SARAH MCKAY

Within the Outside

Our visual perception is largely based on the sense of sight. Sight depends on light. We see objects in the world when the eye focuses an image onto a light-sensitive membrane in the back of the eye, the retina. Light determines the way in which we perceive that world, but human perception is limited by human physiology.

In my work I am using light as the subject, transformed through a unique method of photography which allows what would normally remain unseen to the human eye to be revealed on the photographic image through light. *Within the Outside* is a series of eight glass photographs that was inspired by the research of Craig Rodger in the Department of Physics at the University of Otago, a work which emphasises the temporal nature of the processes used and the subject photographed. Through light and colour, momentarily perceived through receptors placed in different sites on the surface of the planet, he and his fellow researchers gain a fleeting and nearly imperceptible impression of phenomena occuring in the interstices between outer space, the atmosphere and the planet Earth that can be captured only through the manipulation of light through the camera lens.

It was an entirely new experience for me to commence a creative project in collaboration with someone outside of the art world. It was also interesting on another level, as I have often used scientific ideas in my art to inspire not only the subject I am working with, but also the processes and the way I photograph, print and display my images.

After the first meeting of the Art and Light Project, where the scientists introduced themselves and their research to the artists, I knew that Craig Rodger was the scientist with whom I wanted to work. I chose Craig from the Department of Physics at Otago University because, although he was working on projects of which I had no specific knowledge, they covered a similar area of research in space physics in which I already had a personal interest and around which my research within my own practice is centred. I was drawn to Craig's passion for his work as well as his ability to communicate and vividly describe his research. He was able to make connections between his work, science and everyday things in such a way that, despite not being a scientist, I was able to understand clearly. The opportunity to work with someone from one of the sciences who was willing to open up their research to the perspectives of an artist has been invaluable to my own art practice.

The initial inspiration for the series of artworks came from my own fascination with astronomy, perception and the physics of light. I was interested in how they interact and how we can perceive phenomena both within and outside the atmosphere surrounding our earth. Getting to work with someone who was able to explain their areas of research in an entirely different way to how I would normally understand and undertake research on my own was helpful when it came to the technicalities and the science that drives them. It gave me a quite different level of understanding of the work and processes that go into a scientific project, especially where results and even the nature of the problems may not yet be clear.

Figure 1. Loop Antenna, British Antartic Survey Base Halley. Photo courtesy of Jeff A. Cohen from AARDVARK website.

After being introduced to a number of projects in the Physics Department, I focussed on two in which Craig is particularly engaged, the AARDVARK Project (Antarctic–Arctic Radiation-belt (Dynamic) Deposition – VLF Atmospheric Research Konsortium) and the WWLLN Project (World Wide Lightning Location Network). I understood that both projects were interested in phenomena that occur in the atmosphere and which affect and impact on our planet Earth. From my perspective, they highlight the connection between the Earth and the atmosphere that surrounds it. I was able to communicate my interest and questions to Craig initially through email, as a way of gaining a greater insight into this area of research, as he is often working on these projects with scientists and groups overseas.

Craig explained how atmospheric phenomena are picked up by monitoring receivers placed in different locations around the world. In particular, some of these atmospheric events are picked up by the WWLLN project in the form of lightning, as energy is transferred into our atmosphere and can be detected and located by sensors located across the globe. Lightning can have a devastating effect on human life depending on when and where it hits. The information received through the WWLLN

sensors can provide information to local communities affected by its occurrence. On the other hand, the AARDDVARK project looks at the "upper atmosphere as a gigantic energetic particle" in order to "observe and understand changing energy flows." The information gathered is used to expand our "knowledge and understanding of global change, communications, and navigation." Both projects work collaboratively to gain and process data in various ways, and from many locations around the world, and provide information that can be used widely. They are able to transform raw data into knowledge and information that can be used by local and global networks.

Figure 2. Lightening Strikes over the Chilean Volcanic Eruption—Sourced from the Internet.

The AARDVARK receivers are able to pick up changes and events occurring in the atmosphere that are completely invisible to us. Craig explained how the receivers are designed to collect data and what that information looks like: "It's like thousands and thousands of kilometres of colour of which the eye is only able to see a very, very small percentage." As I use only colour and light in much of my work, his explanation allowed me to reconceptualise the science and my own practise in a very visual way. The distance between the place and time of the phenomena and the receivers, and their ability to sense more than anything previously thought possible, related to my own feeling that, however remote events that occur around the world may be, they are still connected to us and can have a very direct impact on us. This was very influential around the printing and display of the work. I too needed to find a way for people to connect with the work and the ideas behind it.

