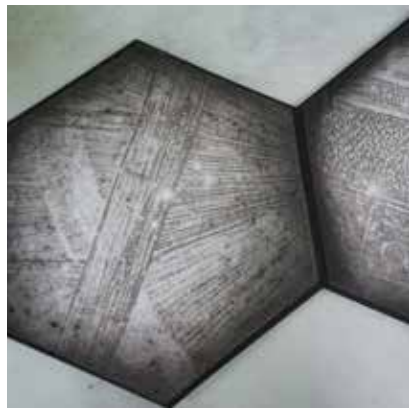
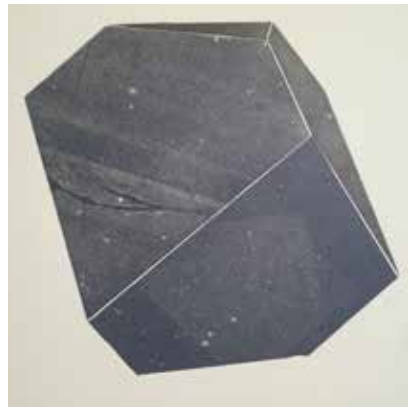
Melencolia

Figure 97
Colleen Boyle
Digital Photograph
2014

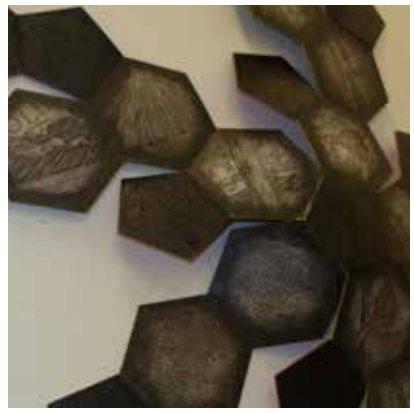
The Melencolia Project, is named for its conceptual association with Albrecht Dürer's well known engraving, *Melencolia I,* of 1514, and the spelling of the title is thus in keeping with his. Dürer's image has been subject to a great deal of analysis due to the mysterious mix of symbols and forms it includes such as: a "magic square" of numbers, the tools of geometry and architecture, an hourglass, scales, ladder, bell, a despondant angel, and rather emaciated-looking yet faithful dog.

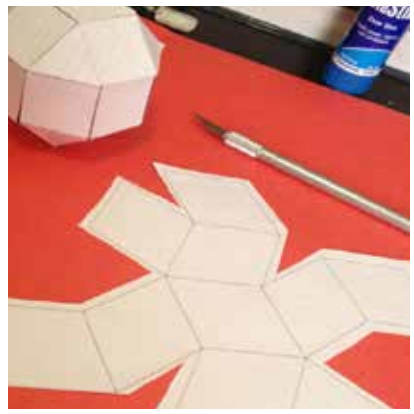
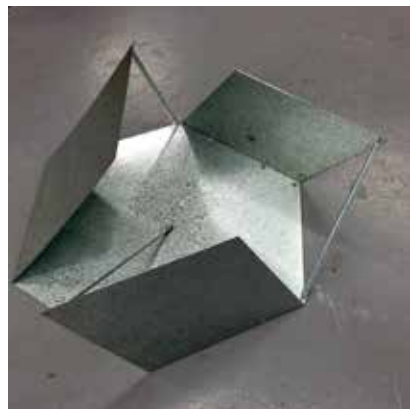
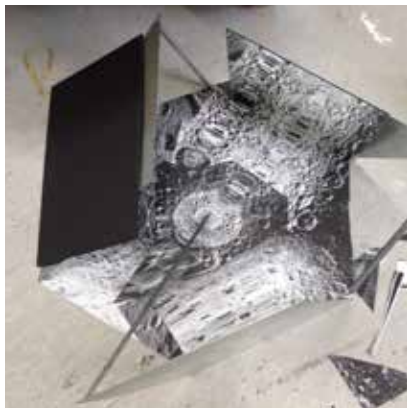
As I have outlined in previous pages, the form that attracted me most is often referred to as "Dürer's Solid", a strange geometric, three-dimensional shape on the left of the image. This led to research into polyhedral nets: two-dimensional, planar, forms of geometric solids. Like maps, they describe form in a linear manner, but in this case (most unlike a map) they can be folded up to create the solid. I then discovered that there was a form of carbon—Carbon Sixty (C60)—that had been discovered in outer space and which had a net that was the same as a soccer ball. Coincidentally, it was also the net that most approximates the shape of the Earth. It was an analogous form. An attempt to produce a version of C60 with layers of tracing paper printed with either pixels or woodgrain resulted in too many layers and a lack of transparency, but the idea of using the form, in some way or another, remained. After several attempts at remaining true to the geometric form of C60 I finally abandoned it, but not before I had experienced a great deal of the melancholy that Dürer had depicted in his print. Like the angel I sat despondantly in the studio, surrounded by failure. So I got out a pair of scissors and I angrily cut it up.

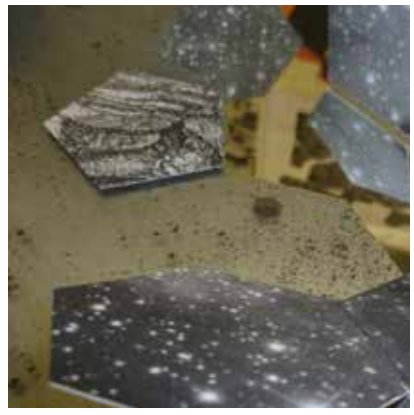
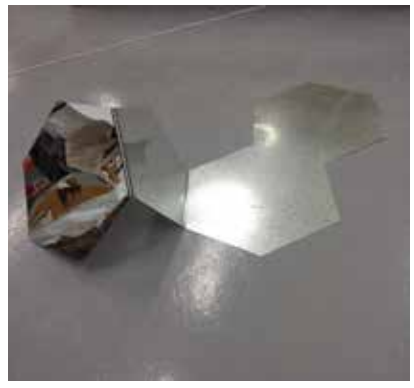
This became a little model on a mirror, which became the basis for the floor installation that is *The Melencolia Project*. Concurrent examination of artists such as Donald Judd and Sol Lewitt lead me to look into commercially available materials such as aluminium paneling and acrylic mirror. The elegant hinged work of Lygia Clark (1920–1988) provided me with a means to fold the material in a variety of angles without forcing breaks, implying movement, folding, and an eventual form. Priting images of the lunar surface onto the aluminium was directly inspired by the image of NASA scientists walking around the large mosaic photographs of the Moon as shown in Figure 00. I intend that the viewer of *The Melencolia Project* will also find themsleves on the surface of the Moon, that this reality will unfold/fold itself in their imagination, just as "Dürer's Solid" does in mine.

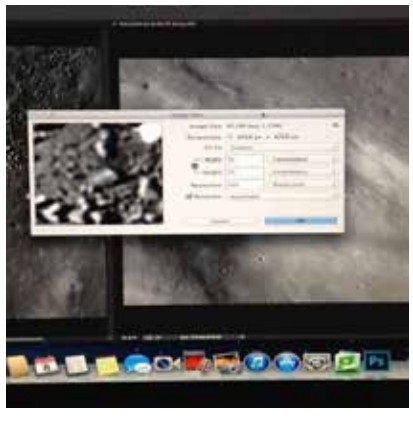




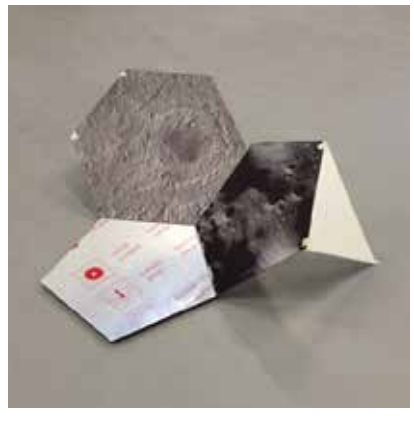






Projection and Light

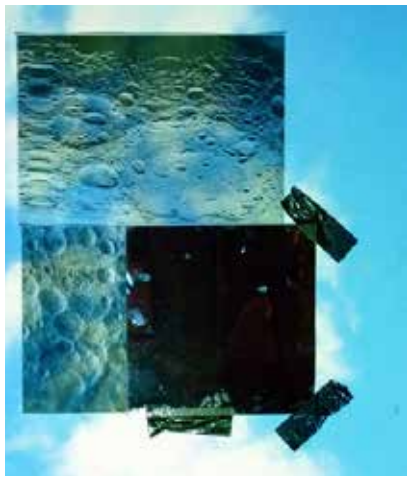


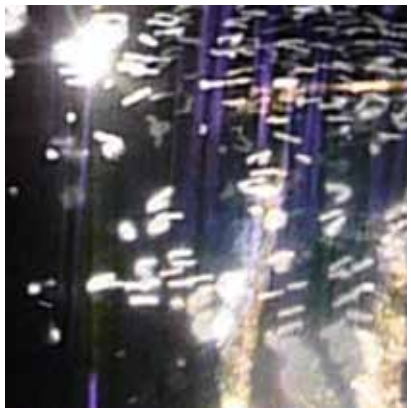
Figure 98
Colleen Boyle
Digital Photograph
2012

My early experiments with light were, again, founded in my practice of everyday photography. By paying attention to the way light behaved in my everyday surroundings I came to understand what it was capable of, such as stretching across a surface, bending around a corner, refracting through materials, or bouncing off surfaces. A longing to do something with the moving image invited me to use projected video as a light source, but the content was kept to the atmospheric and phenomenal: passing clouds, light reflecting off water, or shadows on fabric etc.

In a week spent working with Dr Mark Guglielmetti of Monash University, I trialled different surfaces as projection "screens". I quickly learned that mirrors were only useful if reflecting an image at an angle and not directly back into the viewer's eyeline. Other surfaces such as roughly painted timber softened images, flywire difussed it with a soft grid, and tracing paper could suffice as a poor-man's back projection screen. The most intersting material of all, however, was copper sheeting which gave a projected image a warm glow. More than this, the projected image seemed to both exist *within* the copper as well as sitting on its surface, the overall effect being vaguely holographic.

Other studio experiments involved restricting projections to particular shapes, or using the projection to complete a shape. I tried projections over sculptural arrangements and played with light being shone through perforated window graphic film.

I also became interested in how dynamic lighting, i.e. the use of more than one light source on an object, can create multiple shadows and how the angle of a light source can completely alter the form of an object's shadow, creating something dynamic and unusual and very much a part of the object. Projection and light thus became an indispensible part of my material repertoire.

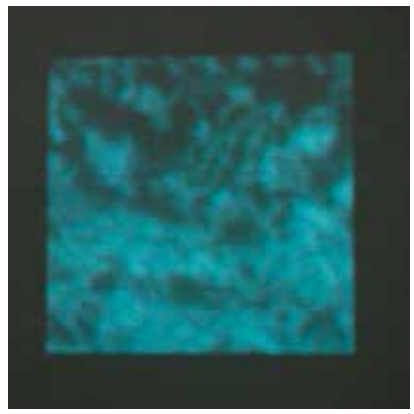


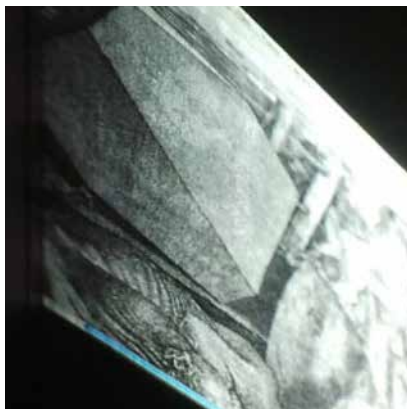




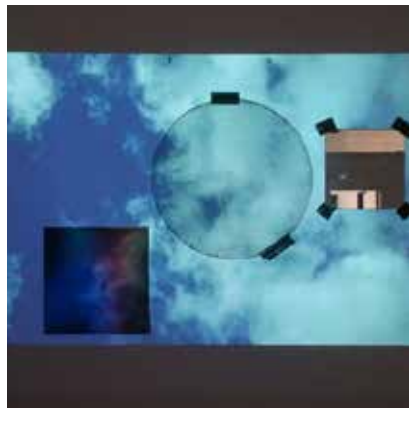










Analogy

Figure 99
Colleen Boyle
Digital photograph
2014

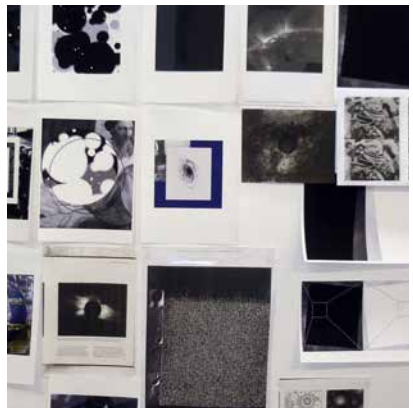
Analogy has proven to be the most difficult and yet the most rewarding of all my areas of researach in this project. Like Barbara Maria Stafford, I am obsessed with images and all forms of their analysis: the semiotic, iconographic, symbolic, historic, metaphoric, and now the analogic. As a printmaker, I had relied on images to form the conceptual content of my work and I often layered several images within one frame. Early in this project, I was encouraged to pull these apart, to unpack the layers in order to enhance the literal and conceptual gaps between the images. And thus began my initial foray into the use of visual analogy.

As simple as it may seem, the practice of pinning photocopied images to my studio wall allowed me to "be" with an image for a period of time, to come to understand it and its potential relation with other images that may, or may not yet be, on the wall. As Stafford points out in her numerous books, analogical relationship is not necessarily a linear or step by step process. It is more akin to the kind of resonnance that one might find between disparate objects within a *wunderkammer* where one cannot logically explain a connection but knows it to be true. By experimenting with images I came to understand possibly more of what analogy is *not* than what it precisely is. It is not, for example, simple similarity in appearance, not the same shape, color, or form. Furthermore, it is *not* showing one thing to represent another. For example, one night I looked at my standard lamp and decided to look at it through my camera lens. The images I took reminded me of 19th century images of the Sun. However, the minute I display this image and give it a title such as "Unknown Sun" it slips into metaphor as I am asking the viewer to make a distinct referential link. This process of seeing something in something else, occured frequently in my activity of everyday photography. For example, a streetlight photographed through wet shade cloth became a UFO and a malfunctioning sprinkler at night became a comet. These were direct "one stop" associations that were as unsatisfying in their finality as the mirror tricks I attempted.

Real analogy lay in the moments when I wasn't watching, wasn't searching for the link or the meaning. Analogy came in pieces like *The Melencolia Project* where the ghost of a lunar landing module found a way to make itself seen through geometry, mirrors, and a potential for movement. Or, in the "inverted camera" which is nothing but a box and light.

