This Artificial Eye:
The Camera Obscura in Artistic Practice of the Seventeenth and
Eighteenth Centuries

by
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ABSTRACT

Beginning in the seventeenth century, the camera obscura became a mechanical instrument that underwent several modifications and improvements, ultimately transforming into a portable device that enjoyed immense popularity until the invention of photography in the early nineteenth century. Throughout the early modern period, the camera obscura was mobilized as a metaphor for vision and the inner workings of the human eye. The act of looking through this device would have had a profound effect on artists and their practice, affording them the opportunity to envision the world in a new and different way, and redefining the relationship between artist and subject. This thesis explores the camera obscura as a historical object and its influence on artistic practice of the seventeenth and eighteenth centuries focusing on the work of Johannes Vermeer (1632-1675), Giovanni Antonio Canal (1697-1768), known as Canaletto, and Thomas and Paul Sandby (1721-1798; 1731-1809). Ultimately, this thesis explores the distinct artistic cultures in which the camera obscura circulated and its various applications.

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INTRODUCTION

*Say, rare Machine, who taught thee to design?
And mimick Nature with such Skill divine?
How little is thy Cell? How dark the Room?
Disclose thine Eye-lid, and dispel this Gloom!
That radiant Orb reveal'd, smooth, pure, polite;
In darts a sudden Blaze of beaming Light,
And stains the clear white Sheet, with Colours strong and bright;
Exterior Objects painting on the Scroll,
True as the Eye presents 'em to the Soul;¹*

Writing from London in 1622, Constantijn Huygens (1596-1687) described his impression of seeing images created in a camera obscura constructed by Dutch engineer and inventor, Cornelis Drebbel (1572-1633):

I have in my home Drebbel's other instrument, which certainly produces admirable effects in reflection painting in a dark room. It is not possible to describe for you the beauty of it in words; all painting is dead by comparison, for here is life itself or something more noble, if only there were words for it. Figure, contour, and movement come together naturally therein, in a way that is altogether pleasing.²

Known since the time of Aristotle in the fourth century BCE, camera obscura³ (Latin for *dark room*) is a natural optical phenomenon that was useful initially as an aid in astronomy for observing solar and lunar eclipses to avoid harming the eyes. Light, when passing through a small opening into a darkened enclosure such as a room or box, will project an inverted and reversed image of the external scene onto the surface opposite the hole. Light rays reflected from

¹ Selected verses taken from "Verses occasioned by the sight of a camera obscura" (1747), a 15-page poem by an anonymous poet used as a trade brochure by instrument maker, John Cuff (1708-1772), quoted in Norma Wenzcel, "The Optical Camera Obscura II: Images and Texts," in Wolfgang Lefèvre, ed. *Inside the Camera Obscura: Optics and Art under the Spell of the Projected Image* (Berlin: Max-Planck-Institut für Wissenschaftsgeschichte, 2007) <http://www.mpiwg-berlin.mpg.de/Preprints/P333.PDF>

² Constantijn Huygens, Dutch diplomat and poet, in a letter to his parents of April 13, 1622, quoted in Svetlana Alpers, *The Art of Describing: Dutch Art in the Seventeenth Century*, (Chicago: University of Chicago Press, 1983), 12.

³ In this thesis, the term 'camera obscura' will be used, but the device is also referred to as 'camera ottica' and 'optical chamber' or at times simply 'camera.'

an object travel in straight lines and when the rays pass through the pinhole of the camera obscura, the lines intersect thus inverting the image, left to right and upside-down (fig. 1).

Beginning in the seventeenth century, the camera obscura became a mechanical instrument that underwent several modifications and improvements, ultimately transforming into a portable device that enjoyed immense popularity until the invention of photography in the early nineteenth century. Throughout the early modern period, the camera obscura was mobilized as a metaphor for vision and the inner workings of the human eye. Leonardo da Vinci (1452-1519) was the first to draw this comparison,⁴ followed by Johannes Kepler (1571-1630) at the turn of the seventeenth century. In *Ad Vitelthionem Paralipomena* (1604), Kepler ushered in a revolutionary theory of vision based on the model of the camera obscura, specifically that when light rays enter through the eye, an image or picture is created on the concave surface of the retina at the back of the eye, appearing inverted and reversed.⁵ “Ut pictura, ita visio” Kepler wrote, “sight is like a picture.”⁶

The Dutch Golden Age of the seventeenth century was an exciting time for natural sciences, and the open culture of relative religious tolerance stimulated new ideas to flourish, fostering explorations in visual perception and optics. The Dutch Republic attracted René Descartes (1596-1650) whose *Optics* (1637) endorsed Kepler’s optical theory, comparing the working of the eye to the camera obscura (fig. 2). For empirical evidence, Descartes conducted an experiment with “the eye of a newly deceased man, or for want of that, of an ox or some other large animal,”⁷ to prove that the eye was a passive mediator that still functioned irrespective of

⁴ David C. Lindberg, *Theories of Vision from Al-Kindi to Kepler* (Chicago: University of Chicago Press, 1976), 164.

⁵ Alan E. Shapiro, “Images: Real and Virtual, Projected and Perceived, from Kepler to DeChales,” *Early Science and Medicine* 13, no. 3, “Kepler, Optical Imagery and the Camera Obscura” (2008), 270.

⁶ Alpers, *The Art of Describing*, 36.

⁷ René Descartes, *Discourse on Method, Optics, Geometry, and Meteorology*, trans. Paul J. Oscamp. (Cambridge: Hackett Publish, 1988), 91.

the rest of the body, thereby “representing the relation of a perceiver and the position of the knowing subject to an external world.”⁸ Because the image passes through the retina, which acts as a mediator, “it is the mind which sees, not the eye and it can see immediately only through the intervention of the brain.”⁹ For Descartes, the camera obscura was a model of vision for a single disembodied eye.

For Descartes and Kepler, vision was considered objective and truthful because it occurred independently of the body and detached from the observer. In the seventeenth and eighteenth centuries, it was precisely this “pictorial equivalent to vision” that artists were striving to capture.¹⁰ As this thesis aims to show, the act of looking through the camera obscura, even if no direct tracing was involved, would have had a profound effect on artists and their practice because it afforded them the opportunity to envision the world in a new and different way. As A. Hyatt Mayor explains, “devices that affect the way we see are bound to affect style in art, since style both reflects and conditions ways of seeing.”¹¹ This thesis explores the camera obscura as a historical object and its influence on artistic practice of the seventeenth and eighteenth centuries, focusing on the work of Johannes Vermeer (1632-1675), Giovanni Antonio Canal (1697-1768), known as Canaletto, and Thomas and Paul Sandby (1721-1798; 1731-1809). Through these case studies I will show how the camera obscura allowed artists to experience the world in a completely novel way, and to recapture what John Ruskin termed “the innocence of the eye.”¹² I argue that the device, which in the seventeenth century manifested as great an impact in the

⁸ Jonathan Crary, *Techniques of the Observer: On Vision and Modernity in the Nineteenth Century* (Cambridge, Mass: MIT Press, 1990), 27.

⁹ Descartes, *Discourse*, 108.

¹⁰ Joel Snyder, “Picturing Vision,” *Critical Inquiry* 6, no. 3 (1980): 514.

¹¹ A. Hyatt Mayor, “The Photographic Eye,” *The Metropolitan Museum of Art Bulletin* 5 (1946): 15.

¹² In 1856, Ruskin wrote, “The whole technical power of painting depends on our recovery of what may be called the *innocence of the eye*.” Quoted in E.H. Gombrich, *Art and Illusion, A Study in the Psychology of Pictorial Representation* (Princeton: Princeton University Press, 1969), 296.

optical revolution as the microscope and telescope,¹³ affected artists' vision and enabled them to see natural phenomenon in ways that were previously not possible.

Ultimately, I argue that the camera obscura redefined the relationship between artist and subject in the early modern period. As a physical object, in addition to becoming a model of the eye, it also became the trusted interpreter of Nature and an artist's guide to seeing the world truthfully and without prejudice. Jonathan Crary explains its effect as inspiring "a kind of *askesis*, or withdrawal from the world, in order to regulate and purify one's relation to the manifold contents of the now 'exterior' world."¹⁴ Due to the popularity and pervasiveness of the camera obscura, I will demonstrate the ways in which artists were affected by its dominance as the model of vision.¹⁵ As it was popular across all of Europe, the effect that the camera obscura had on artists' vision was also informed by the distinct artistic cultures in which it circulated.

Overview of Key Primary Sources on the Camera Obscura During the Early Modern Period

Information on the camera obscura can be found in several art manuals and treatises beginning in the sixteenth century, but there are no constructed devices dating from the seventeenth century or earlier that have survived; all that remains are written descriptions and illustrations. Any documentary evidence available from the seventeenth century that artists used this device as a tool in their artistic practice is scant and controversial. It was during this period that experiments with lenses and mirrors transformed the naturally occurring optical phenomenon of the camera obscura into the mechanical apparatus that we recognize today.¹⁶ The first reference to the

¹³ Wolfgang Lefèvre, "The Optical Camera Obscura I: A Short Exposition" (Berlin: Preprint of the Max Planck Institute for the History of Science, 2003), 7.

¹⁴ Crary, *Techniques of the Observer*, 39.

¹⁵ Crary, *Techniques of the Observer*, 27.

¹⁶ Lefèvre, "The Optical Camera Obscura I: A Short Exposition," 6.

camera obscura as a tool for drawing correctly in perspective appears in Venetian architect Daniele Barbaro's (1514-1570) treatise for use by painters, sculptors and architects, *Practica della prospettiva* of 1568.¹⁷ After detailing how to construct a room camera obscura using a lens taken from the spectacles intended for the elderly, namely a convex lens, to sharpen the image and increase the focus, Barbaro describes the process of drawing:

Seeing, therefore, on the paper, the features of things, you can with a pen, mark all the perspective which will appear on the paper, and shade it and tenderly colour it, according to Nature, which will show you, holding the paper still until you have completed the drawing.¹⁸

Giovanni Battista della Porta (1535-1615), a Neapolitan dramatist and magician of sorts, often wrongly attributed with the invention of the camera obscura, wrote about this device as primarily a purveyor of entertainment and deception in his *Magiae Naturalis* first published in 1558. In his expanded second edition of 1589, he included instructions for using a lens as well as a mirror to correct the image inversion. Della Porta's instructions are specifically directed at those who "cannot draw a picture of a man or any things else; If you can but only make the colours. This is an Art worth learning."¹⁹

Dutch painter and author Samuel van Hoogstraten (1627-1678) recommended the use of the camera obscura in his art treatise of 1678, *Inleyding tot de Hooge Schoole der Schilderkonst, anders de Zichtbaere Werelt* (*Introduction to the Academy of Painting, or the Visible World*), but suggested that it was more useful as an optical guide, to learn from and aspire to, rather than as a means for direct copying. "I am certain that the sight of these reflections in the darkness can be very illuminating to the young painter's vision; for besides acquiring knowledge of nature, one

¹⁷ John H. Hammond, *The Camera Obscura: A Chronicle* (Bristol: Hilger, 1981), 40.

¹⁸ Daniele Barbaro, *Practica della prospettiva* (Venice, 1568-1569), 193. Translation by author.