I found the AARDVARK receivers particularly interesting, and used them to inspire and develop my approach to the photography. Their sensors are fragile and sensitive and need to be isolated away from human noise and interaction or they are not able to gather the information they are designed to collect. I was influenced by this in the way I ended up photographing my subject—providing visual

evidence of the occurrence of the phenomena. Without the right conditions surrounding the process of photography, the subject in front of the camera wasn't able to be captured to form images. The subject was elusive and difficult to photograph, as evidence of its existence is transient and elusive. I was working with material under magnification and carefully controlled lighting conditions, as the subject required only a minimal, delicately angled source of light in order for it to be seen. I was also photographing it in an isolated space, well away from anything that would destroy the subject or interfere with the controlled conditions in which I was creating my images.

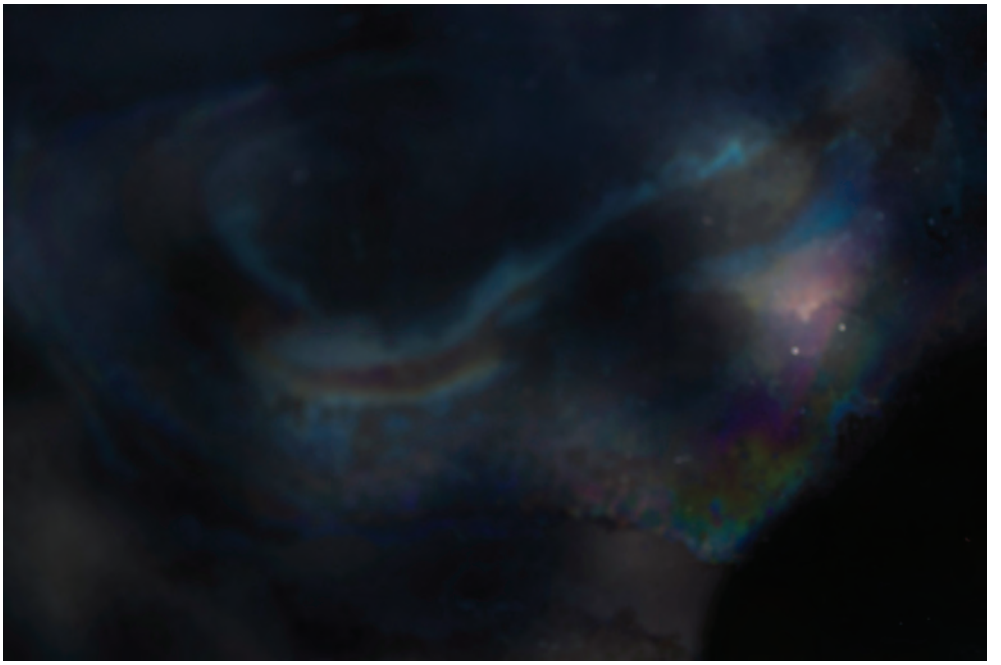

Figure 3. *Echoes #1*, Full Image, Extract from *Echoes Glass* series.

The resulting images appear to be "not of this world;" while they seem distant and removed from any existence in this world, they are created only millimetres from the lens using basic, everyday substances. I wanted to challenge the perception of distance implied by Craig's research, to show the way the sensors are able to pick up all these occurences in the atmosphere which are happening at such a distance from us, and yet the data collected ends up right at our fingertips. I was relying solely on the ability of the camera and the multiple lenses I had stacked on each other to obtain and record information to produce an image that only it—the camera—could see and capture.

The fugitive nature of this methodology and the manner in which I was constructing the images were very delicate, and entirely dependent on the conditions surrounding the whole procedure. I wanted to challenge the ability of the camera and lens I was using to capture an image, creating difficult circumstances in which to photograph where any subtle shift or change would alter the whole image—as well as the ability of the camera even to capture an image that barely existed during the whole shoot. This meant I was working blindly to try to obtain an image which I wasn't entirely sure the camera would capture. I was basing the photographic conditions and the setup of the shoot on

my knowledge of my camera in a room where I was reliant on my familiarity with the equipment, as there was no light to assist with the technicalities of the shoot. Inspired by Craig's leadership role within both research projects, adopting this alternative method of photography has not only challenged me conceptually to respond to the science involved, but has also led me to develop my own method of shooting materials that would otherwise remain intangible to the eye.