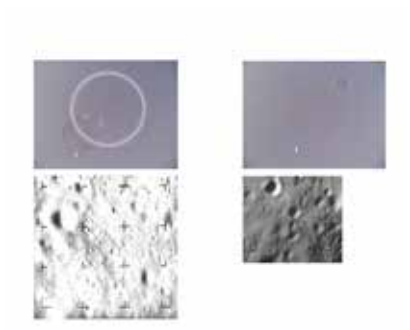


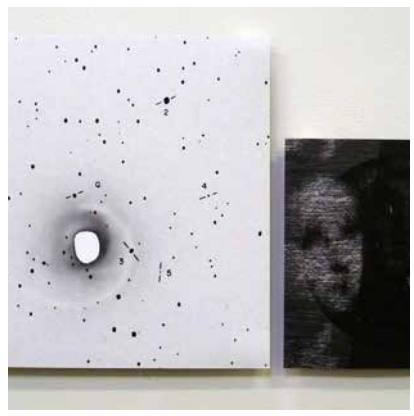


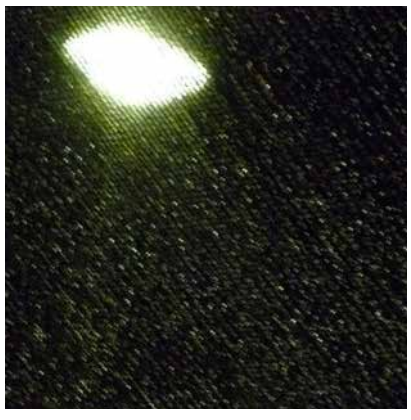



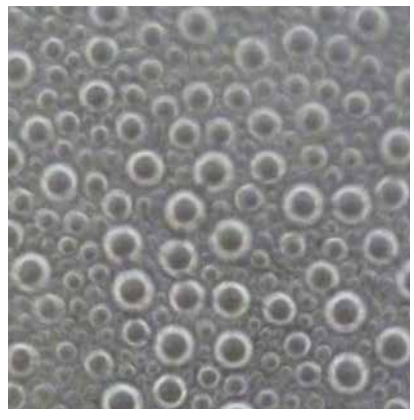

WHOLE EARTH CATALOG
This item has been removed from display




Unknown
View of the









Conclusion

Figure 100
Colleen Boyle
Digital photograph
2013

We don't have pictures in our brains, we have connections.
—Thomas Demand

The main objective of this project was to create artworks that form a bridge, or interface, between seeing and imagining in order to explore the perceptual construction of unseen realities. To achieve this I have conducted research into four distinct areas of inquiry: imagination and perception; the photographic image; what might constitute an unseen reality; and, the embedded tropes or infrastructure of an image such as framing, geometry, and perspective.

The objects of my theoretical enquiry have been images: images created by space exploration, images created by other artists past and present, and images I have made through a method of everyday photography. The latter provided me with hands-on experience of Gombrich's theory of "making and matching", a process that brought

me in touch with the feedback loop of perception and representation and allowed me to analyze the intuitive choices I made in taking a photograph. As a result of engaging this method of working I have come to understand the role of imagination in both objective and subjective modes of observation, that one is not distinctly divided from the other but, conversely, brought into relationship by the imagination. The culturaly imposed divisions between the arts and sciences, which are determined by preconceived ideas of differences between their modes of seeing and perceving, thus become blurred.

Investigations into the history and philosophy of imagination have proven it to be a field that, due to the interiority of imagination, will remain eternally relevant and frustratingly polemic. The imagination avoids direct scrutiny, and like an angel between realms can come quietly or in a blinding flash. Most importantly, for this project, the imagination does not stand alone but works as a mediator between an external world, the threshold of the image, and the internal mind. Together, they constitute an unseen reality of infinite force and scale. As Kant so thoroughly discussed, the imagination is indispensible to understanding, it is both empirical and transcendental, and the only way in which the unseen and the unexperienced can be comprehended intellectually.

My research has shown that as imagination facilitates knowledge of the world it does so by bringing together the fractured and piecemeal data received via the senses from a raw and inaccessible reality. Photographs and other technolgocially mediated images play a vital role in this process, revealing aspects of the world that may remain unseen by our own eyes. Imagination interacts with a photograph as Gilpin's armchair travelers did with a sketch, or Dürer with polyhedra: by taking Flusser's surface code and producing a potential infinity of possible realities that are only seen within the darkness of the mind. What a photograph presents as immutable knowledge via the rhetoric of historic tropes of repesentation—such as perspective—is but a waivering relfection subject to interference and transformation. The referent of an image is permanently unstuck, now shifting

from frame to frame but imagination bridges the gaps, making the world knowable once more by relating what is seen to the previously known and then offering it back, as Kant would say, “to the understanding”.

In attempting to use visual analogy within my artwork I have realized that the generative workings of imagination and the string of associative play that analogy evokes are interlinked. Just as the machinations of imagination cannot be forced, nor can that of analogy—only the groundwork can be laid. As an artist, I can offer the viewer a starting point on an imaginative journey, but never the destination. The use of reflective materials, light, shadow, and form have enabled me to utilize a vocabulary established by previous artists but to which I have added,“back in”, if you will, the role of the image and its relation to time, space, the viewer, and its distinct place within visual perception. As my research has shown, I am not alone in this concern, with contemporary artists such as Sara Vanderbeek, Shirana Shahbazi, Thomas Demand, and Jackie Redgate, all exploring the conncetions between form and image in some way.

Ultimately, my investigations—through the analysis of history and theory and through the creation of artwork—have revealed that unseen realities are a part of human visual perception with a long history that is connceted with how we mediate the world through images. There is an unseen and unbreakable link between a “thing in itself”, its form, and its image, and that is the imagination. Through my creative work I have come to understand how imagination intersects with the missing, the empty, the transitory, and the obscured, and that the threshold this opens up leads to an unseen space that is both a reflection of, and yet more than, anything seen.

In closing, I’d like to precociously suggest that Descartes change his well-known dictum to “I imagine, therefore I am”, for this research, like the work of many before, has proven imagination to be fundamental to consciousness. And as to the question of the construction of unseen realities? My eyes have been well and truly opened to the fact that there shall always be a portion of the surface never seen.

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Appendix:
Published Peer Review Papers

Figure 101
Colleen Boyle
Digital Photograph
Reflections under the Anish Kapoor sculpture commonly known as "The Bean", Chicago.2013

During the course of this project I published three peer reviewed journal papers (one out of field) and one peer reviewed book chapter. The first paper, *You Saw the Whole of the Moon*, was the result of responding to an expression of interest call-out in the journal *Leonardo.* The book chapter, *Eyes of the Machine*, came about after I presented a paper at the *Beyond Representation* conference at London Southbank University in 2012. And the final paper, *Take(s) One to Know One,* was originally presented at *The Fourth International Conference on the Image* in Chicago in 2013, and the peer reviewed version subsequently published in *The International Journal of the Image*. Aside from the publications and conference presentation experience, travelling during the project allowed me to have first-hand experience of art (such as the Anish Kapoor above) that was highly influential to the research.

11

Eyes of the Machine: *The Role of Imaginative Processes in the Construction of Unseen Realities via Photographic Images*.

Colleen Boyle

The relationship between optical technologies and human perception may be relatively young when compared with distant star clusters and galaxies, however it is a relationship that has proven to be intensely co-dependent, particularly within the space sciences. Technology has enabled the extension of our limited vision and image-making capabilities, going well beyond what the naked eye can see and exposing remote or hitherto unseen aspects of reality. Today, sophisticated space-imaging technology such as the Chandra X-ray Observatory and the Hubble Space Telescope reveal the cosmos in every wavelength from infra-red to ultraviolet and X-ray, continuing to provide what Susan Sontag describes as a 'unique system of

disclosures' that shows us reality as we have never seen it before.[1] From the first telescopes onwards, we have found fascination with the seemingly magical way in which imaging technologies could transgress the physical limits of scale and distance, but it is their mechanical capacity to present the external world as a seemingly fixed and objective reality that we truly hold in awe. Modern photography arrived at a time when Western thought was predisposed towards logical positivism, laying the ground for the ever-present association of the photograph with an indexical relationship to reality.[2] The so-called death of analogue photography may have shaken our faith in the veracity of the photographic image but the rhetoric of objectivity and transparency, particularly within the epistemic framework of science, prevails. Indeed, without some form of continuing faith in the indexical link of image to reality, knowledge construction within the framework of science would become problematic. As Bruno Latour so aptly puts it: '[y]es, scientists master the world, but only if the world comes to them in the form of two-dimensional, superposable, combinable inscriptions'.[3] The advent of photography provided the sciences with a method of observation that matched a post scientific-revolutionary desire for evidential disclosure of the world. The camera became the eye of science and, when combined with technology such as rocket propulsion and satellites, a hitherto unseen world was opened up before us. At the core of contemporary unmanned space exploration sits the remote sensor, the disembodied eye of science that completely relies upon the axiomatic nature of the relation that the photograph is supposed to have with reality. In the case of the remotely sensed image, the camera does not lie but more importantly it must not, because no one is there to see otherwise.

Just as Fox Mulder wanted to believe in UFOs, we want to believe in the reality presented to us by photographs. The potentially problematic way in which photographic technology transforms reality – via the transgression of normative vision – is set aside in favour of an ideal, objective truth. However, the link between the photograph and reality is not as clear-cut as the sciences would hope and it is also a topic that has been well addressed by others in various fields.[4] I shall touch on certain elements of that discourse, but my primary concern here is to explore the possibility that the photograph forms a perceptual bridge – an interface – between what we know and what we can imagine, playing a pivotal role in constructing our perception of unseen realities. Through various image examples, primarily from the space sciences, I will explore ways in which the mechanical "vision" of the photograph

acts as a starting point: a pictorial space that invites the construction of a more holistic reality and one that may begin with "objective" knowledge but which is completed by the "subjective" imagination.

The Inner Eye, The Photograph, The Non-finito

The word "imagination", despite its everyday and frequent use, remains as ambiguous as the act itself. A dictionary definition describes it as 'a mental faculty forming images or concepts of external objects not present to the senses', which places it firmly within the realm of perception.[5] However, imagination has also been attributed with privileged links to the productive powers of creativity. Edward S. Casey's phenomenological account points out that when it comes to philosophy, imagination has historically occupied all manner of places within an hierarchical structure of the mind and has been assigned a diversity of roles therein: subordinated by some (Plato); superordinated by others (the Romantics and the Surrealists), and placed squarely in the middle by more (Aristotle, Hobbes, Hume, Kant).[6] Even psychology provides a muddy account as it seeks to explain imagination by associating it with sensation, memory, and imitation.[7] Casey ultimately laments the lack of recognition of imagination as a particular and unique function of the mind and is disappointed that 'imagining has almost invariably been relegated to a secondary or tertiary status in which it merely subtends some supposedly superior cognitive agency such as intellect or (more frequently) modifies some presumably more original source such as sensation'.[8] Instead, Casey proffers a 'multiplicity of the mental' with no hierarchical structure, 'only a proliferation of unforeclosable possibilities'.[9] Imagination is not a self-contained or autonomous bubble of internalized images but part of a broader process that can be productive and affective, spontaneous and unstructured, intentional and controlled.

If we return once again to the dictionary definition mentioned above, we find a second, yet ultimately as important, aspect assigned to imagination: images or concepts of external objects not present to the senses. Casey may have maligned the fact that imagination was often described as a mere modifier of 'some presumably more original source' but this is what it must be. What is imagined must always be something other to what I receive via my senses. This is not a mere rhetorical statement, but a phenomenological truth. Suppose you are looking at a photograph of an apple. Concentrate on looking at that apple, be aware of your act of looking, of seeing and perceiving the

image of the apple. Now, as you continue the act of seeing the apple before you, imagine the apple, internalize the image. You will quickly realize that it is quite impossible to simultaneously see and imagine the apple. The imagined must remain unseen. What is imagined is never immediately available to the senses but this does not mean the removal of imagination from any perceptual "hierarchy" or "multiplicity" if one exists. Imagination is an integral part of our everyday perceptual processes, from daydreams to scientific analysis.

For Wilfrid Sellars, the imagination is productive. It is the binding ingredient between the phenomenological and conceptual components of perception. For him, the imagination plays a role in bringing the sensed external object (which for him exists independently of any observer) to the subject's conception. But more importantly, in this context, the 'imagination "converts" the subject's visual sensing – the underlying non-conceptual phenomenal state – into something altogether much richer, through the fusion of images with the visual sensing of a coloured, spatial array'.[10] The result is what Sellars calls a "sense-image-model", or, what others have referred to as a schema: an underlying model of perceptual experience, constructed by and continually modified by sense experience that allows me to understand what it is like to perceive something from various points of view. Furthermore, Sellars claims that even if we are unsure of the specific type of object we are looking at, we can have some idea of its physical properties due to previous sense experience of similar objects. Paul Coates takes this one, albeit subtle, step further stating that: 'The imagination produces in the perceiver an implicit awareness, or set of expectations, of the likely ways in which the phenomenal, or sensory, aspect of an experience will be transformed'.[11] We become prepared for further, differing types of sense experience, imaginatively and – productively. It is with our imagination that we bridge the gap between what we already know, what we see, and the infinite possibilities of what we are yet to see.

English clergyman and writer/artist William Gilpin (1724-1804) thought that the imagination was a truly creative force that could 'aid the poet's or the painter's art; exalt the idea; and picture things unseen'.[12] On his many walks through the picturesque English countryside Gilpin made countless sketches and written descriptions of the landscape he encountered, many of which were published as armchair travel guides intended to provide the reader with an evocative, albeit dislocated, experience of the places he had witnessed first hand. He declared that when the viewer's imagination was applied to the non-finito (unfinished state) of the sketch that it had 'the power, of creating something more itself', in effect actively constructing a new reality.[13] Not an external reality signified by the sketch, but an internal, unseen reality of the mind. By using the imagination to complete the sketch, the viewer creates a reality that sits outside the constraints of the image.

Although history and discourse have yielded variations on the definition, role, and importance of the human imagination there are certain aspects to which I will remain allegiant. The imagination is a productive perceptual interface, not a passive receptacle for sense data. Imagination must construct from previously received sense data; there cannot be simultaneous input and output as illustrated by the apple example. The imagination plays an important, yet ambiguous, role in the construction of a "sense-image-model" or schema and as such imagination allows us to understand objects we have not encountered previously by referring to what we already have. The imagination's capacity for data combination is literally infinite. Each image it produces leads to another resulting in Casey's "proliferation of unforeclosable possibilities". And finally, the reality created by the imagination is a counterpart of, but not indexical to, an external reality. The reality of the imagination remains internalized: resolutely unseen. It is from this place of vivid darkness that we have the potential to see the world afresh.

Sights Unseen

Prior to the invention of the hot-air balloon, it was only by exercising our imaginations that we could see the Earth from a distance. In 1500, Jacopo de Barbari produced a truly visionary print commonly known as, 'A Bird's Eye View of Venice' (Figure 1). In order to create this, albeit flawed, depiction of Venice as seen from an elevated perspective, Barbari needed to draw on his existing experience of seeing things from above and then attempt to imaginatively add to that basic schema. The resulting image clearly shows an artist grappling with unknown territory, pushing the outer limits of his established visual knowledge in order to create the as yet unseen reality proposed by his imagination. Unless I use my imagination, my visual perception remains restricted by space, time and physics. However, I can use my imagination to fill in the blind spots, the gaps in representation and experience and free my perception of its physical bonds. Thus, Jacopo de Barbari could perceive of a view of Venice he had never seen: the

Figure 1. Jacopo de' Barbari, 'A Bird's Eye View of Venice', 1500.