¹⁹ *Natural Magick by John Baptista Porta, a Neopolitane*, trans. Thomas Young and Samuel Speed (London, 1658), 364.

also sees here the overall aspect which a truly natural painting should have.”²⁰ For Van Hoogstraten, these images seen through the camera obscura were paintings made by the hand of Nature.²¹

In his treatise on painting, *Saggio Sopra La Pittura*, published in 1763, Count Francesco Algarotti (1712-1764) included an entire chapter on the virtues of the camera obscura as a tool for the artist.²² He refers to this device as an artificial eye and explains how it forms an image. He points out the ways in which it allows the artist to discover things that he would otherwise never see with the naked eye. Further, he counsels artists to use the camera obscura in the same way that naturalists use the microscope and astronomers use the telescope, and that the divine pictures of the camera obscura should be studied as a reference for colour, form and aerial perspective. According to Algarotti, the best contemporary Italian painters were making use of this device, although he only mentions one artist by name, Giuseppe Maria Crespi (1665-1747), known as Spagnoletto di Bologna, but he believed that it was being used by others.²³ Similar to Van Hoogstraten, Algarotti also saw the images produced by a camera obscura as painted by the hand of Nature, and advised young artists to begin to study these images as early as possible in order to have their work approach the same perfection.²⁴ The camera obscura became a teacher, like a master painter, that reveals the pictorial secrets of Nature.

²⁰ *Inleyding*, 263, quoted in Celeste Brusati, *Artifice and Illusion: The Art and Writing of Samuel Van Hoogstraten* (Chicago: University of Chicago Press: 1995), 71.

²¹ Brusati, *Artifice and Illusion*, 71.

²² Francesco Algarotti, *Saggio sopra la pittura* (1763), 66-71.

²³ Algarotti, *Saggio sopra la pittura*, 70.

²⁴ Algarotti, *Saggio sopra la pittura*, 71.

Examples of Camera Obscuras in the Early Modern Period

Around 1612, while in Linz, Kepler experimented with constructing a portable device in order to draw landscapes (fig. 3). In 1620, Sir Henry Wotton (1568- 1639) visited Kepler and wrote to Sir Francis Bacon (1561- 1626) concerning the tent-type camera obscura he employed:

He hath a little black tent which he can suddenly set up where he will in a field, and it is convertible (like Wind-mill) to all quarters at pleasure capable of not much more than one man, as I conceive, and perhaps at no great ease; exactly close and dark, save at one hole, about an inch and a half in Diameter, to which he applies a long perspective trunke, with the convex glass fitted to the said hole, and the concave taken out at the other end, which extendeth to about the middle of this erected Tent, through which the visible radiations all the objects without are intromitted, falling upon a paper, which is accommodated to receive them; and so he traceth them with his pen in their natural appearance, turning his little Tent round by degrees, till he hath designed the whole aspect of the field, this I have described to your Lordship, because I think there might be good use made of it for Chorography; For otherwise, to make landskips by it were illiberal, though surely no Painter can do them so precisely.²⁵

Kepler's apparatus is believed to be the first of its kind.²⁶ In the seventeenth century, available models of the camera obscura were, as Charles Seymour suggests, of two types: the "chorographic or Keplerian mode" and the "portable *cubiculum*," or box-type models.²⁷

Illustrations of camera obscuras found in early modern texts demonstrate the variability of their design and uses. Some of the most compelling examples of the device include those of Johann Zahn (1641-1707), a cleric in Würzburg, who provided descriptions and illustrations of optical instruments, including several box-type camera obscuras in *Oculus artificialis teledioptricus sive telescopium* (1685-86). Zahn's models were not intended to be used for the purposes of drawing—they would have been impractical—and if we look closely at one of his

²⁵ Sir Henry Wotton, *Reliquiae Wottoniae* (London, 1651), 413-414.

²⁶ John Hammond, *The Camera Obscura*, 25.

²⁷ Charles Seymour, Jr., "Dark Chamber and Light-Filled Room: Vermeer and the Camera Obscura," *The Art Bulletin* 46, no. 3 (1964): 329.

designs, we see it includes no method for tracing the image (fig. 4). Another design example would have only produced a very small image as indicated by the size of the dotted circle depicted (fig. 5). These large-scale devices were instead intended solely to model vision.²⁸

Denis Diderot's *Encyclopédie* of 1753, a compendium of knowledge, included diagrams of camera obscuras that furnished "a very amusing spectacle," but much like Zahn's, were not intended for the purposes of drawing (fig. 6).²⁹ It was not until sometime after 1758, when English optician John Dollond (1706-1761) introduced a new achromatic lens that corrected some of the distortions seen within the device that it became more practical for drawing.³⁰ However, the device was still cumbersome to carry from place to place. As late as 1787, one writer commented that "if properly made, it will not weigh more than twenty to five and twenty pounds."³¹

In 1778, William Storer, who received a royal patent for his portable camera obscura, described his invention as follows:

Optical instrument or accurate delineator, entirely obviating the defects of the camera-obscura, being used without the assistance of the sun in the day-time, and also by candle-light, for drawing the human face, inside the rooms of buildings, also perspectives, landscapes, foliage and fibres of trees and flowers, exactly representing the true outlines, lights, shades, and colours.³²

The Royal Accurate Delineator was a technically-improved camera with a larger aperture lens that increased the amount of the image that was in focus on the ground glass screen, although

²⁸ Mary S. Hammond, *The Camera Obscura: A Chapter in the Pre-history of Photography*, Ph.D. diss. (Ohio State University, 1986), 302.

²⁹ Denis Diderot and Jean Le Rond Alembert, *L'Encyclopedie ou, Dictionnaire des sciences, des arts et des métiers*, 1753, quoted in Mary S. Hammond, *The Camera Obscura*, 306.

³⁰ Mary S. Hammond, *The Camera Obscura*, 263.

³¹ John Hammond, *Camera Obscura*, 30.

³² History of Science Museum: Collection Database Search, Inventory no. 62524 - Former display label, <http://www.mhs.ox.ac.uk/collections/imu-search-page/narratives/?irn=3704&index=2> (accessed 8 March 2020).

consequently the depth of field was limited so the added rack-work allowed for easier focusing (fig. 7).

Historiography of the Camera Obscura

While there has been a fair amount written on the camera obscura in relation to photography as well as to the history of optics, the historical use of the camera obscura as a tool for artists and the extent of its impact on artistic practice has not been substantially explored despite the recent interest in optical aids used by artists. Since the invention of photography in the early nineteenth century, the device has been viewed primarily as a precursor to the photographic camera solely lacking a means to fix the image, and therefore, examined mainly in relation to photography rather than as an independent tool. I contend that the camera obscura should be treated as a unique device distinct from photography. The peril with treating it as primarily a precursor to the photographic camera is that its extensive influence as a stand-alone apparatus on the history of vision and art is diminished.

Scholarship on the topic of the camera obscura consists of several brief histories of the device that trace its evolution, but the most comprehensive include John H. Hammond's, *The Camera Obscura: A Chronicle* (1981), and Mary S. Hammond's Ph.D. dissertation, *The Camera Obscura: A Chapter in the Pre-history of Photography* (1983). Both sources include a brief chapter on the use of camera obscura in art, but their primary focus is on the historical evolution of the device and its connection to the history of photography. Nonetheless, these two sources are useful for understanding the types of camera obscuras that were available to artists during the seventeenth and eighteenth centuries.

In Svetlana Alpers' seminal work *The Art of Describing* (1983), she conceptualizes the camera obscura as a model that distinguishes the Northern European pictorial tradition from the

Italian tradition of linear perspective. Alpers asserts that what was of utmost interest to the Dutch was the empirical observation of the world through mediating devices like camera obscura. Previously, lenses and mirrors were considered distorting and deceptive, but a shift occurred in the seventeenth century that resulted in a fascination with “the artifice of the image.”³³ For Alpers, the Dutch painterly tradition is inherently interested in representing nature “exactly and unselectively” and does not ask much more of the observer.³⁴ Whereas the Dutch placed emphasis on “seeing and representation,” their Southern counterparts emphasized “reading and interpretation.”³⁵

Another important source on the camera obscura as a model for vision is Jonathan Crary’s *Techniques of the Observer: On Vision and Modernity in the Nineteenth Century* (1990). In Crary’s view, the debate over the artist’s use of optical aids has no practical relevance because “[e]ven if Vermeer never touched the mechanical apparatus of the camera obscura...his paintings are nonetheless profoundly embedded in the larger epistemological model of the camera.”³⁶ He argues that the device as model demonstrates that the relationship between the observer and the object was firmly fixed as separate entities in the early modern period, and therefore, represented a worldview that was objective and truthful.

Subsequently, the camera obscura has been included in several monographs on the interaction between science and art. In Martin Kemp’s major work detailing the history of perspective, optics, and color theory, *The Science of Art: Optical Themes in Western Art from Brunelleschi to Seurat* (1990), he devotes a section on the “lens-based systems” that laid the foundations for photography. My thesis takes its cue from the three significant episodes of the

³³ Alpers, *The Art of Describing*, 33.

³⁴ Alpers, *The Art of Describing*, xxiii.

³⁵ Alpers, *The Art of Describing*, xxiv.

³⁶ Jonathan Crary, *Techniques of the Observer*, 46.

camera obscura's history that Kemp details, namely the use of the camera obscura by Vermeer in seventeenth-century Holland, Canaletto and the *vedutisti* in Italy, and British topographical painting in the eighteenth and early nineteenth centuries.³⁷ While Kemp gives a succinct but cursory overview of these case studies, my thesis will delve deeper in order to extrapolate on the nuanced role technology played in these distinct cultural settings.

In recent years, the study of artists' materials and techniques has attracted increasing attention in the discipline of art history. This can be attributed to the publication of British artist David Hockney's controversial book *Secret Knowledge: Rediscovering the Lost Techniques of the Old Masters* (2001), wherein Hockney suggests that aids such as lenses, mirrors, and the camera obscura were secretly used by artists to feign technique beginning as early as the fifteenth century. As his argument goes, optical aids were the driving force behind the development of naturalism and realism in the early modern period. However, Hockney's hypothesis is rather superficial, and I argue that interactions between artists and optical aids were far more nuanced than he proposes.

Anne Friedberg in *The Virtual Window: From Alberti to Microsoft* (2006), devotes a chapter to "The Frame" and examines the role of the camera obscura as both an instrument of science and for creating optical illusions. With its unique position between Alberti's perspective window and the invention of photography and cinema, she qualifies the camera obscura as both a continuation and a rupture in this path. The camera obscura became a mediating device that extended human vision.³⁸ As Friedberg explains, the "camera obscura acquired the discursive

³⁷ Martin Kemp, *The Science of Art* (Yale University Press, 1990), 189.

³⁸ Anne Friedberg, *The Virtual Window: from Alberti to Microsoft* (Cambridge: MIT Press, 2006), 62.

weight of metaphor, and over centuries, its identity as a philosophical paradigm developed alongside—although somewhat separately from—its use as a technical apparatus.”³⁹

Pictures became “counterfeits of the activity of the seeing eye” and changed the relationship between artists and the visible world around them.⁴⁰

Through my three case studies, I will show that the relationship between the artist and the projections seen in a camera obscura was more complex and subtle than the debate over the use of the device suggests. I will extend Martin Kemp’s theories on the impact that devices such as the camera obscura had on the artistic practice of the artists in question. My thesis will complicate Crary’s perspective on the status of the observer in the early modern period, whose approach is problematic. Crary integrates Vermeer and Canaletto into his analysis but he fails to address the British experience of observation and spectatorship during the late eighteenth century. I will also demonstrate how Svetlana Alpers’ argument on the influence of visual culture, when nuanced with concrete examples, is an appropriate lens through which to examine the camera obscura in these three case studies.

This thesis will address central questions, such as: what evidence do we have that artists used camera obscura in their artistic practice, and how reliable is this evidence? What does the evidence really tell us about the ways in which this device was used? What was the influence of the camera obscura on artistic practice in the seventeenth and eighteenth centuries? How is this informed by the varying visual cultures of Holland, Italy, and Britain and what does this say about the perception of optical aids in artistic practice?