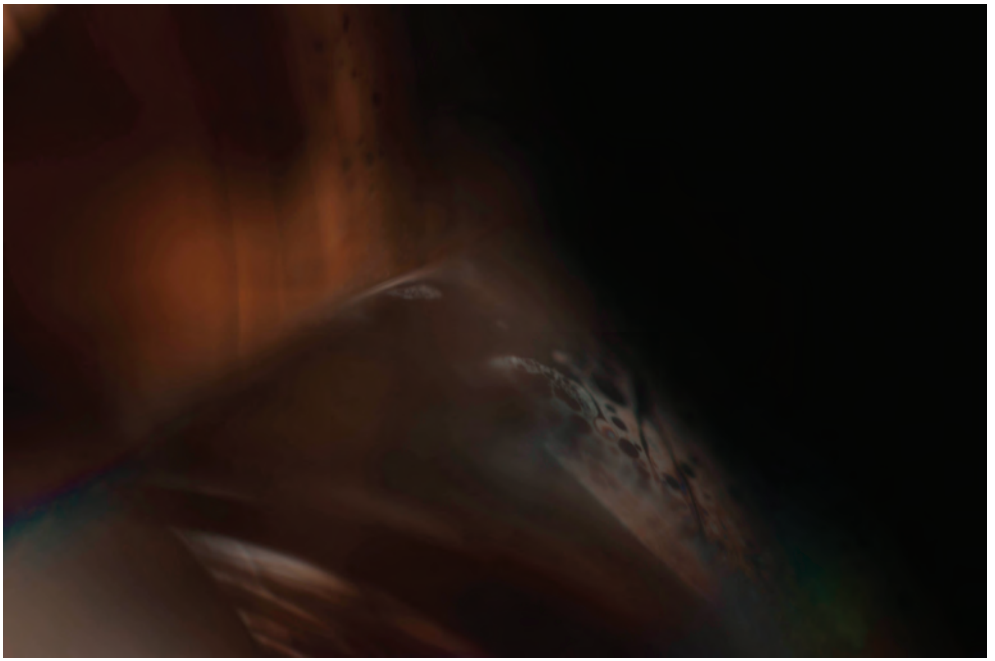

Figure 4. *Rebounded Divergence,* Image from *Within the Outside* Series.

As I was initially unaware of what I had managed to capture, I was left in a state of uncertainty until I was able to see the developed images. Then I was struck with the beauty and details that the digital sensors within the camera were able to pick up that the eye could not. The light striking the sensors revealed intricate colours and patterns, connecting and reflecting into and out of the surface, as if they were fluid, fading in and out. They spoke to me of something beautiful in their intangibility, something that no longer existed beyond the image trace they left behind. The inscribed images are comparable with the signals and information gained from the two scientific projects. There is no visible trace of the changes and events that have occurred in the atmosphere, except for the information that has been received and recorded.

Working within photography, approaching it from an abstract perspective, I was able to look at the individual properties that define something rather than the subject as a whole. Previously, I had been exploring the subject of altered perception and how, through photography, I was able to manipulate and transform any subject by controlling possible perceptions of it. By manipulating the way the camera works, one can capture something that the eye doesn't usually see—and that the camera, under normal circumstances, wouldn't pick up. This approach allowed me to create an image that can appear as something other than it naturally appears to the viewer's unaided perception. In

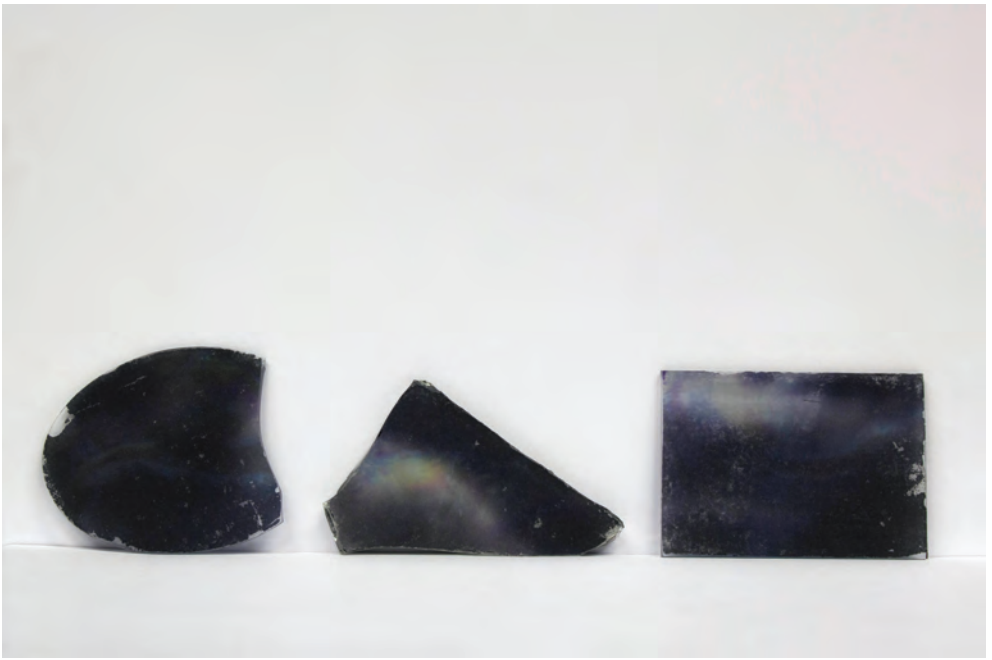

Figure 5. *Echoes,* Trial Series Pieces of Glass Variable sizes, Approx. 5 cm.