Once photography was established as a stable process, did our imaginations yield to the authority of the mechanically made image? Did this internal process waiver, after photography had so emphatically recreated the external world? If the camera can so easily reveal unseen aspects of reality for us, do we need to imagine it any more? Don Ihde has claimed that transformations imposed by technologically mediated vision are 'non-neutrally acidic' to traditional visual culture.[14] In other words, once we have learned how to see via the photograph we cannot go back, the eye can no longer be naked. Others, such as Marx Wartofsky, have claimed that photography didn't merely change how we interpreted what we could see; it actually changed what we could see, integrating itself into our perceptual processes like a discreet virus. He holds that – although the camera may not see – we can now see like cameras and perceive of the world as photographs, pictorializing the reality we encounter via the eye.[15] However, it remains to be determined whether this "acid attack" on our perceptual processes includes the expulsion of the imagination.

According to Wartofsky the 'hidden or tacit presupposition that the camera "sees" what we would see, were we present' is the most deceptive piece of "knowledge" we can take to any new observation.[16] In our enthusiasm for the so-called objectivity of the photograph, we often forget how narrow and abstracted its field of vision is.

The photograph is a tenuous representation ripped from an infinite continuum of reality: it is fragmented and incomplete. Furthermore, the transgression of normative vision via technology leads to an aura of fascination surrounding the photographic image and distracts us from the fact that the very process of taking a photograph conceals as it simultaneously reveals.[17] In effect, the photograph entirely alters the context in which we see the object and yet we continue to equate the way our eyes work with the workings of the camera.

This shortcoming of photographic representation was conveniently overlooked in the early days of space exploration. The fascination with what the technology could reveal completely overshadowed what it left out. In 1946, the United States Army launched the third of a number of German V-2 rockets that had been captured during World War II. On board was a 35mm motion picture camera that made a continuous record of the rocket's journey: from the ground, through the atmosphere, into "outer-space" at an altitude of approximately 65 miles (just under 105 km), and then back down again. The pictures revealed just a thin slice of the Earth's cloudy surface, not an entire globe. Compared to today's satellite technology, this rocket-propelled photographic mission may seem rudimentary.

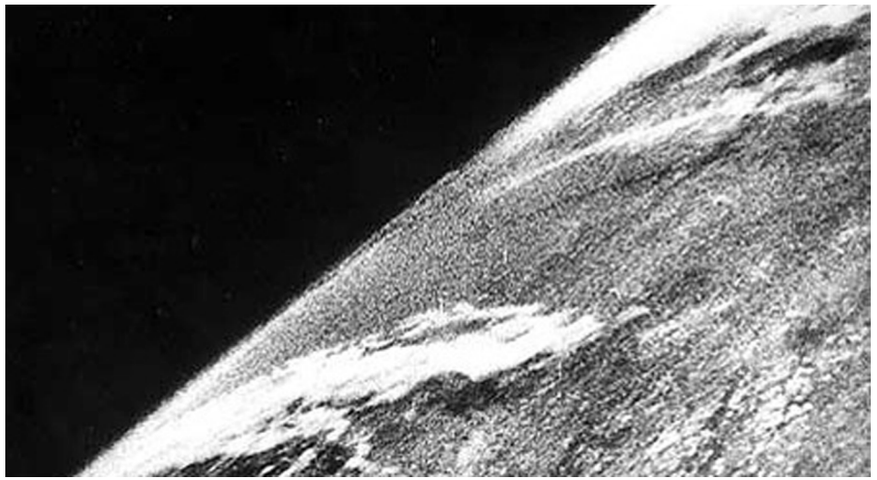

Figure 2. The first view of Earth from space from a camera on V-2 #13, 24 October 1946, (White Sands Missile Range/Applied Physics Laboratory).

However, this image (Figure 2) provided us with a glimpse of something we had never seen before, something that prior to the camera (and the rocket) had lain beyond our capacity to represent: ourselves. Here was a powerful example of the capacity for technology to reveal the unseen, devoid of any human or subjective intervention.

Suddenly, the military were thinking about what they might be able to see, not just shoot. In 1957 the Russians sent up Sputnik, but it was not equipped to take photographs. In response, the USA rushed out Project Explorer in 1958. Three satellites and only one year later, Explorer IV took the first television images of the Earth from space (Figure 3) and the potential for space-borne cameras to see what we could not was realised. The newly formed NASA immediately identified the technology's potential for meteorological studies and the Department of Defence was keen to explore any military applications. This prompted President Johnson to say at the time: 'Without the satellites I'd be acting by guess or and by God. But I know exactly how many missiles the enemy has'.[18] He didn't need to imagine anything, let alone use his own eyes: the satellite eyes showed "everything". In his enthusiasm for this new-found omnipotent view Johnson turned a blind eye to the fact that technologically mediated images can only provide selective access to unseen realities, restricted as they are to the very mechanism with which they reveal: the frame. The fragment of the Earth's surface revealed by a camera atop a V-2 or an orbiting satellite is just that: a fragment. President Johnson may have thought he saw all the enemy's missiles, but no doubt "God" still had a better view.

One method of getting around the fragmentary nature of the photograph is to bring the pieces together in order to make a greater whole. In the days of pre-digital, unmanned space exploration just such an approach was necessary if high-resolution images of large bodies such as planets were to be obtained. Individual photographs had to be manually stitched together to form mosaics such as Figure 4, a half-disk mosaic of Mercury, comprised of images taken by NASA's Mariner 10 spacecraft in 1974. Here, each raw image is clearly visible and no attempt has been made to hide the fact that the image is incomplete. Each image seems to maintain its individual integrity, as it simultaneously becomes more than itself. In this case, I use my imagination to see beyond the individual images, beyond the errors in contrast or brightness, beyond the evident borders between one image and its neighbour. As viewers we actively participate in the act of deception that the mosaic asks us to complete internally, beyond the

picture plane itself. Within the internal space of our imaginations the incomplete, patchwork image of Mercury becomes unified and whole.

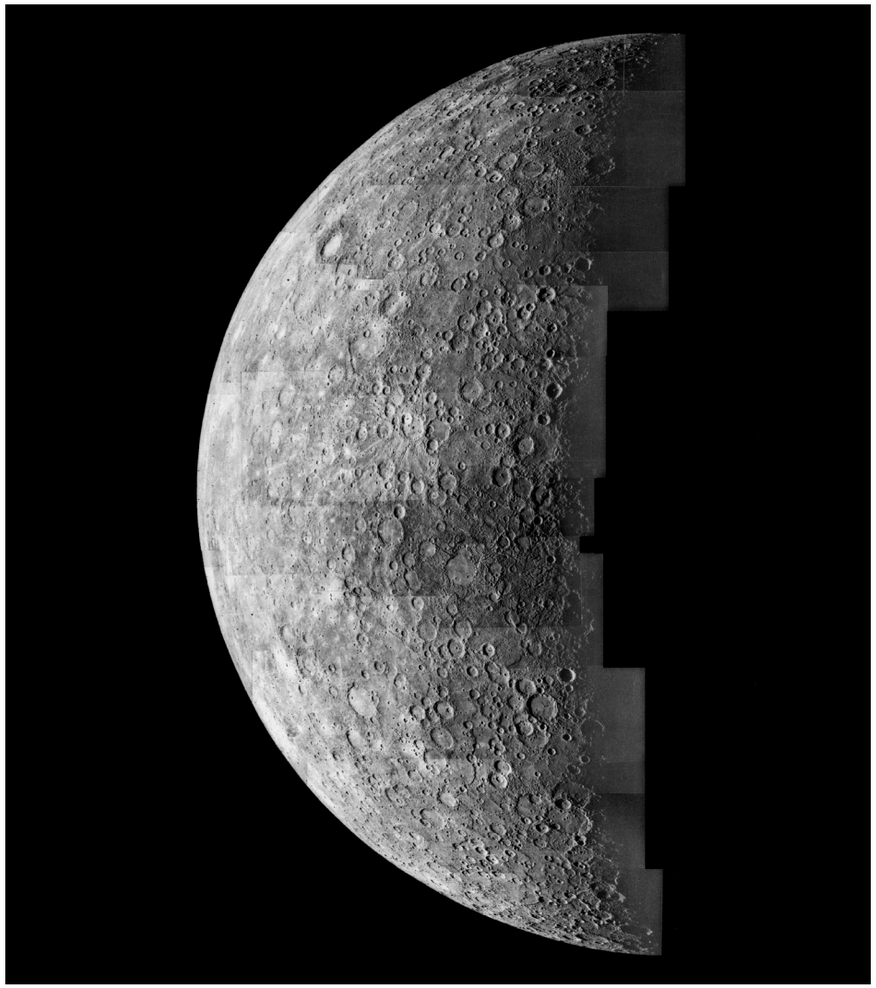

Figure 4. Half-disk mosaic image of Mercury, Mariner spacecraft, 1974, (NASA).

Figure 5. The Orion Nebula (M42) as imaged by the Hubble Space Telescope, (NASA, ESA, M.Robberto [ESA/STCCI] and the HST Orion Treasury Project Team).

Today, the Hubble Space Telescope takes multiple images in order to superimpose them into one, "complete" image. It is tempting to think that what one sees in an image produced by Hubble is the raw "reality", but this is not generally the case – or at least – not what is released to the public. As is clearly stated on the Hubble website, 'Hubble images are made, not born. Images must be woven together from the incoming data from the cameras, cleaned up and given colours that bring out features that eyes would otherwise miss'.[19] Evidently, when it comes to seeing the unseen, too much is at stake to rely on physics alone.

One full-colour Hubble image, such as Figure 5, begins as seven black and white images from three different cameras. Each image is scaled and aligned in photo-editing software before data gaps and other errors, such as dropped pixels, are filled in with information from another camera. Each image is then assigned a colour, and when combined they make a single, full-colour image. Because the final image is comprised of photos taken on the very edge, or even outside the visible spectrum, they contain aspects of reality that we would never have seen with our own eyes. To reveal these features – and show us what we might see if we could see beyond the visible spectrum – red, blue, or green are assigned to specific images: blue to those from short wavelength filters, red to those from long wavelength filters, and green for those in the middle.[20] The resulting images have little to do with what our eyes would see had we been present. Rather, they are complex models, riddled with subjective choices that render them just as much art as science. These images are truly revelatory, truly fascinating, and truly transgress any sense of normative vision, whatever that normative vision may have been. These images have moved away from any original connection to an external reality and have become heavily layered constructs. No longer a trace of nature, these images are the visual equivalent of theatrical performance, all made-up and set for the stage which, in this case, means the Hubble website, coffee-table publications, and a vast array of printable merchandise.

As visually attractive as these images may be, they successfully deflect any attempt by the imagination to add to their visual presence. Casey's "proliferation of unforeclosable possibilities" has been well and truly foreclosed. The construction of these images requires a great deal of subjective choice, but not by the viewer. In this case, all the imagining is done before we even get a glimpse at that nebula, galaxy, or star cluster. Once again everyday vision has been transgressed

by a technologically mediated version and we are left blinded by fascination and a post-production "pop" aesthetic. And yet, there remains one imaginative possibility: the idea that something this spectacular and alien to our everyday experience can exist – out there, somewhere – in a non-locatable space which can only be verified by the eyes of a distant machine. The possibility of the object, as implied by its photographic image, is therefore interred within the equivalent non-locatable space of the imagination.

Bringing it Back

The majority of our internal image of the Earth from space has been constructed by hand-held photography conducted by NASA astronauts. Since NASA's Gemini program of the late 1960s, astronauts have been extensively trained in Earth-observation including landmark location and colour matching through the use of photographs. And yet, despite such training astronauts are literally left speechless when actually faced with the Earth slowly spinning below them in real-time.[21]

As I have explored in previous work, the gap between what astronauts see and what they have been prepared to see, via photographs, is vast.[22] It appears that their visual schema of the Earth from space, developed through the use of photographs without first-hand visual knowledge of the referent, is somehow inadequate. This visual incongruence seems to prove Wartofsky's theory that 'we are saddled with a model of human vision based on the notion of pictorial representation', expecting that the reality we encounter, particularly if we have not already seen it with our own eyes, should look like its photographic counterpart.[23] In this case, the reality of the Earth from space is found to be more spectacular, more beautiful, more luminescent than any photograph could ever portray.

Astronaut Andrew Thomas spent a considerable amount of time looking out the window and taking photographs when he completed his residency aboard the Mir Space Station in 1998. Although all Earth-observation photographs are ultimately of scientific value, Thomas' primary reasons for taking the photographs were as a personal record of his journey, expecting that the photographs would allow him to return to that moment arrested within the frame.[24] In this case, the photographs fell remarkably short of what Thomas saw and experienced and so he decided to draw. The process of drawing allowed him to mentally escape the confines of the spacecraft and to explore things he 'could not photograph, but could only imagine',

making them 'much more unique than any photo 'and a more accurate representation of his time in space.[25] Within his drawings, Thomas was able to imaginatively attend to what he felt was hidden or absent from the photograph, left free to engage subjectively with the view from the window and thus to create a personal record.

The astronaut-photographer in the pursuit of quality Earth observations, very carefully avoids subjectivity and the potential for "error" with which it is associated. Over the years, the technique of taking photographs in space has been gradually perfected; from John Glenn's drugstore-purchased modified 35mm rangefinder in 1962, to the Space Shuttle's "workhorse", the Hasselblad; and finally to today's Nikon digital cameras.[26] The likelihood of aberrations, such as motion-blur and sun-glare is minimized by carefully following pre-established photographic procedure. Margins of error for all variables are taken into consideration: obliquity (look angle); lens optics (primarily focal length); spacecraft altitude; film type, and high-contrast objects. Also, the conditions of space-flight photography make getting a blur-free photograph challenging. The astronaut-photographer on the Space Shuttle floated in near zero gravity, attempting to point the lens of the camera through a small viewing window at a slowly rotating target and around which they orbited every 90 minutes. However, even this has been carefully minimized by astronauts on the International Space Station who have learned to use feedback from their digital cameras to track the moving Earth below as they take their photographs.[27] In short, all "extraneous" phenomenological and experiential data has been filtered out in the pursuit of image clarity and the highest resolution possible (currently a spatial resolution of under six meters). The result is a body of beautiful, informative but essentially homogeneous photographs that disclose little of the phenomenological experience of seeing the Earth from space (Figure 6). As Thomas said when he first viewed his own photographs of Earth, "Anyone could have taken them" because any mark of the maker has been eradicated by uniform technical process.[28] For Thomas, without any mark of his making – erroneous or otherwise – any attempt to imagine himself back into the image, to rebuild his phenomenological experience, was thwarted.

As photographers, astronauts are at the mercy of NASA training, procedures that are designed to get the best photographic observations possible. However, as astronaut Marsha Ivins once explained, there was nothing in her training that prepared her for the sight of the Earth as seen from the unique vantage point of the Space Shuttle.[29] One

look at the real thing revealed that the disparity between photograph and reality was immense. But this mismatch goes much deeper than the surface of the photograph. In this case, the photograph provided the astronaut with an incomplete schema or model, a broken code.[30] Bruno Latour reminds us that the Latin origin of the word 'reference' is referre, 'to bring back'.[31] If the schema is the point at which representation and observation meet in the feedback loop of perception, here we find that what has been brought back by the photograph is somehow incomplete or corrupt. The photograph has become a fraudulent "ready-made" whose feedback to the referent has been prematurely halted, effectively circumventing the productive process of imaginatively adding to an initial schema. Photographs of the Earth from space can never hope to provide a window on reality. The gap between what the astronaut knows and what the photograph presents will remain difficult to bridge.