Chapter Breakdown

³⁹ Friedberg, *The Virtual Window*, 60.

⁴⁰ Brusati, *Artifice and Illusion*, 242.

In Chapter One, I investigate the use of the camera obscura in Dutch art of the seventeenth century, with a focus on Vermeer's alleged use of the device. Through an analysis of Vermeer's *View of Delft*, 1660-61, I will show how Vermeer's intention was not to recreate the world exactly as he saw it through a camera obscura, but to create the appearance of reality. Vermeer's use of the camera obscura has been a hotly contested topic, and I will provide an overview of the debates in order to situate my own argument. As the Dutch were especially intrigued by the camera obscura, just as they were with the microscope and telescope, I will examine the influence of scientific culture on Vermeer's attitude toward painting. Alpers' theories concerning the visual mode of Dutch painting will be explored in order to unpack the relationship between artists and optical aids.⁴¹

In Chapter Two, I turn to the use of the camera obscura in eighteenth-century topographical painting in Italy. The art of the *veduta* as exemplified by Canaletto consisted of capturing the city as a magical illusion suspended in time. Through a case study of Canaletto's *Piazza San Marco*, 1742-46, I will show how the camera obscura allowed the *vedutisti* to observe the city through a mediating device that impersonalized and defamiliarized their view, allowing them to instill their own sense of order to the topography for the tourist market. The working method of Canaletto's forerunner, Gaspar Van Wittel (1652-1736), known as Vanvitelli, will be examined as a means of comparison to Canaletto's artistic practice. Subsequently, I will provide an overview of the historiography on Canaletto's purported use of optical aids to establish the basis for my own argument, which is that the camera obscura became a mediating device that allowed the *vedutisti* to first observe, and then to abstract and distort, in order to create an illusion that imitated, but did not reflect, reality.

⁴¹ Alpers, *The Art of Describing*, 33.

In Chapter Three, I will examine the use of the camera obscura in eighteenth-century Britain, with a focus on the work of the English artists Thomas and Paul Sandby. I will first explore Paul Sandby's *Roslin Castle, Midlothian*, c. 1780, which demonstrates the popularity of the camera obscura with amateur artists, as well as themes of spectatorship and picture-making through devices that mediated vision. Subsequently, I will show that while the camera obscura was implicated in asserting control over the landscape, it also played a role in shaping national culture, as it allowed the citizens of a newly unified Great Britain to construct a sense of individual and collective national identity.⁴² Through an analysis of the Sandbys' panoramic city views, and the search for the picturesque, I will show how the camera obscura played a double role as curator of both the real and the ideal, and turned the image of the English landscape into an aesthetic object.

To conclude, during the seventeenth and eighteenth centuries, the camera obscura had a profound influence on art and visual theory. While artists may not have directly copied their work from images seen in a camera obscura, the act of looking through the device would have had a significant impact on their artistic practice. As detailed in the conclusion of my thesis, the camera obscura as a metaphor for objective or truthful vision abruptly dissolved in the early nineteenth century. The device was thought to present a false impression and presented too many defects and distortions to be useful to the artist. Furthermore, the detachment of the observer required by the camera obscura was now seen as less desirable. Instead, it was more favourable to feel connected to nature as painters began painting outdoors, *en plein air*, emphasizing the immediacy of their emotional experience and personal vision.

⁴² Steven J. Gores, *Psychosocial Spaces: Verbal and Visual Readings of British Culture, 1750-1820* (Detroit, MI: Wayne State University Press, 2000), 40.

CHAPTER ONE

VERMEER AND THE CAMERA OBSCURA IN THE SEVENTEENTH CENTURY

“There is a landscape by Vermeer, though, that was a surprise and is wonderful. I know and have long admired his figure pictures, and I know that he painted landscapes also, but I had no idea *how* he painted it. In fact, the picture is enigmatic to me now and I can’t see how the dickens it is done. It is real sunlight and air and out-of-doors and makes all the other Dutch landscapes look like feeble, brown *drawings*.”⁴³

-Kenyon Cox (1856-1919) in a letter to his mother dated September 10, 1889.

Introduction

Johannes Vermeer (1632-1675), known primarily for his interior genre scenes, also painted several exterior scenes of Delft, two of which have survived.⁴⁴ The cityscape, *View of Delft*, 1660-61 (fig. 8), in the Mauritshuis, The Hague, has always been highly valued⁴⁵ and was the first painting of Vermeer’s to enter a public collection.⁴⁶ One of the most remarkable aspects of this cityscape is the naturalistic light that the artist succeeded in capturing. Writing about this painting in 1866, art critic Théophile Thoré (aka William Bürger) called the effect “très-réel.”⁴⁷ Because this painting achieves such a realistic representation of nature, like a view from a window, it is one of the works that is most often associated with the artist’s use of the camera obscura. The remarkable quality of verisimilitude that Vermeer achieved in *View of Delft* has led to speculation that he used a camera obscura to produce it. However, this is a controversial theory. In this chapter I will examine the historiography and arguments related to Vermeer’s use

⁴³ Excerpt from a letter to the artist’s mother, Helen Finney Cox, from La Haye, Netherlands. Kenyon Cox was an American artist studying in Paris from 1877-1882. *An Artist of the American Renaissance: The Letters of Kenyon Cox 1883-1919*, ed., H. Wayne Morgan (Kent State University Press, 1995), 101.

⁴⁴ J. Michael. Montias, *Vermeer and his Milieu: A Web of Social History* (Princeton: Princeton University Press, 1989), Appendix A: “An estimate of the total number of paintings Vermeer painted between 1656 and 1675.”

⁴⁵ *View of Delft* sold for 200 guilders, the highest price of any of the 21 paintings by Vermeer in the Dissius auction of 1696. Montias, *Vermeer and his Milieu*, 255.

⁴⁶ John M. Nash, *Vermeer* (London; New York: Scala Books, 1991), 6.

⁴⁷ William Bürger, “Van Der Meer De Delft,” *Gazette des Beaux-Arts* XXI (1866) : 298.

of the camera obscura. By examining his mature works, what can be reasonably surmised about his working methods, and the art treatises that were available to him, it is highly likely that Vermeer was aware of the images produced in a camera obscura and intrigued with the effects he saw. He then, in turn, duplicated these effects in painting. However, it has been speculated that Vermeer traced his compositions onto canvas from projections in the camera obscura. As I will show, if the paintings are relied on as evidence, as is often suggested, then Vermeer's body of work does not show consistent proof that he used any optical aids.⁴⁸ Instead, I argue that Vermeer exemplifies what Alpers has called the northern 'optical' mode of representing nature, or as she terms it, "Keplerian."⁴⁹ In the optical mode, the image appears as it is seen by the eye, as it would paint itself on the retina. Further still, Jonathan Crary argues that because the camera obscura and the observer were considered two separate entities, it "stood as a model, in both rationalist and empiricist thought, of how observation leads to truthful inferences about the world."⁵⁰ The camera obscura became a metaphor for the objectivity of sight as well as being a popular device for observing the world, an apparatus offering entertainment value, a means of scientific inquiry, and of primary concern in this inquiry, an instrument of artistic practice.⁵¹ Ultimately, I argue that Vermeer's familiarity with the effects produced in a camera obscura is evident in his work, but his artistic practice was more in keeping with the visual culture of Netherlandish art, characterized by an interest in imitation and counterfeit. Vermeer's works demonstrate that he was concerned with painting the world as it appeared to him, even if that was in conflict with its spatial structure.

⁴⁸ Walter A. Liedtke, *A View of Delft: Vermeer and His Contemporaries* (Zwolle: Waanders Publishers, 2000), 247.

⁴⁹ Alpers, *The Art of Describing*, 37.

⁵⁰ Crary, *Techniques of the Observer*, 29.

⁵¹ Crary, *Techniques of the Observer*, 29.

View of Delft: Formal Analysis

In Vermeer's painting of Delft, the city is seen from the south from a slightly elevated position, and it has been possible to determine the location of the building from which Vermeer may have painted this view.⁵² The painting is large in size, 96.5 x 115.7 cm, especially in comparison to the majority of Vermeer's work. He has divided the composition into four horizontal sections; the largest area, consisting of about two-thirds of the canvas, is composed of a dramatic sky with impressive cumulous clouds ranging in colour from bright white in the distance to darker grey looming just overhead. The buildings of Delft are silhouetted against the sky forming a pattern of red, orange, ochre, and blue roofs with their spires and chimneys periodically punctuating the sky. This gives the painting a feeling of expansive space and the impression that we are only glimpsing a slice of Delft. The emphasis is placed on the horizontality of the scene, which gives the city a sense of solidity and permanence. The verticals are placed at right angles to the horizontal base creating a synergy between the two. Not surprisingly for a relatively flat region, horizontality plays a significant role in Dutch landscapes.⁵³

The area of the harbour, a section of the River Schie, takes up the next horizontal section, with the watery reflections of the buildings. The section closest to the viewer is the embankment that gently curves across the lower left and extends to the right before dropping out of sight as it reaches the other side of the canvas. This arc helps to offset the more rectilinear quality of the town buildings. On this embankment, there are several figures: burghers and servants judging by their attire, standing close to a small transport boat from which they may have just disembarked.

⁵² Arthur K. Wheelock and C. J. Kaldenbach, "'Vermeer's View of Delft' and His Vision of Reality," *Artibus Et Historiae* 3, no. 6 (1982): 19.

⁵³For information on the concept of horizontality in landscapes as discussed in the Dutch treatises of Karel van Mander and Samuel van Hoogstraten, see Ernst van de Wetering, *Rembrandt: The Painter Thinking*, (Amsterdam University Press, 2016), 167-169.

The harmonious colour combination chosen by Vermeer is limited to earth tones, but the sun shining through the clouds picks up the brighter yellow hue of a roof that strikes a clear distinctive note above the other roofs of blue and orange. The eye is drawn to this sunlit roof which then moves fluidly to the familiar tower of the Nieuwe Kerk, an important monument to the citizens of Delft. Vermeer has used sunlight strategically, letting it shine through the clouds so that the sense of depth is achieved not with linear perspective but by the play of light over the forms. Vermeer decided not to use a vanishing point in this painting which would have directed the eye; instead, the viewer is invited to take in the scene leisurely moving along each horizontal section. Nonetheless, there is an implied direction to read the scene from left to right due to the curving shapes that slope to the right, and the direction of the light that moves from the area in shadow on the left to illuminating more forms on the right. To add a sense of texture, Vermeer has also varied his brushwork with layers of thicker impasto paint with an underlayer of sand implying the roughness of the bricks and the tiled roofs.⁵⁴

The shape of the embankment and the dark cloud directly overhead act as repoussoirs that frame the top and bottom edges of the scene, and which also help to lead our eye into the painting and adds to the illusion of depth. The figures lend the cityscape a sense of scale, although we know that Vermeer depicted these figures smaller in size than they would have been in reality.⁵⁵ Some scholars have suggested that this was due to his use of the camera obscura.⁵⁶ However, it may have been a conscious decision on Vermeer's part to alter the scale so that the

⁵⁴ "A rough surface texture was created in many places, particularly in the stone façades, and in the roofs, by underpainting with lead white containing exceptionally coarse pigment particles mixed with sand. The fine yellow ochre paint of the step gable at left contains transparent rounded particles of sand." Arthur K. Wheelock and F.J. Duparc, ed., *Johannes Vermeer* (Washington: National Gallery of Art, 1995), 120.