so doing, I was able to capture and create a unique image from a perspective that explores the possibilties of a subject when it loses its definition and clarity. This approach shows how a subject is able to change its familiar identity, to become indefinite in nature—and possibly anything at all. This process of deconstructing a subject through photography to reveal an entirely new image highlights the temporality in the nature of the subject, enabling the subject to become more abstract. Indeed, the subject itself can become ever more fluid as the camera captures it and breaks it down, so that photography becomes about the way an image is created and less about the original subject itself.

This approach also means that I am able to concentrate on the technical properties of a photograph, the colour, light and contrast that define details and give the shape and form. My aim was to examine atmospheric phenomena symbolically—as images and the possibilities such images have to show life representatively. Although these phenomena are minute and fugitive, through the photographic process they can appear quite out of proportion to their size and distance from us, and lose all of their ephemeral qualities and apparent remoteness from our lives, becoming part of our experience. While the viewer finds it hard to give these fleeting phenomena a sense of reality, I sought to achieve this through the way in which I used colour. I found that it could be used to suggest the fleeting connection between the surface of the Earth and the phenemona that occur within the atmosphere. By altering the scale of the subject, I was able to control the effect and impact of the imagery. Shifts in scale change the reading dramatically. The detail is suddenly important because it is visible on a scale quite out of proportion to its actuality. This altering of scale has the ability to change our perception completely. It is as if we are looking at a subject under extreme magnification, and reveals how I used the camera as a tool to capture a view of the subject that the eye is unable to perceive. In my other artwork I have been looking at what is called the butterfly effect—how one seemingly