The success of "making and matching" a representation to an observed object is dependent on the original choice of schema to be developed.[32] Without some sort of initial schema there is nothing to go on with, nowhere to look. Through the process of drawing, Thomas attempted an on-site upgrade of his deficient, internal, schema. Unfortunately, Thomas's schematic upgrade was doomed to fail as, in order to draw, he resorted to working from video stills of the scene from out of the window. In doing so, Thomas was blind-sided by the two-dimensionality of the image plane – seduced by its flat abstraction – and no modification of schemata could take place. Thomas once again failed to make contact with the referent and became perceptually trapped into looping back on the same deficient schema he had all along.[33]

Photographic images of our home planet from space may stand on shaky schematic ground but they are all we have got to go on. They add, ever so gradually, to our collective schema of the Earth, contributing to the construction of our inner vision of space. However, if we continue to fall prey to the prevailing belief in photography's connection to the world, if we continue to see the world through the persuasive lens of pictorial representation, then we will be sorely disappointed. We must free the photograph of the Earth from space from its indexical responsibilities and begin the process of imagining an alternative.

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Figure 6. Earth as photographed from the Space Shuttle, STS-77, (Image courtesy of the Image Science & Analysis Laboratory, NASA Johnson Space Center).

The Moon Considered as a Model, as a Photograph: Occlusion and Imagination

The problem of an obscure referent is not a new one. In the early days of photography it was difficult enough to picture what could be seen let alone what could not. Photographic technology in the 19th century was complex and required lengthy exposures to produce an image. Clumsy processes hindered the translation of reality to image, particularly in astronomy where the photographer needed to account for the subtle movement of celestial targets across the sky without the aid of automated tracking systems. This often resulted in blurry images that lacked detail and were thus only useful, in scientific terms, to an observer already well accustomed to the sight of the

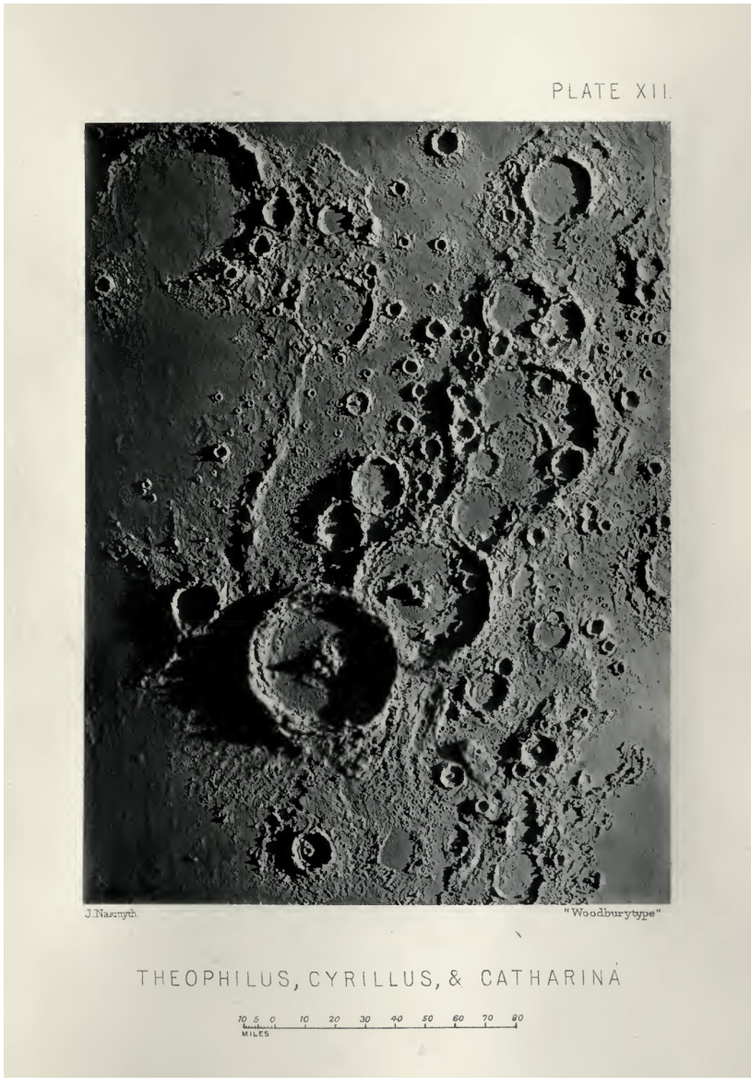

Figure 7. Lunar craters as modelled and photographed by James Nasmyth, The Moon: Considered as a Planet, a World, and a Satellite, 1874 (second edition 1885).

Figure 8. A photograph of a cracked glass orb as analogous reference to the geological forces that shaped the Moon, James Nasmyth, The Moon: Considered as a Planet, a World, and a Satellite, 1874 (second edition 1885).

"real" object through the telescope.[34] An extraordinary example of a "work-around" solution to this problem can be found in the lunar photography of Scottish engineer and accomplished amateur astronomer, James Nasmyth. In 1874 he published a book called The Moon: Considered as a Planet, a World, and a Satellite.[35] It contained extraordinary images of the Moon, such as Figure 6, that proved to be a curious blend of both knowledge and imagination. The crisp, clear and detailed images were produced after a process of careful telescopic observation and drawing combined with plaster modelling techniques that Nasmyth had learned from his landscape-painter father. The intricate models of the lunar surface were then photographed in a manner intended to create the illusion that the moon depicted in the image was the same moon that Nasmyth had seen through the telescope. But of course, this is far from the case. Due to the technical difficulties mentioned above, Nasmyth could not provide the viewer with the perfect view of the Moon as he had seen it because the referent was occluded by the very process that sought to expose it.

Instead, Nasmyth arrived at the clever solution of shifting the photograph's indexical relationship from the referent to its model. These complex images ask that the viewer do several things simultaneously. One is to accept the plaster model moon in place of the actual Moon, not merely to acknowledge the model as a stand in but to allow the viewer's imagination to convince them of the model's status as the real Moon. The success of this unspoken contractual arrangement between viewer and representation is aided by the fact that this representation is presented as a photograph, in particular, a 19th century photograph at a time in which the veracity of the photographic image was as yet unchallenged. Boosted by such faith in the photograph's capacity to render reality truthfully, Nasmyth was able to ask the viewer to use their imagination to traverse the distance between the copy and the real. But, here lays a double deception with both model and photograph claiming an indexical relationship to a reality that quite simply remains out of sight. In this way, Nasmyth's photographs of the lunar surface provide the viewer with a veritable "babushka doll" of indexical relationship: a Moon, inside a model, inside a photograph. The resulting photographs become the encoded presence of dual realities: the moon that Nasmyth saw through his telescope with his own eyes and the one that he asked us to forge within our imaginations, and which is truly more than the sum of its parts.

Nasmyth's curiosity about the Moon extended to its geological

formation. In order to help describe the various processes that Nasmyth thought might have formed the lunar landscape his book included images such as the wrinkled back of a hand, a shrivelled apple, and a cracked glass orb (Figure 8). In this way, Nasmyth could ignite a chain of analogous, visual relationships within the imagination of the viewer and any indexical relationship between photograph and object is forced to take second place. It is upon this potentially infinite string of association, that the viewer constructs knowledge of the Moon, from a cracked glass orb to the cratered lunar surface. Any recourse to indexical relationships, in this case, would be a meaningless transgression. Indeed, analogy – as Barbara Maria Stafford points out – is a process of connecting the disparate.

> It is the proportion or similarity that exists between two or more apparently dissimilar things: like the tensile harmony that Parmenides maintained fitted together fire and earth, or Empedocles believed conjoined love and hate, or Anaxagoras thought tied the visible to the invisible realm.[36]

Nasmyth thus takes his lead from Anaxagoras and reveals geological forces that we shall never see, via the photographic image of an everyday and accessible object. Our knowledge of the processes that shaped the lunar landscape is thus forged within the intermediary space of the imagination as it hops from image to image, from the seen to the unseen.

Mikael Pettersson has recently explored the relationship between the seen and the unseen, and the role the imagination plays in traversing the two, in relation to Richard Wollheim's theory of pictorial "seeing-in".[37] According to Wollheim's theory, we undergo a twofold perceptual process when we look at an image: we see the content/subject of the image but also the medium/surface in which it is presented.[38] For example, when I look at Nasmyth's cracked glass-orb, I see the orb itself but I simultaneously see that it is printed on paper. Because of this twofold process, we are not always able to say exactly "where" we see the picture. Pettersson takes this further in an exploration of how visual occlusion or quasi-occlusion within an image (for example, one object obscuring another, a cat with its tail behind) can lead to a non-localized experience of seeing-in or what he describes as a "non-localized pictorial experience".[39] By this, he means a perceptual experience that is "seen" in the non-locatable and intangible space of the imagination. In short, when an element of an

image is occluded from our vision it is our imagination that fills in the gaps.

However, let us take this proposition one step further again. What if we accept the photograph as a total visual occlusion? For Vilém Flusser, the photograph itself blinds us to that we wish to see, putting itself in front of the object. In his eyes, "technical images" such as photographs are not windows on reality, but 'computed possibilities (models, projections onto the environment)' that have no indexical relationship to the world.[40] He refers to a kind of "programming imagination" (Einbildungskraft), one that is capable of recognizing that, although 'the last vestiges of materiality are attached to photographs, their value does not lie in the thing but in the information on their surface'.[41] The examples I have examined thus far would seem to correlate such a proposal and espouse the concept of photograph as simultaneously an occlusion – to an a priori, external reality – and a threshold to an infinity of possible realities of the mind. Photographs ask that we accept their encoded surface in place of the real, diverting our line of sight and blocking access to the external reality we so desire. They simultaneously occlude what they present, literally arresting our gaze as we attempt to "see in" to the reality of the image. This occlusion forces us to internalize the image and thus render the world imaginable. Each image we encounter, each occlusion, adds to an internal mosaic of our subjective reality as imperfect and as incomplete as the 1968 image of Mercury.

Fragments, Torrents, Models

The contemporary experience of images – in particular, the photograph in all its diversity – is such that we have a myriad of images upon which to draw, in order to fill any gaps in our direct experience of the external world. Reality itself has become fragmented by pictorial duplication, dispersed amongst what Siegfried Kracauer once described as a "blizzard", a blizzard that has now well and truly become a "torrent".[42] In order to see anything nearing a degree of totality or wholeness, we must adapt, casting aside our craving for the assurance of a concrete reality reinforced through the relentlessly monocular view of the traditional perspectival, isolated image. To truly perceive the unseen, we must discard our normative vision and trust in the eyes of the machine to provide, not a link to a traditional reality but the code – the fragments, the model – from which we are to build our own. By shifting the angle of our viewing, by bringing

images together within our imaginations, we just might find that they can provide more than the sum of their parts. Just as two images taken from slightly different angles can be combined to realize a three-dimensional image, so too can a more holistic "vision" of reality be achieved by the imbrication, layering, and interposing of images in the non-localized zone of the imagination.

Photography is now as difficult to define as it is to contain; its practices are fluid and its physicality near to invisible. As the blizzard of the 1920s became the image torrent of today, a subtle shift occurred in how we use photography to relate to the external world. Artist Penelope Umbrico recently went so far as to state that the 'image torrent is actually alive, emergent and perhaps more indexical than photography has ever been in the past', and that all images 'function as a collective visual index of data that represents us – a constantly changing and spontaneous auto-portrait. The index has shifted from visually descriptive truth to accumulative visual data'.[43] We now construct our concept of reality upon this accumulated visual data, each fragment of information scaled and aligned by the editing software of the imagination.

We may never see Earth's blue disc from space with our own eyes but we can construct our own perception of this, via a multitude of images presented to us in both print and electronic form. Personally, I have often wondered what it might have been like to be NASA astronaut John Glenn when, in 1962, he became the first American to orbit the Earth and the first human to take photographs of its surface. I wonder what aspects of the reality of that journey are not brought to me via the photographs and the films; what truths remain untold, what parts remain unseen in the gaps between the images. The photograph can no longer hold us with naïve realism; no longer tempt us with the seductive powers of positivism. Instead, the photograph reveals the world in a manner akin to the best form of striptease: always leaving something on, always covering what the eye desires and therefore leaving the rest up to our imaginations. [Figure 9

The photograph may bring us the world in pieces, but it is via the photograph that we are able to "imagine" ourselves into a broader field of reality. The photograph can only ever be a surface of code, a model – plaster moon or otherwise – a sketch, a non-finito, or a fragment. We add to this seductively incomplete rendering of reality with our own experience, drawing on existing schemata, other images, and visual impressions to construct an unseen reality within our minds. In some cases the foundations upon which we build

these internal impressions may be shaky, our visual schemata may be lacking and this is a problem inherent in any concept of reality based solely upon the photograph. To use the parlance of space image processing: there will always be "data gaps" or "hot" or "dropped" pixels. However, it is in these inconsistencies, absences, and occlusions that we find the potential to see through the eyes of the machine in a truly imaginative and human way.

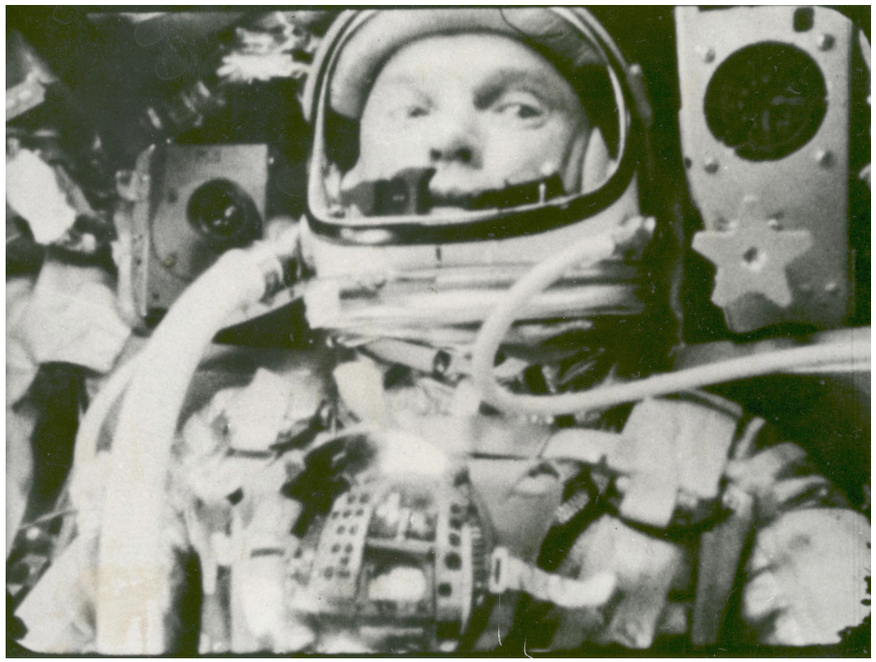

Figure 9. Astronaut John Glenn as photographed by a 16mm motion picture camera on board Friendship 7, 1962, (NASA).