⁵⁵ Montias, *Vermeer and his Milieu*, 188.

⁵⁶ Charles Seymour, "Dark Chamber and Light-Filled Room: Vermeer and the Camera Obscura," *Art Bulletin*, XLVI (September 1964): 329; Philip Steadman, *Vermeer's Camera: Uncovering the Truth Behind the Masterpieces* (New York; Oxford: Oxford University Press, 2001), 36; Lawrence Gowing, *Vermeer*, (London: Faber and Faber, 1970), 128.

focus remains on the buildings and gives the city a greater sense of grandeur. Although this area of Delft would have normally been a hub of activity, Vermeer has chosen to depict the scene in the early hours before the day's business has really begun. The clock on the Schiedam Gate shows the time as 7:15 in the morning. Vermeer's decision to depict the town at this quiet hour adds a greater sense of dignity and timelessness, similar qualities to those evident in his intimate interior genre scenes such as *Woman in Blue Reading a Letter*, 1663-64 (fig. 9), in which a figure, oblivious to any observer, is so absorbed in her own thoughts that she is caught suspended eternally in a moment of time.

The Camera Obscura and Netherlandish Art Treatises in the Dutch Golden Age

To understand Vermeer's approach to painting, it is useful to examine the literary tradition of Dutch art. In the seventeenth century, the Dutch 'school' of painting was highly influential, and students travelled from across Europe to study with Northern masters. However, surprisingly, the Dutch wrote very little about their artistic practices. When painter Karel Van Mander (1548-1606) published his *Schilder-Boeck* (Book of Painting) in 1604,⁵⁷ he informed his reader that "Nothing has been written in our language up till now for the training of painters."⁵⁸ Despite this literary scarcity, Vermeer would have had access to art treatises such as Van Mander's, which provided instructions for constructing perspective. The recommendations to young artists included close observation of the natural world; Van Mander repeatedly tells his readers to "look...just look."⁵⁹ For artists who wanted to capture in paint the light of dawn, his advice was

⁵⁷ The year 1604 is also the year Kepler published his *Ad Vitelhonem Paralipomena*, which explains the workings of the eye and comparing it to a camera obscura. Kepler was also the first to use the term 'camera obscura.'

⁵⁸ Karel van Mander, *Grondt*, quoted in Van de Wetering, *Rembrandt*, 82.

⁵⁹ Karel van Mander, *Grondt*, as quoted in Van de Wetering, *Rembrandt*, 161.

to be awake at that time to observe the day beginning.⁶⁰ He also includes information on copying tools that may be helpful to the artist such as ‘the veil’: a frame of threads (fig. 10) already known as a viable method from Leon Battista Alberti (1404-1472)⁶¹ and Albrecht Dürer (1471-1521).⁶² For Van Mander, the means were not as important as the final result which should appear “welstandt”, or “seemly”, suggesting that the representation agrees with nature.⁶³

Vermeer’s contemporary, Samuel van Hoogstraten (1627-1678), was one of the few Dutch artists to write about the art of painting.⁶⁴ His treatise, *Inleyding tot de Hooge Schoole der Schilderkonst (Introduction to the Academy of Painting, or the Visible World)*, although published in 1678, three years after Vermeer’s death, provides useful information about the prevalent ideas on art that circulated in the Dutch Republic.⁶⁵ In his treatise, Van Hoogstraten writes about the camera obscura without revealing any firsthand experience using the device for his artistic practice. Instead, he recommends its use to young artists in order to understand the “overall aspect which a truly natural painting should have.”⁶⁶ Van Hoogstraten may be the only writer to suggest that artists not only study and learn from the images seen in a camera obscura, but to “adopt its artifice as their model.”⁶⁷ For Van Hoogstraten, painting is a form of deception. In Ernst Gombrich’s words, “The artist cannot copy a sunlit lawn, but he can suggest it.”⁶⁸ Similar to Van Mander’s focus on prolonged looking, Van Hoogstraten emphasizes the authority

⁶⁰ Desmond Shawe-Taylor, *Dutch Landscapes* (London: Royal Collection Publications, 2010), 112.

⁶¹ Leon Battista Alberti, *On Painting* (New Haven: Yale University Press, 1966), 67-68.

⁶² Albrecht Dürer in *Underweysung der Messung*, 1538, advised a method for copying: “In this method one uses a frame with a grid of strong black thread. The spaces or quadrangles should be about two fingers wide.”

⁶³ Hessel Miedema, “Karel Van Mander: Did He Write Art Literature?” *Simiolus: Netherlands Quarterly for the History of Art* 22, no. 1/2 (1993): 60.

⁶⁴ Brusati, *Artifice and Illusion*, xxvi.

⁶⁵ Unfortunately, little is known about the impact of these treatises on Dutch artists, such as which ones were considered useful or important to read. Van Hoogstraten’s treatise has also been described as an updated and extended remake of Van Mander’s treatise. Van de Wetering, *Rembrandt*, 91.

⁶⁶ Liedtke, *A View of Delft*, 247.

⁶⁷ Brusati, *Artifice and Illusion*, 71.

⁶⁸ Gombrich, *Art of Illusion*, 38.

of the eye, and he encourages young artists to begin “[c]ultivating the habit of attentive observation.”⁶⁹ Van Hoogstraten’s theories are based on illusionistic artifice and fooling the eye, as “every single thing that art represents is an imitation of natural things.”⁷⁰ Vermeer’s paintings demonstrate this concept through his methodical approach of carefully observing optical phenomenon. The objects that Vermeer included in his works are depicted with careful attention to how the light defines its texture and material. This close observation of the ways in which light falls on the world allowed Vermeer to give the viewer a sense of the tactile qualities of such diverse objects as fur on a jacket or a varnished map hanging on the wall.

Vermeer’s Working Methods: The Camera Obscura and *View of Delft*

We know very little about Vermeer’s working methods, but he must have been methodical in his work because the number of paintings he produced in his lifetime is relatively small.⁷¹ We know that he made use of his surroundings in his paintings; his family members were likely his models, and he used objects he owned.⁷² He seems to have been an introspective painter who planned his compositions carefully and thoughtfully. At the same time, we know that he was also a well-respected member of the community of painters to which he belonged, being appointed twice as head of the painter’s Guild of St. Luke.⁷³

Charles Seymour has posited that Vermeer’s *View of Delft* was created using a camera obscura. In this case the view was seen from the window of a room in the upper floor of a house across the water, using a telescope with one lens removed, projecting the image onto a white

⁶⁹ Brusati, *Artifice and Illusion*, 227.

⁷⁰ Brusati, *Artifice and Illusion*, 245.

⁷¹ Even taking into consideration that some of his paintings have been lost, J. Michael Montias’ estimation of the total number of his works is between 44 and 54. This would average to two paintings a year. Montias, *Vermeer and his Milieu*, 266-267.

⁷² Montias, *Vermeer and his Milieu*, 339-344.

⁷³ Montias, *Vermeer and his Milieu*, 159.

background in a darkened room.⁷⁴ Those that support Seymour's thesis also point to the circles of confusion, or small dabs of paint depicting reflections from the water on the larger boat. However, Vermeer included these diffused highlights in many of his paintings and they are scattered arbitrarily, appearing in areas of shadow and on non-reflective materials,⁷⁵ which would not occur in images using this optical device.⁷⁶ Camera obscuras were considered useful in townscape painting in order to depict the buildings accurately and in perspective, but it has been shown through technical examinations and comparisons to contemporary town plans that Vermeer made modifications to the Delft skyline that would have been visible from this vantage point.⁷⁷ He adjusted the exact location of the buildings and simplified their structure. Infrared images of this painting show that Vermeer made several changes in the composition as he worked, such as: modifications to the spacing of the buildings so they would appear less crowded; simplifying their structure to unify them; alterations to the shape of the reflections of the buildings in the water; and an additional male figure on the shore was removed (fig. 11, fig. 12, fig. 13).⁷⁸ These compositional modifications were selectively and consciously made at the later stages of completion while Vermeer was assessing the image on the canvas, when there would have been no need for a camera obscura. When making these decisions, Vermeer would have been concerned with the final image and not with what he had observed through a device.

Arthur Wheelock postulates that the camera obscura would have been helpful to Vermeer in visualizing the scene and guiding his conception, while others such as Walter Liedtke caution that the impact of this device on his work is dubious and overstates its usefulness.⁷⁹ Vermeer

⁷⁴ Seymour, "Dark Chamber and Light-Filled Room: Vermeer and the Camera Obscura," 326.

⁷⁵ Mary S. Hammond, *The Camera Obscura*, 369.

⁷⁶ Wheelock and Kaldenbach, "'Vermeer's View of Delft' and His Vision of Reality," 20.

⁷⁷ Wheelock and Kaldenbach, "'Vermeer's View of Delft' and His Vision of Reality," 12.

⁷⁸ Wheelock and Kaldenbach, "'Vermeer's View of Delft' and His Vision of Reality," 9 (n.2).

⁷⁹ Liedtke, *A View of Delft*, 247.

must have admired certain effects of colour, light, and focus in a camera obscura, but he persistently departed from what he actually saw—in the camera, in his studio, or in another artist's work—in accord with his own highly refined aesthetic and expressive goals.⁸⁰ Liedtke argues that the modifications and refinements that Vermeer made to the composition in *View of Delft* imply that he did not use a camera obscura to record the site.⁸¹ He may have observed the scene with a camera obscura but it provided him with “no more than memories of optical effects.”⁸²

To the viewer, the *View of Delft* appears naturalistic, but Vermeer's priority was not topographical accuracy. His goal, rather, was to create a harmonious and pleasing composition that created the illusion of reality.⁸³ Similarly, according to Van Hoogstraten, a painting is “a mirror of Nature, making things appear to be that are not, and deceiving in a permissible, delightful and commendable way.”⁸⁴ Vermeer is engaging the viewer to recognize the scene and accept it as reality, but it is only a simulation, the *appearance* of being copied from nature.⁸⁵ The artist's difficult task of translating three-dimensional perception onto the canvas is expressed in passages from Philips Angel's (c. 1618-1664) treatise *Lof der Schilderkonst (In Praise of the Art of Painting)*, published in 1642:

So what is seen is not what should be painted: reality must be rearranged for the eye to be satisfied, for a mere copy of ‘the image on the retina’ would not produce a painting with either force or an appearance of solidity. Light, shadow and colour have to be artfully selected and composed if the illusion of three dimensions is to be produced on a two-dimensional surface.⁸⁶

⁸⁰ Liedtke, *A View of Delft*, 247; Wheelock and Kaldenbach, “Vermeer's View of Delft’ and His Vision of Reality,” 23.

⁸¹ Liedtke, *A View of Delft*, 232.

⁸² Liedtke, *A View of Delft*, 232.

⁸³ Wheelock and Kaldenbach, “Vermeer's *View of Delft*,” 19-23.

⁸⁴ Thijs Weststeijn, *The Visible World: Samuel van Hoogstraten's Art Theory and the Legitimation of Painting in the Dutch Golden Age* (Amsterdam University Press, 2008), 273.

⁸⁵ Wheelock, *Vermeer and the Art of Painting*, 17.

⁸⁶ Paul Taylor, “The Concept of Houding in Dutch Art Theory,” *Journal of the Warburg and Courtauld Institutes* 55 (1992): 220.

While Vermeer may have been inspired by looking at images in a camera obscura, the *View of Delft* is not an exact copy of the scene as it would have appeared on a two-dimensional surface; therefore, it is unlikely that he traced the image of the city projected by the device. Instead, he engaged in rearranging reality, selecting what to include and what to omit, carefully composing his painting, as Angel recommends, to create a painterly illusion.