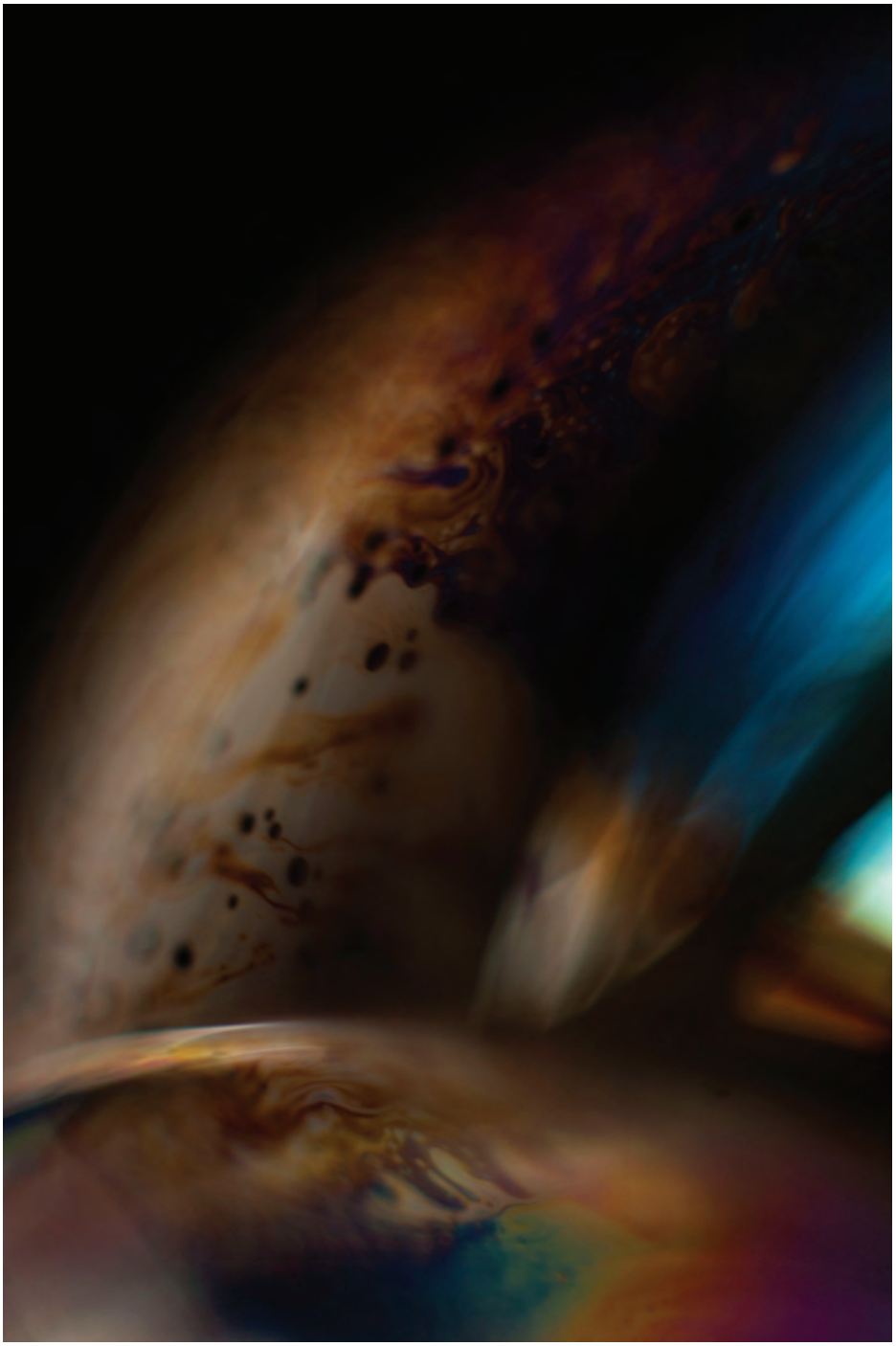

Figure 6. *Collapsing the Precarious,* Image from *Within the Outside* series.

insignificant shift or change can cause a series of larger, dramatic events at quite a remove from the original occurrence. This approach is similar to the ideas that Craig Rodger has been working with. I translated this directly into the way that I approached my subject by exploiting the differences between its photographic materiality and the scale at which the images were printed and its lack of visibility to the eye. I was interested in showing the extreme fragility of the cosmic system and how such seemingly invisible occurence so far removed from us can be a part of our lives and have an effect on us.

Figure 7. Installation view, *Within the Outside*, 2015.

I selected a particular site in the gallery space to install my work as I wanted it to reflect the ideas of the connection that exists between the entire atmosphere, the phenomena and the effects they have that directly impact our lives and our world. Mirrors are a material I often use in my work, as they are a way of engaging the viewer in a different way, because light is able to be reflected back from them. In this way they directly involve and engage the viewer from multiple perspectives. I wanted to create a connection between the viewer and and the community, the world both inside the gallery and the world beyond, as I realised the impact of these projects around the world, amongst local, economic and scientific communites. When installed my work was emphasising the way a space, that is already a transitional space as a window, is a space that connects the outside with the inside, and vice versa, that the work, was able to retain the same potential that space had to connect the outside and the inside but in a different way.

The pieces of glass are glazed to be mirrors from the street side of the windows, allowing the viewer outside to see only themselves, their reflection remaining outside, separate from the work. This one-way reflective film, however, allows the viewer inside to see the outside becoming a part of the work, as light is able to break through the printed surface of the glass in the less dense parts of the work. This is a form of temporal subjective viewing. It will always change. One view will never be consistent and it can never be predicted, as it relies on variable, uncontrollable elements of this particular location and the evanescent quality of light, which is why I chose it. This work will forever change in its appearance and its visibility, both from the inside and the outside, depending on the lighting conditions on either side. As the light grows stronger on the outside the works glare and brighten. They glow, appearing metallic, the glass edges refracting the light coming from the outside, creating prismatic effects. The light catches and blinds the viewer. In total contrast, with the approach of night, as the light on the inside grows stronger, and as the outside world moves into darkness, the works now become visible to the viewer on the outside, as the outside is no longer solely a mirror-reflection. This is expressive of my style of photography, to challenge people's perceptions depending on their physical relationship to the work. It is a way of connecting people, involving them in the artwork, which has been created through the influence of a scientific practice.

This Art and Light project, allowing me to work with a scientist and within an area of science in which I have an interest, has really allowed my practice to become more inclusive and made me more aware that scientific connections can inspire and alter my perception within photography. It has let me see the way I choose to approach my subject matter and the manner in which I manipulate the camera and properties such as lighting, time and colour. It has made me more aware of the connections and the place both art and science have within communities, locally and globally. I feel that the works I created at the end of this process have reflected that combination of both science and art, connected through the single relation of each practice to light.

Sarah McKay graduated from the Dunedin School of Art with a Bachelor of Arts (Hons) in Photography and Electronic Arts in 2015.