Notes

[1] Susan Sontag, On Photography (New York: Farrar, Straus & Giroux, 1973), 119.

[2] See: Alan Trachtenberg (ed), Classic Essays on Photography (New Haven: Leete's Island Books, 1980).

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[12] William Gilpin, cited in Wendelin A. Guentner, 'British Aesthetic Discourse 1780-1830: the Sketch, the Non-Finito, and the Imagination,' Art Journal, Vol. 52, No. 2 (1993), 43.

[13] Ibid.

[14] Don Ihde, Postphenomenology: Essays in the Postmodern Context (Evanston, IL: Northwestern University Press, 1993), 43.

[15] See: Marx Wartofsky, 'Cameras Can't See: Representation, Photography, and Human Vision', Afterimage, Vol. 7, No. 9 (April 1980), 8-9.

[16] Ibid., 8.

[17] Ihde, Postphenomenology, 47.

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[20] Ibid. http://hubblesite.org/gallery/behind_the_pictures/meaning_of_color/ [accessed 20 June 2013].

[21] See: Coleen Boyle, 'The Artist and the Astronaut', Meanjin: Fine Writing and Provocative Ideas, Vol. 59, No. 3 (2000), 201-210.

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[27] See: About.com Space/Astronomy, International Space Station Astronauts Set New Standard For Earth Photography (2002), para. 5,

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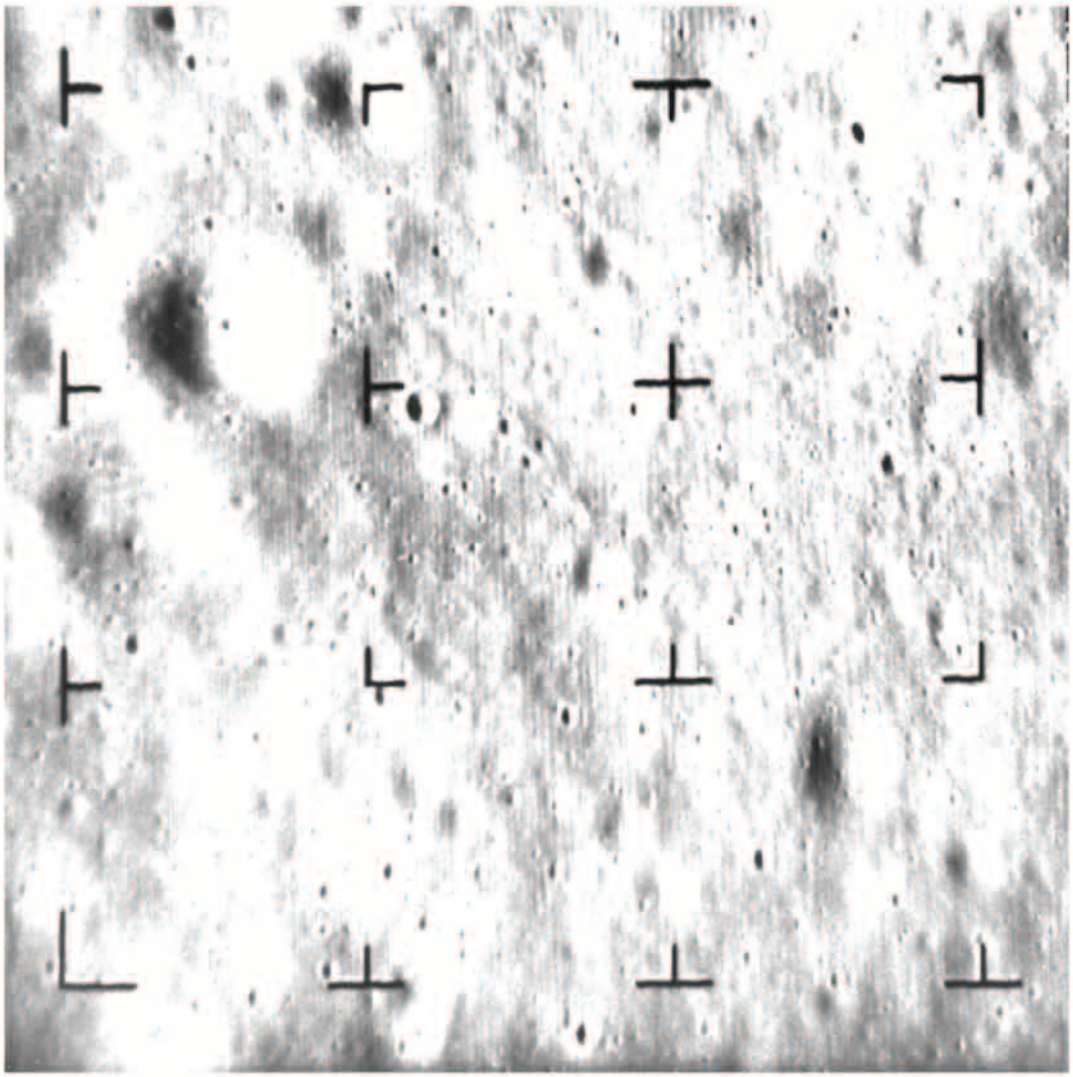

GENERAL NOTE

You Saw the Whole of the Moon: The Role of Imagination in the Perceptual Construction of the Moon

Colleen Boyle

ABSTRACT

The author offers a short history of how our perceptual relationship with the Moon has changed over time. Examples of lunar imaging by Early Renaissance painter Jan Van Eyck, Leonardo da Vinci, Galileo, 19th-century photographer James Nasmyth and NASA's *Ranger* and *Lunar Orbiter* missions of the 1960s reveal ways in which our perception of the Moon has changed. Images of the Moon produced by technology remain far from "complete"—they are akin to fragments, sketches or models, providing information upon which the imagination can build. How we imagine the Moon, the author argues, is symbiotically linked with our representations of it; we only perceive the truly complete, whole Moon in the non-localized zone of our imaginations.

I wandered out in the world for years
While you just stayed in your room
I saw the crescent
You saw the whole of the Moon [1].

While browsing a 1950s astronomy book, I came across a lunar topographic map with the curious title "A Complete Description of the Surface of the Moon, Containing the 300-inch Wilkins Lunar Map." My immediate reaction was that surely this description, detailed as it was for the time, was anything but complete. After all, it contained no information about the dark side of the Moon. Despite this obvious omission, the notion of "a complete description" truly piqued my curiosity. What would constitute a "complete" description or view of the Moon? By charting a short history of how our perceptual relationship to the Moon has changed over time, this paper explores the role our visual imagination has played in bringing the "complete" Moon into focus.

Alien neighbor, distant friend and nearest natural satellite, the Moon remains a secret to our naked eyes, hiding half its sphere in perpetual darkness due to its synchronous rotation with the Earth. Our everyday, phenomenological experience of the Moon is thus "one-sided," but when combined with our pictorial experience of the Moon, this natural occlusion, or incomplete vision, can be circumvented by the imagination. Mikael Pettersson has recently built upon Richard Wollheim's concept of "seeing-in" [2] to an image by suggesting that in cases where the image contains visually occluded elements, "seeing-in" becomes non-localized, in that no particular part of the image's surface sustains the experience of seeing [3]. Furthermore, because this experience is due to the occlusion of elements, it should not be likened to "pictorial *seeing*," but perhaps thought of as "pictorial perceptual presence" [4]. It is in just the manner of this non-localized presence that I propose we now perceive the Moon—a presence that has been constructed via a potent combination of phenomenological experience, representation and our imaginations.

Imagination is a highly visual and constructive cognitive function. When I read a book, I "see" the events unfold in my head. When I look at an abstract painting, I "see" an image within. I conduct research for this paper and my imagination helps me construct a hypothesis. My imagination, whether in the service of scientific deduction or artistic creation, reaches further by reassembling previously obtained sense data. Without previous knowledge, without preconceptions, my imagination has nothing on which to build. In the case of the Moon, my imagination has manifold perceptions on which to draw.

Historical Examples

The way in which we currently perceive the Moon is firmly linked to how humans have viewed and represented it over time, from the naked eye to the lens, the photograph and beyond. Prior to the Renaissance the Moon was seen with a pre-photographic, pre-scientific, pre-ocularcentric consciousness that perceived the external world through a complex filter heavily tinted with religion, mysticism and metaphysics. Being able to see, think and act outside of what Foucault would term the *episteme* [5] of one's time is remarkable; individuals who make the inferential leap into new ways of thinking are rare.

In the early 15th century, Dutch painter Jan van Eyck (1395–1441) unveiled the Moon in spectacular, naturalistic clarity, leaving behind the more simplified and symbolic representations of his predecessors. First in *The Crucifixion* (1420–1425) and in four subsequent paintings, van Eyck truly observed the Moon as it looks to the eye in the daylight sky: pale, white and blue, the dark plains of the surface easily visible [6]. His was an objective vision, a faithful representation that heralded a new way of seeing the natural world, such as would come to the fore in the following century. Van Eyck's great imaginative contribution to how we see the Moon was to see what others did not, to see it as it was and to represent it as such**.** His eye, which as Panofsky noted operated simultaneously as microscope and telescope [7], enabled him to imagine an alternative to the hitherto allegorical or iconographic treatments of a lunar presence within established Christian scenes.

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See <www.mitpressjournals.org/toc/leon/46/3> for supplemental files associated with this issue.

Article Frontispiece. Colleen Boyle, *Moon-Pixel-Bubble*, inkjet print, 40 × 53 cm (top)/53 × 53 cm (bottom), 2010. (© Colleen Boyle)

 doi:10.1162/LEON_a_00564

Leonardo da Vinci (1452–1519), who was born shortly after van Eyck died, lived at a time when the world was awakening to scientific thinking. Many artists were exploring simple lenses and instrumentation to aid their creative pursuits. Leonardo, however, derided the use of these devices, claiming that artists who made images "through glass, or other surfaces or transparent veils" could not "reason about nature with their minds" and thus produced images that were "poor and mean in every invention" [8]. Leonardo seemed to sense a change in how these images connected with reality, perhaps tapping into what Vilém Flusser has described as a shift from the observation and depiction of objects by "traditional" images to the computation, or visualization, of concepts by "technical" images [9].

Leonardo's world was whole and tangible, not fractured and conceptual. Thus, the only instruments he required to explore it were a keen eye and mind [10]. The dark, volcanic plains of the Moon, known as *maria* (Latin, meaning "seas"), are easily visible via the naked eye, and their nomenclature is a reminder of how early astronomers imagined the Moon's terrain as analogous to that of the Earth, with mountains, plains and even water. Leonardo made three drawings in his notes that included these features. It seems, however, that he saw these dark spots as landmasses, assuming the more reflective areas of the lunar surface to be water [11]. Indeed, it was by simple naked-eye observation, and liberal use of this analogous link between Earth and Moon, that Leonardo came to the conclusion that the ghostly image of a full moon visible during a crescent moon occurred due to sunlight reflecting off the Earth's oceans and illuminating the lunar surface.

We now know that the majority of earthshine is due to clouds, not oceans, but this does not diminish the fact that Leonardo's discovery is an extraordinary example of what knowledge combined with imagination can achieve. Today, we value the perceived objectivity of automated imaging processes, particularly within the sciences. However, the role of imagination in representing and perceiving the Moon has not been made redundant. Rather, as I explain below, that role has shifted from the site of image production to the site of image consumption [12].

Perception and Interpretation

It is extremely difficult today to reverse-engineer our knowledge of the Moon and to fully comprehend the magnitude of the shift in perception that accompanied the introduction of technologically mediated vision. Prior to the publication of Galileo's telescopic observations of the Moon in his book *Sidereus Nuncius* [13], the Moon was considered "immaculate," associated with Mary in the Christian faith—mother most pure and inviolate. Although the English astronomer Thomas Harriot made telescopic observations of the Moon just 4 months prior to Galileo in 1609, his drawings added little information to what was already available to the naked eye, and they were never published. Galileo, on the other hand, forever changed how the lunar surface was perceived by adding to what he saw through his rudimentary telescope with a combination of prior knowledge and imagination (Fig. 1). Galileo was aware of analogous comparisons between the Earth and Moon and the idea that the lunar topography might contain Earth-like features such as mountains, valleys and seas [14]. Thus, when he looked through his telescope, his mind was ripe with preconception on which to imaginatively build. Furthermore, it was perhaps his artistic training and understanding of chiaroscuro that aided his ripe mind in the revelation of a more alien lunar landscape, dramatically pocked with craters.

The Moon was now blemished; Galileo's observations and depictions of the Moon had led to "a revolution in perception and thinking that was reflected back to earth and its inhabitants" and constituted "an irreversible historic turning point" [15]. In 1969, Neil Armstrong may have claimed that landing on the Moon was "one small step for [a] man; one giant leap for mankind," but nearly 360 years earlier, Galileo claimed the Moon with his imagination, illuminating its surface with his drawings and expanding the space of which we believe ourselves a part. One simple telescope established a new framework from which to view the cosmos, and the universe was no longer seen with the eyes alone. We turn our eyes to the Moon at night, and our imaginations immediately see more than what is visibly available to us. We move beyond what we can see, filling in the gaps with every image we've ever seen of the Moon, including, if we're lucky, Galileo's magnificent watercolors and engravings.

Fig. 1. Galileo's lunar observations printed as engravings in *Sidereus Nuncius (Starry Messenger)*, 1610. Image courtesy of Octavo Corporation and Warnock Library.

Photography

The Moon is a part of our everyday visible reality, and yet the bulk of what we know of it has been brought to us via photographic images. In the late 19th century, astronomers struggled with technical difficulties inherent in telescopic photography as they attempted to realize their goal of photographically mapping the lunar surface. Without automated motion-tracking systems, early telescopic photographs could not reconcile the need for lengthy exposures with the Moon's subtle movement across the sky.

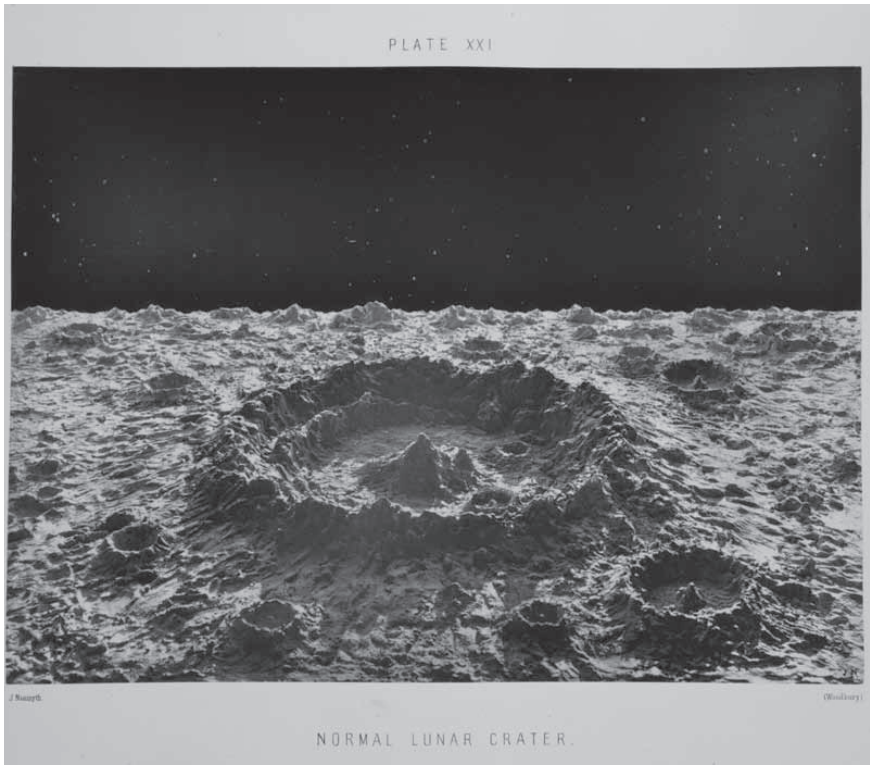

Fig. 2. James Nasmyth's publication *The Moon: Considered as a Planet, a World, and a Satellite* (1897) contained photographs of plaster models of the lunar surface based on his telescopic observations.