The Debate Concerning Vermeer's Use of the Camera Obscura

Historically, beginning in the eighteenth century, there was speculation that Northern painters relied on the camera obscura to produce the realistic effects in their paintings. In 1711, W.J. 's Gravesande (1688-1742) wrote:

On the topic of the camera obscura, it can be noted that many Flemish painters (from what is said) have studied and imitated the camera obscura in their paintings, the effect it presents and the manner in which it depicts Nature; many people have believed that it was capable of giving excellent instruction to understand light and that which is called chiaroscuro...The effect of the camera is striking, but false.⁸⁷

Francesco Algarotti (1712-1764) writing several years later in 1763, also expressed the opinion that it was probable that several of the “‘Olttramontani’ masters, considering their success in expressing the minutest objects, also made use of the camera obscura.”⁸⁸ In 1781, Sir Joshua Reynolds (1723-1792) remarked on the look of Dutch paintings as having “very much the effect of nature seen in a camera obscura.”⁸⁹ In all of the above cases, these writers are referring to the effects seen in the paintings that suggest the use of the camera obscura rather than having factual knowledge of the artists’ working methods.

⁸⁷ “On peut remarquer à l’occasion de la chambre obscure, que plusieurs Peintres Flamands (à ce que l’on dit) ont étudié et imité, dans leurs tableaux, l’effet qu’elle, présent, et la manière dont elle fait voir la nature...L’effet en est à la vérité plus piquant, mais il est faux.” W.J. ‘s Gravesande, *Essai de Perspective*, Paris (1711), quoted in Charles Antoine Jombert, *Méthode pour apprendre le dessin*, 138-139. Translation by author.

⁸⁸ Algarotti, *Saggio sopra la pittura*, 70.

⁸⁹ Alpers, *The Art of Describing*, 29.

Presently, the debate surrounding Vermeer's use of the camera obscura can be divided into two camps. On one side is the 'optical'⁹⁰ camp made up of historians who subscribe to the theory that Vermeer used the device "wholesale"⁹¹ and that he set up an optical apparatus in his studio as a separate room or with heavy drapes, and literally copied his compositions from the image that he saw projected in the device. The opposing 'artistic' camp believes that Vermeer may have been inspired by what he saw projected in a camera obscura and he reproduced its effects, but that he did not, ultimately, copy directly from the device.⁹² The 'optical' camp points to the paintings of Vermeer's mature period as proof and considers them primary documents that demonstrate formal elements of painted optical phenomena that do not appear in the work of his contemporaries, which to some scholars suggests the likely use of the camera obscura.⁹³

Because there is no definitive documentary evidence that Vermeer used optical aids in his work, some historians have chosen to recreate some of his individualistic effects using a camera obscura.⁹⁴ In several cases, even his studio space was rebuilt in order to visualize his artistic process.⁹⁵ These recreations do not take into consideration that Vermeer may have allowed

⁹⁰ In Liedtke's view, "the debate divides between optical and artistic camps." Liedtke, *Vermeer: The Complete Paintings*, 182.

⁹¹ Philip Steadman, *Vermeer's Camera: Uncovering the Truth Behind the Masterpieces* (New York; Oxford: Oxford University Press, 2001), 1.

⁹² Walter Liedtke, *Vermeer: The Complete Paintings* (Ghent: Ludion, 2012), 179-189.

⁹³ In 1891, Joseph Pennell was the first to notice aspects of Vermeer's work that suggested a photographic quality. In the painting *Officer and the Laughing Girl*, there is an exaggeration in the size of objects closest to the viewer. The officer appears disproportionately larger than the girl who is further away. Joseph Pennell, "Photography as a hindrance and a help to art," *British Journal of Photography*, XXXVII (1981): 75. A. Hyatt Mayor also noticed aspects in Vermeer's work that reminded him of photographic effects. In addition to the discrepancy in size of objects closest to the viewer, the colour and tones that Vermeer used were "blended as perfectly as the ground glass of a camera," and that the highlights on objects appeared to "break up into dots like globules of halation swimming on a ground glass." Hyatt Mayor, "The Photographic Eye," 20; Daniel A. Fink, "Vermeer's Use of the Camera Obscura — A Comparative Study," *The Art Bulletin* 53, no. 4 (1971): 493.

⁹⁴ In collaboration with photographer Henry Beville, Seymour experimented with a camera obscura to reproduce some of the effects in two of Vermeer's paintings in the National Gallery in Washington, D.C., *Girl with a Flute* and *Girl with a Red Hat*. They were able to reproduce the effects of soft focus and the circles of confusion in the highlights; however, since they were not able to take photographs with the camera obscura, they were forced to improvise with a modern-day camera. The conclusion they reached was that the evidence supported the hypothesis that Vermeer made use of a camera obscura. Seymour, "Dark Chamber and Light-Filled Room," 329.

⁹⁵ P.T.A. Swillens, *Johannes Vermeer: Painter of Delft, 1632-1675* (Utrecht: Spectrum, 1950), 69.

himself some artistic license and built up his compositions from elements taken from various places, some actual and some from his imagination. In *Vermeer's Camera* (2001), architect Philip Steadman made a model of Vermeer's studio to test his hypothesis that the artist constructed a booth in the back part of his studio in which he was completely enclosed to copy what he saw through a lens.⁹⁶ Artist David Hockney experimented with a 'mirror-lens,' as he called it, to paint a portrait and concluded that it was likely that artists such as Vermeer followed a similar process using optical instruments.⁹⁷ Subsequently, the work of Steadman and Hockney inspired Tim Jenison, an engineer and inventor, as well as an art enthusiast, to recreate a Vermeer painting in the 2014 documentary film, *Tim's Vermeer*.⁹⁸ Artist Jane Jelley, in her book of 2017, also experimented with a method for transferring under-drawings from a camera obscura using a still-wet oiled sheet of paper pressed against the canvas similar to a monotype in print-making.⁹⁹

Recreations of Vermeer's artistic methods are presented as attempts to discover the 'secret' to his work. Since Thoré-Bürger first rediscovered Vermeer's work, there has been increasing interest in the artist and his oeuvre, and a desire to understand why his paintings are so remarkable. This assumes that his approach to painting was fundamentally different from his contemporaries, but this does not appear to be the case.¹⁰⁰ Relatively little is known about Vermeer's motives and his methods, which invites speculation and facilitates ascribing to him a variety of qualities and impulses. Ultimately, these attempts at recreating his working methods raise more questions than they answer. Some of this interest is driven by people with mechanical

⁹⁶ Steadman, *Vermeer's Camera*, 105 (see Figure 52 for possible arrangement).

⁹⁷ David Hockney, *Secret Knowledge: Rediscovering the Lost Techniques of the Old Masters* (New York: Viking Studio, 2001), 58; 74-76.

⁹⁸ Teller, Tim Jenison, Penn Jillette, David Hockney, *Tim's Vermeer* (Sony Pictures, 2014).

⁹⁹ Jane Jelley, *Traces of Vermeer* (Oxford University Press, 2017).

¹⁰⁰ Christopher Heuer, "Perspective as process in Vermeer," *RES: Anthropology and Aesthetics* 38, no. 38 (2000): 86-89.

expertise such as Tim Jenison, who seek to reduce Vermeer's talent or genius to technical proficiency that would be accessible to anyone with the appropriate knowledge. It is the contrary view to that of Sir Kenneth Clark who believed in the idea of artistic genius and that exceptional individuals do exist in the history of art.¹⁰¹ These attempts at recreating the effects seen in Vermeer's work suggest that anything worth admiring can be explained by technique alone, but it ignores all the complex influences and experiences, the atmosphere and society of Delft in the mid-seventeenth century, the interactions with his artistic milieu, the innovations in science, the physical nature of his materials, that came together and were then expressed by one sensitive and observant individual with great technical abilities. Historians have commented on Vermeer's bias towards the visual and his ability to be highly objective in his observations. Vermeer paid close attention to that which was visible in front of him, and he was able to ignore what he knew from experience. Lawrence Gowing has interpreted this objectivity as impartiality, remoteness, and detachment, and concludes that optical projections influenced his mature work, and that he was "alone in putting it to the service of style rather than the accumulation of facts."¹⁰²

Of all the "points of correlation"¹⁰³ that scholars in the 'optical' camp rely on to prove that Vermeer made use of a camera obscura, only one, the out-of-focus points of light that are outside of the depth of field, which our eye detects as 'circles of confusion,' has garnered general acceptance.¹⁰⁴ Alpers argues convincingly that the visual mode of Dutch paintings was inspired more by artists' familiarity with optically produced imagery and trust in these devices than by their use of them as aids for copying. Vermeer's use of light, colour and focus shows evidence of

¹⁰¹ "Above all, I believe in the God-given genius of certain individuals, and I value a society that makes their existence possible." Kenneth Clark, *Civilisation: A Personal View* (New York: Harper & Row, 1969), 347.

¹⁰² Gowing, *Vermeer*, 23.

¹⁰³ Fink, "Vermeer's Use of the Camera Obscura," 494.

¹⁰⁴ Alpers, *The Art of Describing*, 31-32. For further critical analysis of Fink, see Arthur K. Wheelock, *Perspective, Optics, and Delft Artists Around 1650* (New York: Garland Pub, 1977), 285-291.

effects that would have been observed through a camera obscura, but these effects are not always present.¹⁰⁵ Kemp argues that these effects were a stylistic choice for Vermeer, and part of his creative process involved deciding when and where to use them.¹⁰⁶ In Kemp's words, "luminous dabs are exploited as a form of painterly shorthand which is optical in origin and artificially contrived in application."¹⁰⁷ The available evidence suggests that Vermeer used the camera obscura mainly as a tool for observation and inspiration.

When pinholes were made evident by x-radiography in about fifteen of Vermeer's paintings, it confirmed that he made use of well-known and accepted methods for creating perspective.¹⁰⁸ The holes would have been formed when a pin was inserted in the canvas with strings attached to guide Vermeer in constructing precise orthogonal lines, which converged at the pin, as vanishing point. By closely examining where this point is located, we can see that Vermeer was very methodical in deciding its placement. In this way, he deliberately leads our eye to the heart of his composition and where he wants to focus our attention. His use of this method for constructing perspective supports the idea that he was consciously constructing images and not simply copying from an optical device.¹⁰⁹ If Vermeer used a camera obscura, it was not for the purposes of finding a shortcut for perspectival construction in his work. In addition, if one considers the lenses available in the seventeenth century, it would be unlikely for

¹⁰⁵ Liedtke, *A View of Delft*, 247.

¹⁰⁶ Kemp, *The Science of Art*, 193.

¹⁰⁷ Kemp, *The Science of Art*, 194.

¹⁰⁸ Jørgen Wadum, "Vermeer in Perspective." In *Johannes Vermeer*, A.K. Wheelock, ed. (Yale University Press, 1995), 67-79.

¹⁰⁹ See also Christopher Heuer, "Perspective as Process in Vermeer," *RES: Anthropology and Aesthetics* 38, no. 38 (2000): 82-99.