The resultant images were lacking in clarity and focus and not truly representative of what was seen through the telescope, requiring a trained eye to be made useful [16].

In 1897, James Nasmyth, Scottish engineer and accomplished amateur astronomer, found a way of circumventing these difficulties through the inventive use of plaster models. Encouraged by developments in printing technology (namely the invention of photomechanical prints and the use of permanent, carbon-based inks), Nasmyth decided to share his vision of the Moon via a publication with his business partner, astronomer James Carpenter, and together they produced *The Moon: Considered as a Planet, a World, and a Satellite* [17]. After a process of careful observation and drawing, Nasmyth built on techniques learnt from his landscape-painter father and produced intricate plaster models of the lunar surface, effectively replicating what he saw through the telescope with his own eyes. These stationary models were then dramatically lit and photographed (Fig. 2).

The resulting images have a complex relationship to reality to which the viewer is not immediately privy. Like any photograph of this period, these images declare to the viewer that they *refer* to a real object, that they have a direct, indexical relationship to reality. However, in this case, that reality is a false moon, a model constructed by Nasmyth from his first-hand visual knowledge of the real Moon. The power of these images lies in their proposition that the viewer accept the model in place of the real in order to gain access to the reality of the Moon as seen through Nasmyth's eyes. In other words, we are asked to accept the indexical relationship of the photograph to the model but to simultaneously imagine a "real" moon in its stead. Furthermore, by providing analogous examples of what the lunar surface is *like*, Nasmyth's images once again tempt the viewer's imagination into crossing the threshold between the copy and the real.

In order that the viewer have some understanding of the processes that Nasmyth felt had forged the physical properties of the Moon, the book included images such as the back of a wrinkled hand, a shriveled apple and other such likenesses (Fig. 3). By visually postulating complex geological processes through these analogous examples, Nasmyth continued the perceptual construction of knowledge from the point at which the photograph left off, relying not on indexicality but on visual correspondences. Or, as Barbara Maria Stafford describes it: "Real information in one sense is accompanied by a perception in another sense" [18]. Perception, in this case, is a process of imagination**,** where analogy provides the power to trigger a potentially infinite string of association in the mind of the viewer, from a wrinkled hand to the surface of the Moon.

Nasmyth's publication was a resounding success with both popular and sci-

Fig. 3. James Nasmyth used analogical imagery such as photographs of a wrinkled hand and a shriveled apple to describe lunar geological processes.

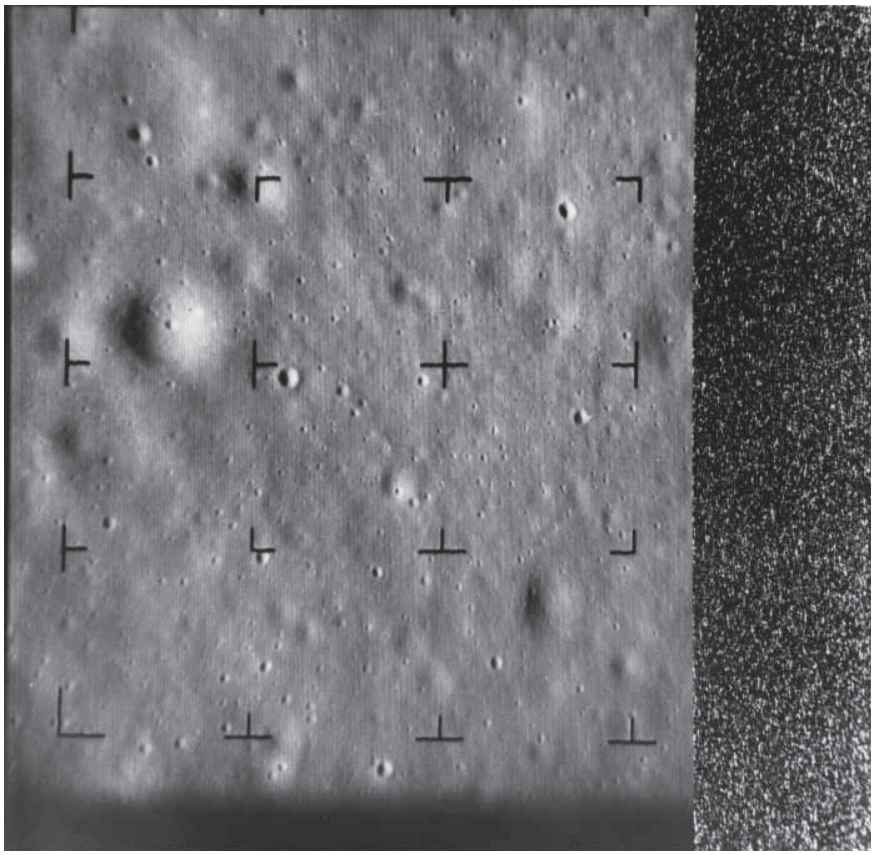

Fig. 4. Final image transmitted by Camera A on NASA's *Ranger VIII* spacecraft, 1965, just prior to the vessel's crash into the lunar surface. (Photo: National Aeronautics and Space Administration [NASA])

entific audiences, success with the latter being an extraordinary feat, given that Nasmyth used the very "flaw" that scientific observation attempts to eradicate: imagination. Nasmyth's curious images lie in a transitional region, somewhere between an internal and an external reality, between the telescope and the photograph, the copy and the real; and it is our mind that is asked to make the journey between the two.

The process of adding to real information with the imagination and extending beyond what is seen with the eyes alone is similar to what English artist, scholar, clergyman and keen walker William Gilpin (1724–1804) described in comparison of the sketch, or *non-finito,* to a completed painting. Gilpin brought the concept of the *picturesque* to eager 18th-century armchair travelers through publications that contained vivid descriptions and suggestive sketches of his many walks through the British countryside. Gilpin moved beyond the idea of the sketch as stimulating the viewer to imagine a potential, completed painting, proposing instead that the sketch in combination with the viewer's imagination could actively construct reality. He felt that a description of a scene, written or pictorial, could never match reality, but that a sketch could assist the imagination in realizing "it has the power, of *creating something more itself*" and that the force of our imagination could "aid the poet's or the painter's art; exalt the idea; and *picture things unseen*" [19]. For Gilpin, imagination was a powerful, self-aware force that drove the creation of a new *reality*; not an external reality signified by the sketch but an internal, *unseen* reality of the mind. By adding to the incompleteness of the sketch, drawing on preconception and archetype—the footholds of visual analogy—the viewer's imagination is free to glow with "a thousand beautiful ideas" [20] in an infinite, nonlinear string.

In 1983, Vilém Flusser suggested that "even though the last vestiges of materiality are attached to photographs, their value does not lie in the thing but in the information on their surface" [21]. For Flusser, "technical images" such as photographs are "computed possibilities (models, projections onto the environment)" [22] that break all contractual obligation to indexicality. In this sense, they are as Gilpin's sketch or *non-finito*: a threshold of unfinished information upon which the imagination builds. In the early 1960s, NASA sent a series of six *Ranger* imaging spacecraft to photographically map the lunar surface. In Fig. 4, we see the Moon's surface at close proximity and in the greatest detail the *Ranger VIII* imaging system could produce. A thin strip of incoherent noise and static provides evidence of the spacecraft's "death" as it crashed into the lunar surface and ceased transmission. Here, it is not only the Moon itself that I imagine but also the death throes of a blind machine in the service of scientific vision. The (non) information or, as Pettersson would say, "occlusion," provides fertile ground for the imagination, affirming that although the photograph may be considered indexical, it is not isomorphic. The photographic image, like the sketch, is not a window on an external reality but an aid to our capacity to realize another: one contained within our minds. Ironically, in order to overcome the inherent visual occlusion of the Moon (of the side never seen from Earth), we sent machines that inevitably produce their own blind spots, susceptible as they are to visual interference and the constraints of engineering [23].

The photograph is the technologically mediated image that dominated the 20th century, expanding the world by breaking it into fragments, frame by frame. In 1970, art theorist Rosalind Krauss used Alfred Stieglitz's cloud series *Equivalents* (1923–1931) as a "pre-eminent example of the fact that, if photography duplicates the world, it does so only in pieces" [24], suggesting that the cropping of the image directly implies the presence of that which is not represented. This is precisely what images of space do on a truly astronomical scale, presenting us with radically decontextualized objects, ripped from the continuum of the sky. Even our Moon, if it is to be imaged in any detail, must be photographed in pieces. In Fig. 5, two scientists in their socks examine a mosaic of the Moon's near surface produced by NASA's *Lunar Orbiter IV* mission of 1967 [25]. The series of five spacecraft took high-resolution images of the Moon in order to confirm the selection of the proposed Apollo mission landing sites. To make this "complete" view of the Moon, *Lunar Orbiter IV* transmitted individual images back to Earth, line by line. The images were then printed and arranged on the floor of NASA Headquarters, the imbrication of their edges allowing the formation of a whole. The two men ponder, explore and gesticulate over photographic prints of a place they

have not seen with their own eyes. They run their fingers over the surface of the prints, imagining each rocky bump, the play of light upon the edge of a crater, the texture of the lunar dust, when in fact the only thing the image yields is the smoothness of its impenetrable surface. The reality of the Moon, as Flusser said, is not contained within the photograph itself, nor is it in the unseen reaches of space. It is a model, a projection off the surface, constructed in much the same manner as the mosaic image—piece by piece, edges overlapping—in the minds of the scientists that caress the image.

The Contemporary Moon

The contemporary Moon is glimpsed between city buildings, caught accidentally in a family snapshot; it is rarely *seen*. In my photographic work *Moon-Pixel-Bubble* (Article Frontispiece), a soap bubble reflects the light of the Moon, and 4 pixel-like squares cover the Moon's presence as captured by my domestic digital camera. Due to our increasingly mediated lives, our primary relationship to the Moon is via its reproduced image. Like remote sensors, we collect images from various sources: books, magazines, TV, film and the Internet. The Moon's visibility has been redistributed, the "real" Moon paling in comparison to its many clones, fragmented into Krauss's pieces as it is duplicated. *Moon-Pixel-Bubble* taps into these fragments, using a modified version of a Ranger spacecraft photograph and an artificial "moon" in order to set off Gilpin's chain reaction of the imagination and to *picture things unseen*. Here the viewer is asked to *see* the pictorially occluded Moon via a photographic version of the Moon that they have never experienced with their own eyes. My eyes will never see the Moon in its entirety, but I construct my conceptual reality of it via images brought to me through technology. It is, as Don Ihde would suggest, a reality of the mind and not of the eye [26]. Even my domestic digital camera, as it "looks" at the Moon, can only give me a blob in the sky, but if I use my imagination I can construct a hybrid Moon: bringing together its visible and invisible features, its reality and fiction.

I no longer need to cast my eyes at the face of the Moon. Van Eyck saw it for me; Leonardo studied it for me; Galileo transformed it for me; Nasmyth showed me the real Moon via its copy; and many others following them have illuminated its surface through "transparent veils." The potent combination of space exploration and the camera broke the Moon's surface into myriad frames, disclosing its "magnificent desolation" [27], acting as a threshold for the imagination, an imagination that navigates a nonlinear, layered and complex conceptual reality that is never directly experienced. In this way, the Moon is a hybrid perceptual entity, a Moon of Pettersson's *pictorial perceptual presence,* whose "completion" lies "out there" somewhere, its presence without true location, yet more ontologically present than the Moon you might see in the sky tonight. You might *see* the crescent, but with a little imagination you'll perceive the whole of the Moon, in that free-floating eye of your mind.

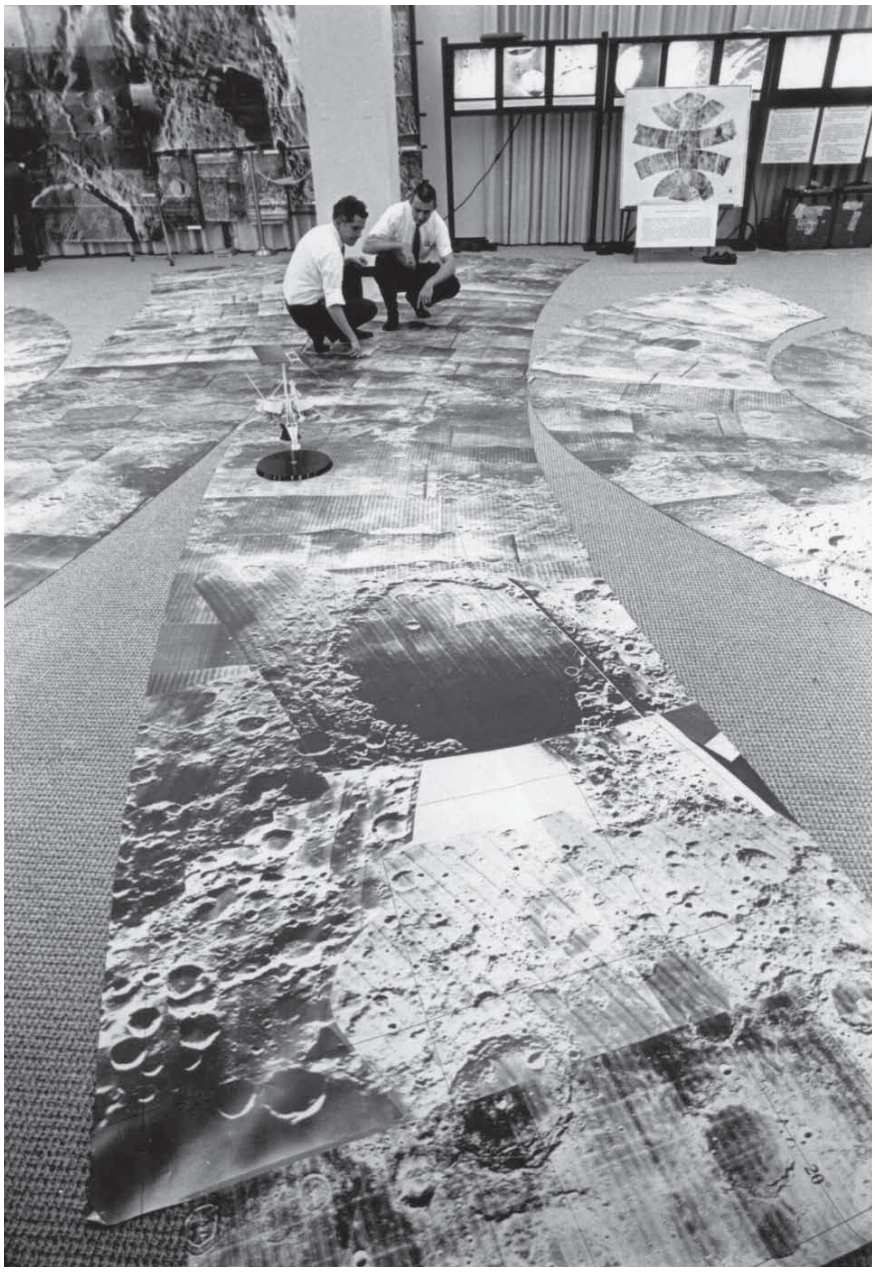

Fig. 5. A 30-foot-square mosaic composed of 127 *Lunar Orbiter IV* photographs of the lunar nearside, arranged on the floor of NASA Headquarters auditorium in 1968. (Photo: National Aeronautics and Space Administration [NASA])

References and Notes

Unedited references as provided by the author.