Vermeer to have painted his interior scenes in the manner that Steadman has suggested. The images at full size would have been too dim to copy using such lenses.¹¹⁰

In *Techniques of the Observer* (1990), Crary investigates the camera obscura from a wider perspective than as an artist's tool. Although he finds the debate surrounding Vermeer's alleged use of optical aids interesting, he contends that this issue has been over-simplified. Instead, Crary focuses on how the camera obscura situates and controls the observer's perception. The camera obscura was "*not* simply a pictorial or stylistic option, one choice among others for a neutral and ahistorical subject."¹¹¹ To move beyond the debate, Crary ascertains that Vermeer's paintings are firmly rooted in the "epistemological model" of the camera obscura, even if Vermeer did not use one in his artistic practice.¹¹² Although the device went through several modifications during this period, I agree with Crary that its status as a metaphor for vision was consistent throughout the seventeenth and eighteenth centuries even though the device as an object continually changed its physical structure.¹¹³

In the final analysis, there is no convincing evidence that Vermeer traced his compositions from the images he saw in a camera obscura. The optical effects, such as the circles of confusion, strongly indicate that he was aware of the images seen through the device and that he copied these effects in his mature works beginning around 1658. Vermeer demonstrates in his work that he was a careful observer of the effects of light and how it behaves in areas of shadow, the ways in which it can describe the tactile qualities of drapery and other objects, the many facets it can exhibit across a flat plane, and the way it dances off reflective surfaces. In *The*

¹¹⁰ Allan A. Mills, "Vermeer and the Camera Obscura: Some Practical Considerations," *Leonardo* 31, no. 3 (1998): 218; Jørgen Wadum, "Vermeer in Perspective." In *Johannes Vermeer*, ed. A.K. Wheelock (Yale University Press, 1995), 67-79.

¹¹¹ Crary, *Techniques of the Observer*, 46.

¹¹² Crary, *Techniques of the Observer*, 46.

¹¹³ Crary, *Techniques of the Observer*, 30.

Lacemaker (c.1669-70), for instance, Vermeer has carefully observed how the light, coming from the top right, strikes the girl's hands to suggest their three-dimensional form, which are the focus of the painting (fig. 14). Similarly, the girl's face as she looks down intently at her work is modelled into simple planes defined by the light. Her lace collar looks flat on the right side where the light hits it full on, but the shadowed area on the left is painted in variations of cool, translucent tones that describe its texture, and the light is allowed to pick up some of the highlights in small dabs of paint. The threads that spill out like liquid from the pillow are out of focus and this is often remarked on as an indication that Vermeer may have used a camera obscura. However, by making the conscious decision to leave the table and the threads less distinct, the focus remains on the girl's hands.

In addition to being observant of the world around him, Vermeer was also an innovative artist who stood apart from his contemporaries because his work displayed a higher level of inventiveness. He had a keen understanding of how visual perception functions and the role the observer plays; for example, the viewer, from experience, will fill in any missing details in an image or combine tonalities to recognize what is being depicted. It is likely that he found the effects projected in a camera obscura to be intriguing, and he purposely included ambiguities because he understood the extra dimension they brought to his work. As Tomohiro Ishizu explains, when looking at a mature work by Vermeer that includes optical phenomena, such as *Girl with a Pearl Earring* (fig. 15), the brain engages in 'disambiguation,' meaning that in order to make sense of what we are seeing, we must process the painted shapes, the pointillés or the circles of confusion, and determine what they represent.¹¹⁴ For example, the nose of the model has no defined edge but the eye and the mind process the image correctly. This requires active

¹¹⁴ Tomohiro Ishizu, "Disambiguation of Ambiguous Figures in the Brain," *Frontiers in Human Neuroscience* 7, (2013): 1.

participation on our part, although we are not consciously aware of completing the image. Depending on what the observer brings to the painting, the result can be a mutability or a shimmering life-like quality that can be enthralling.

Vermeer shared the Dutch interest in optics. His use of the camera obscura as an ‘artificial eye’ allowed him to augment his vision, similar to the way in which his fellow citizen of Delft, Antonie van Leeuwenhoek (1632-1723) used his microscope, attentively observing the world around him with fresh eyes and boundless curiosity.¹¹⁵ This interest in optics and trust in intermediary devices became, as Alpers argues, part of the Northern “cultural ambience.”¹¹⁶

The Influence of Culture on Dutch Art and the Use of the Camera Obscura

Celeste Brusati explains the difference in attitude to art in the North and South through the figure of Narcissus. For Alberti in Italy, Narcissus was the inventor of painting because he was the first to paint his image on the surface of the water.¹¹⁷ For Van Hoogstraten in the North, the reflected image of Narcissus on the surface of the water was painted by Nature, and Narcissus witnessed “nature painting itself through the image-making properties of light.”¹¹⁸ Narcissus is compared to the artist/observer looking at a “truly natural” painting formed in a camera obscura. Similarly, Dutch artists captured their own images as they saw them in the reflective surfaces of the objects they painted.¹¹⁹

In their pursuit of ‘naturalism,’ Dutch artists were striving to paint objects as they appeared to the eye rather than as they were in reality. According to Alpers, Netherlandish art

¹¹⁵ Laura J. Snyder. *Eye of the Beholder: Johannes Vermeer, Antoni von Leeuwenhoek and the Reinvention of Seeing* (New York: Head of Zeus, 2015), 312.

¹¹⁶ Alpers, *The Art of Describing*, 26.

¹¹⁷ Alberti, *On Painting*, 64.

¹¹⁸ Brusati, *Artifice and Illusion*, 160.

¹¹⁹ Brusati, *Artifice and Illusion*, 160.

was inspired by Keplerian optics in its pursuit of the “‘look’ of things.”¹²⁰ Alpers summarizes the differences in paintings of artists in the north and south of Europe as:

...attention to many small things versus few large ones; light reflected off objects versus objects modified by light and shadow; the surface of objects, their colors and textures, dealt with rather than their placement in a legible space; an unframed image versus one that is clearly framed; one with no clearly situated viewer compared to one with such a viewer.¹²¹

In the Albertian model, the painting is equivalent to an observer’s view from a window and this view is understood to be a “spatial extension of the world.”¹²² For Alpers, “Alberti’s painting...begins not with the world seen, but with a viewer who is looking out at objects...in space,”¹²³ whereas in the Keplerian model, the painting is formed on the retina by Nature, “mirrored and caught on a surface.”¹²⁴ In the North, vision is deanthropomorphized.¹²⁵ The distinction for Alpers is that in the northern tradition, it is an “art of describing as distinguished from the narrative art of Italy.”¹²⁶ This difference exists, with variations and exceptions, between Italian art and Dutch art, although Alpers does not go so far as to argue that it is a polarity between north and south, Holland and Italy.¹²⁷ Instead, she is concentrating on Dutch visual culture that branched out from the Italian Renaissance.¹²⁸ According to Alpers, the camera obscura was “paradigmatic” of the images produced in Dutch art of the seventeenth century.¹²⁹ It is not her contention that all Dutch artists used the camera obscura but that it was the trust that the Dutch placed in optical devices that is significant for understanding their painterly style. The

¹²⁰ Alpers, *The Art of Describing*, 45.

¹²¹ Alpers, *The Art of Describing*, 44.

¹²² Brusati, *Artifice and Illusion*, 74.

¹²³ Alpers, *The Art of Describing*, 41.

¹²⁴ Brusati, *Artifice and Illusion*, 74.

¹²⁵ Alpers, *The Art of Describing*, 36.

¹²⁶ Alpers, *The Art of Describing*, xx.

¹²⁷ Alpers, *The Art of Describing*, xx.

¹²⁸ Alpers, *The Art of Describing*, xxv.

¹²⁹ Alpers, *The Art of Describing*, 32.

sense of vision was considered of primary importance for acquiring new knowledge, and the act of seeing itself became a part of this ‘new science.’ In his *Daghwerck (The Day’s Work)* of 1639, Constantijn Huygens uses the camera obscura and the microscope as metaphors for acquiring knowledge.¹³⁰ His delight in Drebbel’s camera obscura was apparent, but he also trusted his eyeglasses,¹³¹ and marveled at what he saw through the microscope: a “world of tiny creatures till now unknown, as if it were a newly discovered continent of our globe.”¹³²

Alpers makes several broad generalizations and she admits that there are exceptions to her thesis; however, her argument is productive and illuminating. If we look at the paintings produced in the seventeenth century in Italy versus those in Holland, there is a difference which we can ascribe to culture. For Michel Foucault, culture contains fundamental codes, which mediate experience.¹³³ These codes form a “hidden network” structuring the ways in which objects, words, concepts, practices and perceptions can be linked within a given period.”¹³⁴ Foucault insists that perception is never neutral, it is always coded.¹³⁵ In order to decipher these codes, Alpers argues that it is necessary to look at Dutch art differently and to refrain from interpreting their images in relation to the Italian tradition.¹³⁶

Optics and the Theory of Vision in the Seventeenth Century

The Dutch Golden Age was the age of empirical reasoning, when observation and experimentation were paramount to discovering truth. The camera obscura played a fundamental

¹³⁰ Snyder, *Eye of the Beholder*, 172.

¹³¹ Alpers, *The Art of Describing*, 33.

¹³² Snyder, *Eye of the Beholder*, 172.

¹³³ Joseph J. Tanke, *Foucault's Philosophy of Art: A Genealogy of Modernity* (London; New York: Continuum, 2009), 20.

¹³⁴ Tanke, *Foucault's Philosophy of Art*, 21.

¹³⁵ Tanke, *Foucault's Philosophy of Art*, 21.

¹³⁶ Alpers, *The Art of Describing*, xx.

role in shaping a burgeoning science of vision. In his writings on *Optics*, Descartes explains that images will appear in the chamber of the device even if a lens is not used, although they will be imperfect. Adding a lens and adjusting the distance between the aperture and the surface on which the images are projected will cause the images to appear more or less distinct. “Further,” he writes, “not only do the images of objects form thus on the back of the eye, but they also pass beyond to the brain.”¹³⁷ “It is due to the intervention of the brain that we are occasionally deceived.”¹³⁸ He explains that:

...in order to depart as little as possible from currently accepted beliefs, we prefer to avow that the objects which we perceive truly transmit their images to the inside of our brain, we must at least observe that there are no images that must resemble in every respect the objects they represent—for otherwise there would be no distinction between the object and its image—but that it is sufficient for them to resemble the objects in but a few ways, and even that their perfection frequently depends on their not resembling them as much as they might.¹³⁹

He goes on to give the example of the rules of perspective. For an object such as a circle or square to be interpreted correctly, at times it must be represented by an oval or a diamond. “So that often, in order to be more perfect as images and to represent an object better, they must not resemble it.”¹⁴⁰ For an artist’s illusions to be interpreted as reality, they must accept objectively what they see with their eyes rather than what they cognitively know exists. This theory is evident in Vermeer’s approach to painting, and it is this quality that Gowing interprets as “detachment” or “naivety” and his observation of tone as “so impersonal, yet so effective.”¹⁴¹ Indeed, Gowing went so far as to describe Vermeer as a “walking retina.”¹⁴² For Vermeer, it was the visual aspects of the world, the play of light on forms, that most interested him.

¹³⁷ Descartes, *Optics*, *Fifth Discourse*, 100.

¹³⁸ Descartes, *Vision*, *Sixth Discourse*, 108.

¹³⁹ Descartes, *Fourth Discourse*, 90.

¹⁴⁰ Descartes, *Fourth Discourse*, 90.

¹⁴¹ Gowing, *Vermeer*, 19.

¹⁴² Gowing, *Vermeer*, 19.

Conclusion

In his paintings, we see evidence that Vermeer was aware of and interested in images seen in the camera obscura, so it is likely that he spent time observing these visual phenomena and copied the effects he saw such as the circles of confusion on highlights. It is far from obvious that he would have copied what he saw directly because these optical effects are found in his paintings even in areas of shadow, which would not have appeared in a camera obscura.

The materials and techniques available to Vermeer were also available to his contemporaries, but Vermeer was able to make viewers believe that the sun is shining in his *View of Delft*. His accomplishment was translating the optical phenomena presented by a camera obscura into paint. To the viewer, the scene appears naturalistic, but Vermeer has manipulated the effects he has observed and presented us with an illusion of reality. By copying the effects that the camera obscura produces, Vermeer was able to achieve his desired effect, which was not to recreate reality but to create the appearance of reality.