1. The Waterboys, "You Saw the Whole of the Moon," words and music by Mike Scott, released on Ensign, 1985.

2. Philosopher Richard Wollheim (1923–2003) proposed a theory of viewing images that he called *seeing-in*. According to Wollheim, this is a twofold experience. One aspect is where the viewer experiences seeing the surface of the picture (its media, shapes, texture, color, etc.). The second aspect involves recognition of the object depicted, as if seeing it face to face. These two aspects of *seeing-in* operate

simultaneously. See Richard Wollheim, "Seeing-as, Seeing-in, and Pictorial Representation," in *Art and Its Objects*, 2nd Ed. (Cambridge: Cambridge University Press, 1980).

3. Mikael Pettersson, "Seeing What Is Not There: Pictorial Experience, Imagination and Non-Localization," *British Journal of Aesthetics*, Vol. 51, No. 3, 280 (2011).

4. Pettersson [3] p. 280.

5. For Foucault, the *episteme* was an a priori set of parameters within which and by which we may come to know the world within any given epoch. See Michel Foucault, *The Order of Things: An Archaeology of the Human Sciences* (New York: Vintage Books, 1994). First published in English by Pantheon Books, 1971.

6. Scott L. Montgomery, *The Moon and the Western Imagination* (Tucson: University of Arizona Press, 1999) pp. 86–95.

7. Erwin Panofsky, quoted in Montgomery [6] p. 94.

8. Leonardo da Vinci, quoted in Martin Kemp, *The Science of Art: Optical Themes in Western Art from Brunelleschi to Seurat* (New Haven: Yale University Press, 2006) p. 163.

9. Vilém Flusser, *Into the Universe of Technical Images*, Nancy Ann Roth trans. (Minneapolis: University of Minnesota Press, 2011). Originally published as *Ins Universum der technischen Bilder* (Berlin: European Photography, 1985) pp. 6–17.

10. However, as Kemp [8] points out, there is evidence to indicate that Leonardo used visual instruments to create many of his images.

11. Montgomery [6] p. 87.

12. This is not to suggest that the human act of taking a photograph does not require imagination. I am suggesting that when the photographic process is fully automated, as in the cases of remote sensors, satellites and other imaging systems, the initial act of photographic creation—excluding post-photographic processes—does not require/contain any human processes of the imagination. Imagination comes into play after the initial act of automated image making, when the image is returned to the control of the human perceptual system.

13. Galileo Galilei, *Sidereus Nuncius* (*Starry Messenger*), 1610.

14. Montgomery [6] p. 115.

15. Andreas Blühm, *The Moon: "Houston, Tranquility Base Here. The Eagle Has Landed,"* Helga Kessler Aurisch trans. (Houston: Museum of Fine Arts, 2009) p. 3.

16. Frances Robertson, "Science and Fiction: James Nasmyth's Photographic Images of the Moon," *Victorian Studies*, Vol. 48, No. 4, 595–623 (Summer 2006).

17. James Nasmyth, *The Moon: Considered as a Planet, a World, and a Satellite* (Memphis: General Books, 2011 print on demand). Originally published London: J. Murray, 1885.

18. Barbara Maria Stafford, *Devices of Wonder: From the World in a Box to Images on a Screen* (Los Angeles: Getty Research Institute, 2001) p. 16.

19. William Gilpin, "Observations on Several Parts of England, Particularly the Mountains and Lakes of Cumberland and Westmoreland" (1808), quoted in Wendelin A. Guentner, "British Aesthetic Discourse 1780–1830: The Sketch, the *Non-Finito*, and the Imagination," *Art Journal*, Vol. 52, No. 2, 43 (1993).

20. Quoted in Guentner [19] p. 44.

21. Vilém Flusser, *Towards a Philosophy of Photography*, Anthony Mathews trans. (London: Reaktion Books, 2000). Originally published as *Für eine Philosophie der Fotografie* (Göttingen: European Photography, 1983) p. 51.

22. Vilém Flusser, *Writings*, Andreas Ströhl ed., Erik Eisel trans. (Minneapolis: University of Minnesota Press, 2002) p. 129.

23. The majority of images produced by space exploration are presented to the general public as finished products. It is rare that the public gets to see the raw images that scientists first work with. These are often riddled with visual interference, or "data gaps." These gaps in information are eradicated during image processing.

24. Rosalind Krauss, "Stieglitz/Equivalents," *October*, Vol. 11, 133 (1979).

25. Mission information and the complete catalog of Lunar Orbiter images can be found at <www.lpi.usra.edu/resources/lunar_orbiter/>.

26. Don Ihde, *Postphenomenology: Essays in the Postmodern Context* (Evanston: Northwestern University Press, 1993) p. 43.

27. As Apollo 11 crew member Buzz Aldrin followed Neil Armstrong onto the lunar surface in 1969 he described what he saw as "Magnificent desolation."

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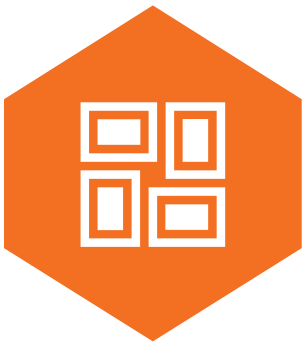

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Take(s) One to Know One

Photography and Practice-led Research

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Take(s) One to Know One: Photography and Practice-led Research

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Abstract: This paper explores how the use of photography may aid the artist-researcher in combining both objective and subjective modes of observation within the conceptual and practical terrain of practice-led research. Research conducted via creative practice sits uneasily within the accepted academic canon, and the knowledge it generates is difficult to locate or describe objectively when placed in comparison with traditional academic frameworks. This is perhaps due to the fact that artist-researchers ask different questions and expect different types of answers, particularly in contrast to the prevailing dominant research paradigms of the sciences. The artist-researcher is thus encouraged to use self-reflective methods in order to objectively engage with their work and describe their research outcomes — outcomes that have been produced through the hidden machinations of intuitive processes. This can result in a polemicized practice where the artist-researcher oscillates between objective/analytical and subjective/intuitive modes of thought and a truly reflective method of research is not attained. This paper proposes that the integration of photography into practice-led research can reach beyond simplistic documentation and instead enables the artist-researcher to conduct reflective thinking that allows for simultaneous objective and subjective modes of observation. In this manner photography can be used in an interpretive and generative capacity that has the potential to reveal the often tacit, subjective, and sometimes, unseen knowledge produced by practice-led research.

Keywords: Photography, Perception, Research

Research and Creative Practice

Undertaking a PhD where the majority of research is conducted via creative practice is a model of study that has been offered in Australia for over 20 years and yet which still sits uneasily alongside traditional PhD programs. These newer programs differ in that it is through the act of creative practice (for example: art making) that the research is conducted and in the creative output (for example: a sculpture) that the research is embodied. The project is driven by a set of research questions and ideas are tested within the ground of creative practice whilst being supported by more traditional research methods such as literature reviews and the study of history and theory in the field. The process is documented and discussed within a written component of the PhD. This is sometimes called a dissertation or thesis, but also as an *exegesis* because it is intended as text that has critically and reflectively engaged with the creative practice.[1]

On the surface, research via creative practice may not appear to be as rigorously constructed as, for example, data within the sciences, or a thesis within art history or theory. Art practice is perceived as operating within a different epistemic framework, one that deals in the abstract as opposed to the concrete, and uses intuition as opposed to analysis. The fact that art is ultimately *subject* to a viewing consciousness and thus to an "endless generation of interpretive activity . . . not explanation"[2] can lead to knowledge claims being misunderstood as insubstantial or negatively perceived as ambiguous, particularly when left to fight for position against traditional, empirically based, scholarly practice. As Josie Arnold of Swinburne University in Melbourne points out, the "academy is by its very nature traditionalist and hence conservative and is based firmly in a Western Enlightenment model" despite any fashionable, so-called, post-paradigmatic

[1] The term 'exegesis' can cause some confusion as it is usually used in reference to exposition of Holy Scripture.
[2] Jan Svenungsson. "The Writing Artist." *Art and Research: a Journal of Ideas, Contexts and Methods*, 2 (2009). http://www.artandresearch.org.uk/v2n2/svenungsson.html

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shift towards an alternative.[3] Within such an environment research via creative practice must fight for position and defend methods that, in order to remain *creative*, involve the tacit, implied and intuited. Nonetheless, any knowledge claims made by creative practice must be drawn out and made visible in order to be substantiated. In order to do this the artist-researcher must engage in a reflective practice.

A Reflective Practice

Reflective practice is a theory and practice made popular by Donald Schön who developed the concept based on research conducted in design and architecture studios in the 1980s.[4] Schön's theory centred on the concept of 'reflection-in-action' whereby the practitioner develops and learns through a process of self-analysis and critical thinking. This process of reflective thinking is described as a loop or circular set of actions that results in a conclusion that then leads to a new plan of action. It is a model that is advocated within the PhD by creative practice that I am currently undertaking at RMIT University.

My personal experiences using this loop of reflective practice has led me to question its usefulness. Within this loop, the artist-researcher is asked to shift between intuitive/subjective and empirical/objective modes of thought: exploring feeling here but categorizing form there; losing oneself in the tacit world of material exploration and then removing the self in order to explicate the experience, etc. The process can result in a polemicized practice where the artist-researcher becomes exhausted and confused and a truly reflexive method of research is not attained. Furthermore, even when aided by knowledge of reflective theory, it can be difficult to attain an objective perspective from which to recognise and describe research outcomes, the majority of which have been produced through intuitive, unseen processes.

However, as Inger Mewburn has suggested, reflective practice is not merely a theory or processes to follow. In fact, it is an assemblage of actors, human and non-human, all of which contribute to the process and outcomes.[5] One non-human actor that may yet prove useful and enable the artist-researcher to reconcile the objective and subjective, the analytical and the intuitive, is photography.

Objectivity and the Photograph

Since its inception in the mid-1800s photography, and its many variants, quickly became an indispensible tool of the sciences. The lens of the camera could reveal details of objects both distant and close — swirling galaxies, the intricacies of a snowflake, or the blinding radiation of the sun — and all could now be evidentially fixed as an image. Photography still has the capacity to assuage our fears of the unknown, to verify reality even as it remains resolutely unseen. It has helped to fill a conceptual gap wrought by an ontological anxiety that has been with us since the time of Descartes' *Meditations*.[6] In Susan Bordo's insightful work "The Flight to Objectivity" she proposes that:

> during periods in which long-established images of symbiosis and cosmic unity *break down* (as they did during the period of the 'scientific revolution'), may we not expect an increase in self-consciousness, and anxiety over the distance between self and world – a

[3] Josie Arnold, "Practice Led Research: Creative Activity, Academic Debate, and Intellectual Rigour," *Higher Education Studies*, 2 (2012): 15.

[4] See Donald Schön, *The Reflective Practitioner: How Professionals Think in Action*. New York: Basic Books, 1983, and, Donald Schön, *Educating the Reflective Practitioner*. San Francisco: Jossey-Bass, 1987.

[5] Inger Mewburn, "Lost in Translation: Reconsidering Reflective Practice and Design Studio Pedagogy," *Arts and Humanities in Higher Education*, October (2011): 363-79.

[6] Descartes published his 'Meditationes de Prima Philosophia' in 1641 in Latin, and then in 1647 with the French title 'Méditations Metaphysiques'.

> constant concern, to paraphrase Mahler, over the 'whereabouts of the world?' . . . Medieval 'participating consciousness,' for which the categories of inner and outer, self and world, human and natural, were not rigorously opposed, had ceased to provide viable models of knowledge for the more aggressive, progress-oriented science and technology of the seventeenth century. New models of knowledge had yet to replace them. It is in this gap that Cartesian anxiety wells up.[7]

This new 'viable', scientific model of knowledge was to be rooted in notions of objectivity, and photography would eventually be placed firmly within its service. And yet, objectivity is no more a 'real' thing than the architectural axonometric mode of drafting. It is a historically constructed mode of seeing and engaging with the external world and is deeply embedded in Western forms of representation.[8] Objectivity, as a framework for observation and analysis, has now been overhauled within critical discourse, even within the sciences: a discipline that relies heavily upon representation and notions of truth.[9] In the opening paragraph to his chapter in the anthology "Picturing Science, Producing Art" Peter Galison postulated that:

> Objectivity is a frightening word. It is lambasted, cherished, hunted, defended; it is realism on Monday, certainty on Wednesday, intersubjectivity on Friday, and truth on Sunday. Claims and counterclaims proliferate: the natural sciences are objective; the social sciences want to be; architecture was in the 1920s. Postmodernism corrodes it, and metaphysics may or may not have captured its essence. Amid the cacophony of these discussions, the term loses its sense…[10]

He goes on to chart a potted history or genealogy of pictorial objectivity within the sciences as he sees it, starting with the early 19th century break from the desire to depict an ideal object that was 'true to nature', and the subsequent move to the 'self-abnegation' of the observer in order to let nature 'speak for itself'. The catalyst for this shift was in part due to instrumentation, in particular the camera, but an equally important part of this shift was the altered role of the observer who was now expected to step back, quite literally 'out of the picture': this was the epistemology of the mechanical image and it was not to be tampered with by human eye nor hand. This was the photograph as objective documentation.

The next break Galison discusses is the end of the mechanical image and procedure and the rise of 20th century judgement. Now the scientist invoked judgment based on familiarity and experience, furthermore, they chose to do so *over* objectivity. The mechanical image was no longer firm basis enough on which to make knowledge claims, one scientist in Galison's paper even stating that "Accuracy should not be sacrificed to objectivity".[11] Knowledge was now to be found (or really, *constructed*) via the powerful combination of objectively framed image and subjective eye. This is the photograph as interpretive device.

Photography and its related technologies reveal far more than ontological 'proof' or the invisible intricacies of the world around us. Each photograph unwittingly reveals the perceptual processes behind it and is not solely documentary. The camera does not merely objectively *record* the physical world*;* it also reveals our subjective *choices*. When worked with interpretively and generatively the photograph has the potential to be a powerful tool for the artist-researcher engaging in reflective practice.

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[7] Susan Bordo, *Flight to Objectivity: Essays on Cartesianism and Culture* (Albany: State University of New York Press, 1987), 58.

[8] See Jonathan Crary, *Techniques of the Observer: on Vision and Modernity in the Nineteenth Century*, Cambridge MA: MIT Press, 1992.