The next chapter will examine how the influence of topographical painting that began in early modern Holland expanded into Italy in the eighteenth century. The paintings by the most famous *vedutista*, Canaletto, were destined to be brought home by tourists on the Grand Tour as aide-memoires of their visit to Venice. Like Vermeer, the effects of the sun shining in Canaletto's luminous paintings led his critics to believe that he also used a camera obscura to produce his work. Canaletto painted his urban environment with an objectivity aimed at the tourist rather than the resident. The next chapter will show how he may have used the camera obscura as a cartographic tool that helped him manipulate the urban environment to suit his intended audience.

CHAPTER TWO

CANALETTO AND THE CAMERA OBSCURA IN THE EIGHTEENTH CENTURY

“As for Canaletto, his work consists of painting views of Venice, and in this genre, he surpasses anything that has ever been done. His style is clear, gay, vivid, with true perspective and admirable detail. The English have so spoiled him, offering him three times what he asks for his paintings, that it is no longer possible to do business with him.”¹⁴³

-Charles de Brosses (1709-1777) in a letter to M. de Neuilly dated 24 November 1739.

Piazza San Marco: Formal Analysis

In the painting *Piazza San Marco*, 1742-46, by Canaletto, the piazza is spread out before us in a wide-angle view (fig. 16). Canaletto directs our attention to the campanile which soars majestically above the piazza at slightly left of centre, against the backdrop of a brilliant blue sky with wisps of pale clouds reflecting the warm glow of the setting sun. Our eye is then subtly guided past the campanile towards the distant Bacino di S. Marco to a miniature vignette worthy of its own canvas where more activity unfolds, and tiny gondolas gently glide past the Church of San Giorgio Maggiore. Although there are many figures walking about in the piazza, they are arranged in a manner that leads our eye through the scene using colour and line. We can see that Canaletto added the figures after most of the painting was complete because over time some of the under-paint, especially the lead white, has shown through. The deep shadow on the right-hand side of the Procuratie Vecchie forms a triangular shape that directs our eye back into the centre of the scene, but also balances the sharp diagonal of the church of San Marco on the opposite side. The three flagpoles to the left of the campanile, symbolic of Venice's past

¹⁴³ “Pour le Canaletto, son métier est de peindre des vues de Venise; en ce genre, il surpasse tout ce qu'il y a jamais eu. Sa manière est claire, gaie, vive, perspective et d'un détail admirable. Les Anglois ont si bien gâté cet ouvrier, en lui offrant de ses tableaux trois fois plus qu'il n'en demande, qu'il n'est plus possible de faire marché avec lui.” Charles de Brosses, *Le Président De Brosses En Italie: Lettres Familières Ecrites d'Italie En 1739 Et 1740*, 3e. éd. (France: Librairie Académique, P. Didier et Cie, 1869), 345. Translation by author.

territorial conquests, which Canaletto painted taller than they are in reality, form a sharp recessed line, leading back into the distance to the column holding the first patron saint of Venice, St. Theodore. The façade of the Byzantine church of San Marco and the Ducal Palace are seen in extreme foreshortening, also leading our eye back towards the column holding the Lion of Venice, symbol of the second patron saint, St. Mark.

Looking across the vast expanse of the piazza with his back to the clocktower was a favoured position of Canaletto's. The point-of-view in his paintings reflect a slightly elevated position, as if viewing the scene from a balcony as a tourist. In this way, Canaletto maintains objectivity and aloofness. The long shadows cast by the sun setting in the west suggest that this is a typical moment later in the day when the merchants will soon be packing up their wares. Some of the figures in the piazza wear the *bauta*, typically worn during Carnevale.¹⁴⁴ For Canaletto, these genre aspects of his paintings were an important element that added vitality to his work.¹⁴⁵ Canaletto's penetrating gaze responds equally to the solidity and timelessness of the buildings as to the transitory quality of everyday life of the city's inhabitants.¹⁴⁶

¹⁴⁴ The *bauta* refers to the disguise consisting of a white mask, a cloak, and a tricorn hat. Michele Emmer, "Le maschere veneziane." In *Matematica e Cultura* 2006 (Milano: Springer Milan, 2006), 275.

¹⁴⁵ Canaletto in a letter to his patron Stefano Conti of Lucca dated 25 November 1725 includes a description of the painting *Grand Canal: the Rialto Bridge from the North*: "the Bridge of the Rialto on the side looking towards the Germans Warehouse which is opposite the Palace of the Magistrates of Camerlinghi and other Magistrates besides, looking down upon the Vegetable Market where they land all kinds of Vegetables and fruits to be shared amongst the dealers in the City. In the middle of the Canal is painted a Peotta Nobile with figures in it, and four Gondoliers going at full speed and close to it a Gondola having the Livery of the Emperors Ambassador." In a subsequent letter of 15 June 1726, Canaletto includes a description of the painting *Grand Canal: from Santa Maria della Carita to the Bacino di S. Marco*: "where I have disposed several small figures amongst which in a little group of three figures in the centre of the Square are two Priests of the same Order who are discoursing with a Philosopher in a violet colored dress." Katherine Baetjer and J.G. Links, *Canaletto* (New York: Metropolitan Museum of Art, 1989), Appendix, 361-369.

¹⁴⁶ Michael Levey, "Canaletto as Artist of the Urban Scene," In *Canaletto* (exhibition catalogue), ed. Katherine Baetjer and J.G Links, 17-30 (New York: Metropolitan Museum of Art, 1989), 28.

Introduction

In this chapter I will analyze the use of the camera obscura in topographical painting in eighteenth-century Italy, with a focus on Canaletto. I will also look at the working method of Canaletto's forerunner in Rome, Dutch artist Gaspar Van Wittel (1652-1736), known as Vanvitelli, and his use of optical aids to paint views of the city. As I will demonstrate, there is more evidence of the camera obscura as an artist's tool in the eighteenth century as compared to the seventeenth. The supposition that Canaletto used a camera obscura to perfect his craft originates in an account by the artist's first biographer, Antonio Maria Zanetti the Younger (1706-1778), who praised the artist for knowing how to correct the distortions seen in the device. Consequently, art historians have taken his commentary as documentary proof that Canaletto used the device in his artistic practice. To understand how this presumption has affected criticism of Canaletto's work, it will be useful to examine the historiography of this debate. My aim will be to clarify what is documented about Canaletto's artistic practice as opposed to what is conjectured. There have been recent investigations that suggest that he did not use optical aids to produce some of his drawings as had previously been assumed.¹⁴⁷ In the first section of this chapter, I will argue that Canaletto's use of the camera obscura would have been beneficial to him at the beginning of his creative process, and that it was used primarily as a tool for observation that allowed him to augment his already acute vision while surveying and detailing his urban environment.

¹⁴⁷ Infrared images taken of six of Canaletto's drawings of the Grand Canal in the Royal Collection Trust clearly show that Canaletto did not use the camera obscura to produce these drawings, but rather, he made extensive use of a ruler and pencil to plot out the scene. Royal Collection Trust, "Secrets of Canaletto's Drawings Revealed Ahead of New Exhibition," (News Release, 18 April 2017), <https://www.rct.uk/about/news-and-features/secrets-of-canalettos-drawings-revealed-ahead-of-new-exhibition#/> (accessed 8 March 2020).

As discussed in Chapter One, Dutch artists such as Vermeer used the camera obscura as a means of imitating nature and capturing the world as it is seen. For Canaletto, on the other hand, the camera obscura allowed him to distort natural vision in order to paint images that were not visible to the naked eye, such as the wide-angle or fish-eye view. Canaletto often made adjustments to the topography of Venice, modifying the distances between buildings or altering their relative sizes to create a sense of balance.¹⁴⁸ His works show his remarkably sensitive awareness of, and ultimately his control over, the physical urban environment as well as the minutiae of everyday life in his native city. Later in this chapter, I will show through engagement with Crary's arguments in *Techniques of the Observer* that the camera obscura provided Canaletto with the means to observe Venice as a "monadic viewer", whereby the observer is a single and indivisible entity, situated "within a city that is knowable only as the accumulation of multiple and diverse points of view."¹⁴⁹ Canaletto's familiarity with his city, acquired after many patient hours spent actively observing, allowed him to know his city intimately, and subsequently, instill his own sense of order to the topography. Ultimately, through the camera obscura, Canaletto was able to impersonalize and augment his vision to create an image of a magical and illusory space.

Canaletto's Working Methods

Canaletto began his career as a theatrical scene painter working with his father, Bernardo Canal (1664-1744), in Venice.¹⁵⁰ It was not uncommon for Venetian artists to also have careers in

¹⁴⁸ Morassi, "Problems of Chronology and Perspective in the Work of Canaletto," 350.

¹⁴⁹ Crary, *Techniques of the Observer*, 52.

¹⁵⁰ Both Bernardo Canal and his son Canaletto are identified as working as set designers for two Scarlatti operas performed in Rome in 1720. Katharine Baetjer and J.G. Links, *Canaletto* (New York: Metropolitan Museum of Art, 1989), 69.

theatre design, which provided them with useful training in linear perspective.¹⁵¹ The experience Canaletto acquired from his background in theatre is evident in the way he manipulates the perspective of his compositions. His training would have included the use of sharp diagonal recessions and multiple vanishing points to deceive the eye and fool the audience into believing that the stage was simply an extension of the space they occupied.¹⁵² Innovative techniques for creating illusion on stage included the *scena veduta in angolo*¹⁵³ using two or more vanishing points moved to either side of the central axis.¹⁵⁴ Canaletto, well-versed in the rules of perspective, also felt free to experiment with two vanishing points and sharp recessions to give the illusion of space in his paintings.

Canaletto made numerous sketches of Venice in his sketchbooks, drawing on site directly from nature. While working in England from 1746-55, his preliminary approach remained the same.¹⁵⁵ This was a practice that he continued until the end of his life as demonstrated by this anecdote from 1760 when British traveler, John Crewe (who later became the first Lord Crewe), was in Venice with his tutor Edward Hinchcliffe:

When the two travelers were at Venice....they chanced to see a little man making a sketch of the Campanile, in S' Mark's place: Hinchcliffe took the liberty...to look at what he was doing. Straightway he discovered a master-hand, & hazarded the artist's name, "-Canaletti-". The man looked up & replied "-mi conosce-".

¹⁵¹ The *vedutista* Michele Marieschi also worked in stage design (*quadratura*) before turning to painting *vedute*. Pellegrino A. Orlandi, Pietro M. Guarienti, and Giovanni B. Pasquali. *Abecedario Pittorico Del M.R.P. Pellegrino Antonio Orlandi, Bolognese, Contenente Le Notizie De' Professori Di Pittura, Scoltura, Ed Architettura*. (1753), 380.

¹⁵² Fabio Finotti, "Perspective and Stage Design, Fiction and Reality in the Italian Renaissance Theatre of the Fifteenth Century," *Renaissance Drama* 36/37 (2010): 27.

¹⁵³ Translated as "scene viewed from an angle" or "angled perspective," which is "a scenographic technique that breaks the central perspective point of view offering unusual lateral glances. The composition of the architectural scene was made in order to show the buildings angled from the spectators' view to achieve diagonal points of observation." Stefano Chiarenza, "Architecture and Perspective in the Set Drawings of the Galli Bibiena." *Nexus Network Journal* 18, no. 3 (2016): 730.