[9] See Lorraine Daston and Peter Galison, *Objectivity*, New York: Zone Books, 2010.

[10] Peter Galison, "Judgment Against Objectivity," in *Picturing Science, Producing Art*, ed. Caroline A. Jones et al. (New York: Routledge, 1998), 327.

[11] Frederic A. and Erna Gibbs, 1950, quoted in Galison, "Judgement Against Objectivity," 335.

The Photographic I/Eye

One of the difficulties of undertaking research via creative practice is that choices, decisions, conclusions — the thought processes of the researcher— are not immediately apparent. In his essay, "Understanding a Photograph", John Berger described photographs as a "witness to human choice" that "celebrates neither the event itself nor the faculty of sight in itself." For Berger, a photograph was a message with a sense of urgency that declares: "*I have decided that seeing this is worth recording."*[12] Furthermore, this sense of urgency was:

> . . . equally true of very memorable photographs and the most banal snapshots. What distinguishes the one from the other is the degree to which the photograph explains the message, the degree to which the photograph makes the photographer's decision transparent and comprehensible. Thus we come to the little-understood paradox of the photograph. The photograph is an automatic record through the mediation of light of a given event: yet it uses the *given* event to *explain* its recording. *Photography is the process of rendering observation self-conscious*.[13]

The photograph declares our observations, externalizes our internalized perceptions and makes us more overtly aware of what we see. Furthermore, as it does so it simultaneously highlights what we do not see. Like Rosalind Krauss[14], Berger highlights the importance of understanding that a photograph "preserves and presents a moment taken from a continuum" of time, and it is photography's capacity to isolate a moment that sets it apart from painting and which provides the medium with a "unique power". Part of this unique power is that the most important reference to which a photograph 'points' is always external to itself and always unseen: "*what it shows invokes what is not shown*."

> The photograph is effective when the chosen moment which it records contains a quantum of truth which is generally applicable, which is as revealing about what is absent from the photograph as about what is present in it. The nature of this quantum of truth, and the ways in which it can be discerned, vary greatly. It may be found in an expression, an action, a juxtaposition, a visual ambiguity, a configuration.[15]

My practice-based PhD project investigates the role a viewer's imagination plays in constructing 'unseen realities' via photographic images. Part of the research is conducted via a process of everyday (vernacular) photography. This body of images includes photographs of things such as: light reflections on surfaces; shadows; patterns; streetlights; airplanes; clouds; and in one particular instance, soap bubbles against a dusk sky. However, when the photograph was taken of the bubbles, the just risen and brightly shining Moon was also captured. Although the bubbles and their accompanying aesthetic qualities — transience, reflection, and transparency — were the *object* of the photograph, it was the Moon that ultimately became the subject. The chosen moment had, as Berger suggested, contained a "quantum of truth" which was "generally applicable", each bubble claiming its presence in the forefront of the image. However, it was the deferred presence — the 'almost-absence' — of the Moon to which the photograph 'pointed'. The photograph revealed more about my perception than I was consciously aware of. It provided a literal reflection of my perceptual choices from which I could then distance myself enough to see the previously unseen.

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[12] John Berger, "Understanding a Photograph" in *Selected Essays and Articles: The Look of Things,* (London: Penguin, 1972), 179.
[13] Berger, "Understanding a Photograph," 179. My italics.
[14] Rosalind Krauss, "Stieglitz/Equivalents," *October* 11(1979): 133.
[15] Berger, "Understanding a Photograph," 180.

These photographs also provided an opportunity to build on these observations creatively and to explore them theoretically, eventually becoming the triptych *Moon-Pixel-Bubble* (2010). In the central image the Moon was digitally removed by 'pixelating' the area it occupied and then a new 'moon' in the form of a white ring was digitally drawn back in. Artificial and constructed, this moon spoke to the blindness of a mechanical vision without the interpretive faculties of the subjective viewer. The first image contained a solitary, tiny, white Moon; and the last depicted a motion-blurred Moon and bubble, and an ambiguous pixelated section that hinted at something hidden or absent from the picture. These additions to the original photographs were explorations into the perceptual construction of the images, and became suggestive of the possible realities inherent in any photograph. For indeed, within the domain of art practice, what we are dealing with is not a paradigm of knowledge interested in proving certainties via a fictive pure perception – which is, as Chris Jenks once stated, the "fundamental canon of empiricism"– but one that proposes the creation of *possibilities*.[16]

The construction of these photographs and their possible realities was then taken one step further by pairing each one with an image of the lunar surface made in stark black and white by NASA's Ranger spacecraft of the 1960s. By juxtaposing these mechanically-made, 'objective', images with my own photographs I attempted to capture the multiplicity of the frames of reference with which we come to understand the Moon, whether they be scientific, historic, or personal. This juxtaposition echoes the twofold manner in which we engage with photographs and which involves mediation between the objective and subjective. Lambert Wiesing (and much earlier Husserl) touched on this when he referred to the difference between image carrier and image object: the former is of the world but the latter remains an object only for the consciousness.[17] The photograph as physical object is framed and contained, present and visible, but the photograph as perceptual subject is delimited by the consciousness that engages with it. In this way, the eyes may see the Moon at dusk, but the mind perceives the Moon in various guises, from Méliès' film *Le Voyage dans la Lune* (1902) to NASA's Ranger or Apollo images and beyond. The viewing consciousness provides an infinite archive from which to draw, from which to retrieve comparative images, and from which to construct one image of the Moon from the multitude already experienced and stored as schemata.

For Wilfred Sellars, the "result of the imagination working on visual input from the perceptual object", in this case a photograph, "is a *subjective, perspectival* 'sense-image-model'".[18] Formed at a phenomenal and nonconceptual level, these models also occur in sequences that are based on understandings of objects perceived from differing points of view and through time.[19] Paul Coates adds to Sellar's theory by suggesting that due to these *schemata* we become prepared for transformations and change:

> So my concepts are both guided by the phenomenal state that is caused by visual input from the perceived object, and through feedback make me implicitly prepared for further kinds of phenomenal experiences.[20]

Therefore, the visual input I receive from a photograph (perceived object), in this example of the Moon, combined with anticipations formed by feeding back previous sensory input, will

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[16] Chris Jenks, "The Centrality of the Eye in Western Culture: An Introduction." In *Visual Culture*, ed. Chris Jenks, (London: Routledge, 1995), 1-25.

[17] Lambert Wiesing, *Artificial Presence: Philosophical Studies in Image Theory*, (Stanford: Stanford University Press, 2010), 80-86.

[18] Sellars was building upon ideas from Kant where the imagination is an extension of understanding. See, Paul Coates, "Perception, Imagination, and Demonstrative Reference: a Sellersian Account," in *Empiricism, Perceptual Knowledge, Normativity, and Realism: Essays of Wilfred Sellars,* ed. Willem A. deVries (Oxford: Oxford University Press, 2009), 69.

[19] Coates, "Perception, Imagination, and Demonstrative Reference," 72

[20] Coates, 75

result in "implicit expectations" that prepare me for possible transformations.[21] In this sense, the photograph becomes a *generative* and not just an *interpretive* tool for the artist-researcher, preparing them to see (and therefore arguably create) difference and change and to do so from the position of observer-once-removed, buffered from an all-encompassing subjectivity by a machine-made representation. The photograph provides a *reflection* of reality but how the image is perceived is at once expansive and *reflexive*, bridging the gap between what is seen and what is represented via the feedback loop of perception. The term 'gap' however, is perhaps not quite correct as it reinforces the concept of a Cartesian dualism or perspectival manner of viewing the world wherein the objective and subjective are forever twain.[22] Perhaps a better analogy would be to see the object and subject, the photograph and the viewer, as two points equidistant within a circle, perpetually connected within a stream of consciousness. The photograph and eye/I sit together in a symbiotic relationship. One cannot be without the other.

A Complex Contribution

The similarities between this feedback loop of perception and the feedback loop of *reflective practice* are significant. But the photograph proves its usefulness to research by creative practice by embracing the subject and object within a simultaneity, remaining at once of the world and of the consciousness therefore allowing for a distancing of researcher from 'data' without sacrificing the subjectivities of the artist. The research can thus remain creative and yet objectively present any knowledge claims by virtue of the photograph's historic links to the dominant research paradigm of the sciences. The knowledge that art, creative practice, contributes to its field and beyond may be complex and difficult to describe in concrete terms, but if part of what the artist-researcher seeks to disclose are "new ways with which to perceive and interpret the world, ways that make vivid realities that would otherwise go unknown"[23] then photography can help ease this anxiety about ambiguity.

However, it must be acknowledged that the information extracted from an image may not always be easily reduced and may need to be maintained in its complexity in order to retain relevancy within a given field of research, in this case creative practice. In this case, the photograph can be left to stand alone in recognition that:

> An image can be a multilayered theoretical statement, simultaneously positing even contradictory propositions for us to consider, pointing to the fuzziness of logic and the complex or even paradoxical nature of particular human experiences. It is this ability of images to convey multiple messages, to pose questions, and to point to both abstract and concrete thoughts in so economical fashion that makes image-based media highly appropriate for the communication of academic knowledge.[24]

Logic can be fuzzy, experience can be paradoxical, and objectivity within *any* research paradigm can be difficult to attain. The photograph, when placed in the service of research, can also alert us to our subjectivities, our own viewpoints and experiences, our prejudices, and our blind spots. Photographic images can facilitate a true circular *reflexivity* as opposed to a two-way reflection within research, allowing us to step back as we simultaneously step in. Photography is a medium that can provide a new perspective from which to view ourselves "increasing the

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[21] Coates, 74

[22] Indeed, Bruno Latour would say that there is no 'gap', just circulating reference. See "How to be Iconophilic in Art, Science, and Religion?" in *Picturing Science, Producing Art*, ed. Caroline A. Jones et al. (New York: Routledge, 1998), 418-439.

[23] Elliot Eisner, "Art and Knowledge*,"* in *Handbook of the Arts in Qualitative Research*, eds. J. Gary Knowles and Ardra L. Cole (Thousand Oakes CA: Sage Publications Inc., 2008), 11.

[24] Sandra Weber, "Visual Images in Research," in *Handbook of the Arts in Qualitative Research,* eds. J. Gary Knowles and Ardra L. Cole (Thousand Oakes CA: Sage Publications Inc., 2008), 43.

potential that we better understand our own subjectivity, leading to humbler and more nuanced knowledge claims."[25] It is this nuanced knowledge that is the domain of creative practice.

Conclusion

Although practice-led research may sit uncomfortably within the academic canon there are tools at the artist-researcher's disposal that can help in realigning it with the still dominant research paradigms of the sciences. I have proposed that photography, long placed in the service of science and strongly associated with notions (artificially constructed as they may be) of objectivity, can be of use to the artist-researcher as it simultaneously incorporates objective and subjective modes of observation therefor allowing for detached analysis and creative intuition. The similarities between *reflective practice* and the circular perceptual processes of engaging with a photograph mean that photography as a research method can be easily integrated. However, I propose that photography avoids the polemicized practice that reflective methods can fall prey to because it prepares the artist-researcher for transformation and change. In this manner photography can be used in an interpretive and generative capacity that has the potential to reveal the often tacit, subjective, and sometimes, unseen knowledge produced by practice-led research.

The lens is not an eye, and the eye not a lens, no matter how much the two are perpetually conflated. However, when they come together in the form of a photograph they become mediators between the objective and the subjective realms, providing a mental lens through which to view the world and potentially form a bridge across the artificial gap between research paradigms. Ultimately, perhaps academia can learn a lesson from history and recognise that new models of knowledge emerge in times of epistemic uncertainty, just as in the time of Descartes. If we look to photography as a perceptual tool we may find that the Medieval "participating consciousness", as described by Bordo, is more contemporary than we think.

[25] Weber, "Visual Images in Research," 43.

APPENDIX A

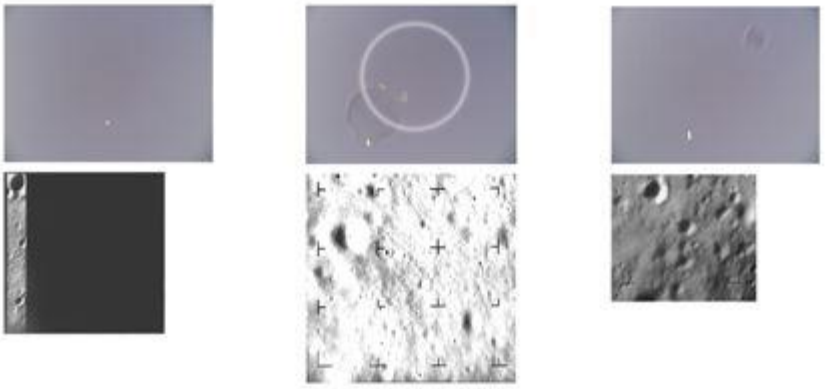

Figure 1: Moon-Pixel-Bubble, 2010, 6-panel photo installation, approximately 900 x 1500mm

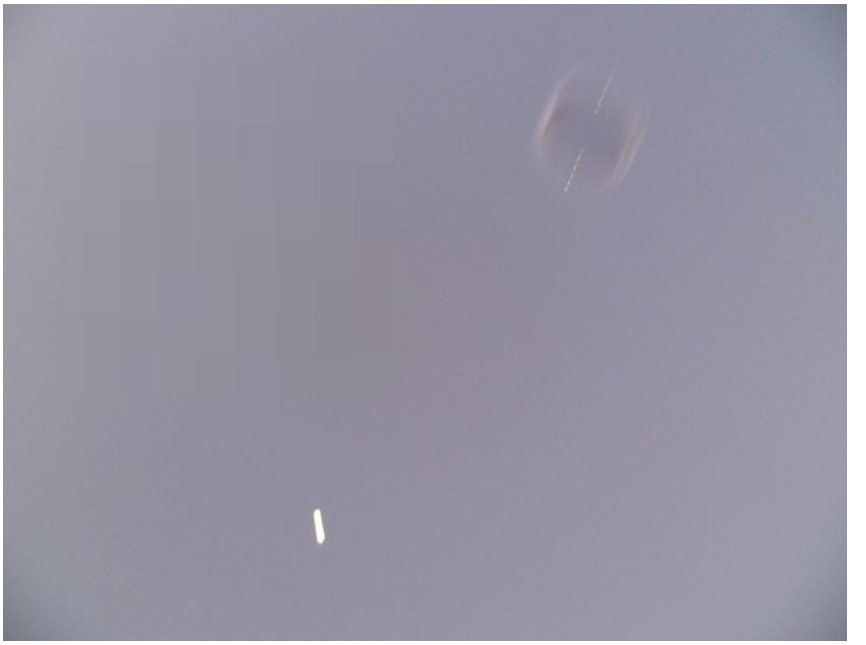

Figure 2: Moon-Pixel-Bubble (detail), 2010.

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The International Journal of the Image interrogates the nature of the image and functions of image-making. This cross-disciplinary journal brings together researchers, theoreticians, practitioners and teachers from areas of interest including: architecture, art, cognitive science, communications, computer science, cultural studies, design, education, film studies, history, linguistics, management, marketing, media studies, museum studies, philosophy, photography, psychology, religious studies, semiotics, and more.

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