¹⁵⁴ W.G. Constable and J.G. Links, *Canaletto: Giovanni Antonio Canal 1697-1768* (New York; Oxford: Clarendon Press, 1976), 60.

¹⁵⁵ Preparatory drawings for the paintings of the Thames from Richmond House commissioned by the Duke of Richmond indicate that he made detailed sketches from nature before deciding on his final composition. Katherine Baetjer, "A Drawing by Canaletto of Richmond House Terrace," *Metropolitan Museum Journal* 37 (2002): 215.

Thereupon a conversation ensued, and Canaletti pleased to find so enthusiastic a judge of drawing, invited Hinchcliffe to his studio, who waited upon him there on the following day, and inspected his paintings & drawings.¹⁵⁶

The sketchbook in the collection of the Gallerie dell'Accademia in Venice contains detailed sketches that Canaletto made beginning in the 1720s for the purpose of gathering information about the urban landscape of his city. Many drawings are simple outlines of buildings which he would have used as reference when he was in his studio. Along with these diagrammatic sketches are annotations on building materials, colour and condition, the exact number of windows or pilasters on the façade, and the types of merchants located nearby (fig. 17).

Vanvitelli also made drawings of topographical views of Rome, which were intended as working drawings for his own use and not for exhibition purposes; because Vanvitelli is considered the forerunner of Venetian view painting, his working method may give us some insights into Canaletto's method.

Vanvitelli and the Italian Veduta

A young Vanvitelli travelled to Rome in 1674 to work as a surveyor for a Dutch engineer and remained in Italy for the rest of his life, becoming a painter of city views. He is considered an important predecessor to *veduta* painting; his oeuvre links the Northern Netherlandish tradition of cityscapes by artists such as Gerrit Berckheyde (1638-1698) and Jan van der Heyden (1637-1712), and the Italian view paintings of the eighteenth century. Vanvitelli's preparatory drawings show evidence that he used a camera obscura in the initial stages of his work, but his practice involved several stages before the painting was complete.¹⁵⁷ There is no documented proof, but

¹⁵⁶ Edward Hinchcliffe, *Barthomley*, (London, 1856), 53, as quoted in Baetjer and Links, *Canaletto*, 336.

¹⁵⁷ Christoph Lüthy, "Hockney's Secret Knowledge, Vanvitelli's Camera Obscura," *Early Science and Medicine* 10, 2 (2005): 315.

several scholars have seen aspects or “peculiarities” that are indicative of the use of the device (fig. 18).¹⁵⁸ However, an examination of Vanvitelli’s methods seems to indicate that if the camera obscura was used, it was only to survey the scene at the beginning of his working process for observation and planning out the composition. In his preparatory drawing of St. Peter’s Square, we can see that Vanvitelli drew directly onto a large sheet of paper on which he had already prepared a grid of horizontal and vertical lines (fig. 19 and fig. 20). He may have used a camera obscura to survey the scene with the help of this overlaying grid system.¹⁵⁹ By looking at the scene through the camera obscura, he could transpose it square by square. When he was satisfied with his composition, he would transfer his drawing onto canvas with the help of a second grid.

It appears that once Vanvitelli had his initial drawing of the scene in its entirety, he repeatedly referred to it for his painted views. In this way, having documented the topography once, there was no need for him to return to the site to sketch the same scene again.¹⁶⁰ Therefore, the use of the camera obscura was limited to the preliminary drawing stages and was not of major importance to him in his artistic practice. It can be reasonably surmised that this was the case for most other *vedutisti* as well. In fact, as Christoph Lüthy states, “...what was relevant about the camera to *vedutisti* was more the ‘look’ it provided than the direct ‘tracing’, for which it would certainly have allowed, but which, as we have seen in the case of Vanvitelli, they were often carefully avoiding.”¹⁶¹ Lüthy’s conclusion is that although the use of the camera obscura during these two centuries on which this study is focused is evident in artistic practice, its role as

¹⁵⁸ Some of these peculiarities can be seen in the drawing of the *Entrance to the Grand Canal, with the Santa Maria della Salute, Venice*, 1695, including the distortions visible in the peripheral areas such as the gondola on the left magnified by the wide-angle effect and the indefinite lines of the buildings at the margins. Lüthy, “Hockney’s Secret Knowledge, Vanvitelli’s Camera Obscura,” 323.

¹⁵⁹ Lüthy, “Hockney’s Secret Knowledge, Vanvitelli’s Camera Obscura,” 326.

¹⁶⁰ Lüthy, “Hockney’s Secret Knowledge, Vanvitelli’s Camera Obscura,” 333.

¹⁶¹ Lüthy, “Hockney’s Secret Knowledge, Vanvitelli’s Camera Obscura,” 336.

a tool involved in the production of artwork was limited to the preliminary stages and was not of central importance to the process.¹⁶² The images Vanvitelli would have observed through a camera obscura were used only as a source of inspiration that were developed further in his drawings and then transferred to his paintings.¹⁶³

Like Vanvitelli, Canaletto relied on his quick sketches, or as he termed them, *scaraboti*,¹⁶⁴ throughout his career for information and inspiration for his paintings. These sketches acted as his references or aide-memoires, and he would turn to them repeatedly to help him construct his townscapes while in the studio.¹⁶⁵ His drawings enabled Canaletto to continue to paint Italian motifs while in England.¹⁶⁶ For most of the *vedutisti*, optical tools may have provided some benefit when planning a composition, but Lüthy cautions against making assumptions about the usefulness of these tools based on our knowledge of modern photography.¹⁶⁷ The *vedutisti* followed a similar multi-step process that included an initial sketch and ended with a final work painted in the studio. It is likely, therefore, that if the camera obscura was used, it would have been beneficial mainly at the beginning of this process but then put aside.

Canaletto's Use of the Camera Obscura: A Debate

Canaletto enjoyed fame during his lifetime so it is not surprising that he would be included in three compilations of artists' lives written by his contemporaries. The first mention of Canaletto

¹⁶² Lüthy, "Hockney's Secret Knowledge, Vanvitelli's Camera Obscura," 337.

¹⁶³ Lüthy, "Hockney's Secret Knowledge, Vanvitelli's Camera Obscura," 335.

¹⁶⁴ This term derives from the Italian verb *scarabocchiare*, which translates as doodling or scribbling.

¹⁶⁵ William L. Barcham, *The Imaginary View Scenes of Antonio Canaletto* (New York: Garland Publishing, 1977), 124.

¹⁶⁶ Baetjer and Links, *Canaletto*, 259.

¹⁶⁷ Lüthy, "Hockney's Secret Knowledge, Vanvitelli's Camera Obscura," 339.

is found in Guarienti's *Abecedario pittorico* of 1753,¹⁶⁸ which is a compendium of artists' biographies. The author praised Canaletto's views as "painted with such accuracy and artifice that the eye is deceived and truly believes it is the real thing it sees, not the painted one."¹⁶⁹ In 1771, three years after Canaletto's death, Antonio Maria Zanetti the Younger (1706–1778), Librarian at the church of San Marco in Venice, wrote:

Canaletto taught by example the proper use of the camera ottica; and to understand the defects that can be introduced into a painting when he trusts entirely the perspective that he sees in it, including the colours of the atmosphere, and does not know how to eliminate that which offends the senses. The learned will understand me.¹⁷⁰

Pierre-Jean Mariette (1694–1774), with whom Canaletto corresponded before his death, included a similar entry in his *Abecedario* as Zanetti: "...from the time he abdicated the theatre, he concentrated on painting views from nature making use of the camera obscura, whose inaccuracies he understood how to modify."¹⁷¹

There is a consensus among art historians that Canaletto made use of the camera obscura in some capacity, however limited, because the aforementioned primary accounts were recorded only a few years following his death. What is up for debate is the ways in which Canaletto may have used the device and to what extent. Some scholars see evidence of the camera obscura in

¹⁶⁸ Pellegrino A. Orlandi, Pietro M. Guarienti, and Giovanni B. Pasquali. *Abecedario Pittorico Del M.R.P. Pellegrino Antonio Orlandi, Bolognese, Contenente Le Notizie De' Professori Di Pittura, Scoltura, Ed Architettura*. (1753), 75-76.

¹⁶⁹ "La grande piazza di S. Marco, in vari prospetti distribuita, con tale aggiustatezza ed artificio dipinse, che l'occhio s'inganna, e crede realmente di veder la vera, non la dipinta." In Pellegrino A. Orlandi, Pietro M. Guarienti and Giovanni B. Pasquali, *Abecedario Pittorico Del M.R.P. Pellegrino Antonio Orlandi, Bolognese, Contenente Le Notizie De' Professori Di Pittura, Scoltura, Ed Architettura* (1753), 462. Translation by author.

¹⁷⁰ "Insegnò il Canal con l'esempio il vero uso della Camera ottica; e a conoscere i difetti che recar suole a una pittura, quando l'artefice interamente si fida della prospettiva che in essa camera vede, e delle tinte specialmente delle arie, e non sa levar destramente quanto può offendere il senso. Il professore m'intenderà." Antonio M. Zanetti and Giovanni B. Albrizzi, *Della Pittura Veneziana e Delle Opere Pubbliche De' Veneziani Maestri Libri V.*, 1771. Translation by author.

¹⁷¹ "...depuis qu'il eut abdicé le théâtre, il ne s'occupe plus qu'à peindre des vues après nature faisant usage de la chambre noire dont il scavoit modéré des faux." Jean-Pierre Mariette, *Abecedario de J.P. Mariette : et autres notes inédites de cet amateur sur les arts et les artistes*. Tome Première (Paris: J.-B. Dumoulin, 1853-1862), 298. <https://gallica.bnf.fr/ark:/12148/bpt6k202240x> (accessed 8 March 2020). Translation by author.

both his panoramic paintings and his drawings, while others concede that some of his quick drawings, specifically those contained in the sketchbook held by the Gallerie dell'Accademia, have characteristics that indicate the possible use of an optical aid. There are also those who do not agree that Canaletto used the camera obscura to produce his sketches, arguing that he only employed it at the beginning of his creative process for inspiration, and following Vanvitelli, then set the device aside.

Canaletto's sketchbook in the Accademia's collection, sometimes referred to as the Cagnola sketchbook, contains a set of 158 drawings.¹⁷² Vittorio Moschini, then Director of the Accademia, who published the sketchbook soon after receiving it, acknowledges the possibility that the camera obscura would have been useful for Canaletto in the early phases of his work for making the quick annotated sketches.¹⁷³ The sketchbook's panoramic drawings extend over several sheets of paper, and are thought by some to be produced with the aid of the device (fig. 21). It is "virtually certain", writes Kemp, that Canaletto used a camera obscura to produce the serial compilations of wide-angle views included in the sketchbook. According to Kemp, "the line possesses an unusual quality."¹⁷⁴ These drawings are outlines only and the line appears to follow a predetermined path rather than being more hesitant or as Hockney describes it, 'groping' (fig. 22).¹⁷⁵ For Kemp, it naturally follows, and it would be reasonable to assume, that other *vedutisti*, in particular Canaletto's nephew and pupil Bernardo Bellotto (1720-1780), also used the camera obscura in their work.

¹⁷² This sketchbook was donated by Don Guido Cagnola to the Gallerie dell'Accademia in 1949. Alessandro Bettagno, "Fantasy and Reality in Canaletto's Drawings," in Baetjer and Links, *Canaletto*, 45.

¹⁷³ Giovanna Nepi Sciré, *Canaletto's Sketchbook* (Venice: Canal & Stamperia, 1997), 15.

¹⁷⁴ Martin Kemp, *The Science of Art: Optical Themes in Western Art from Brunelleschi to Seurat* (New Haven: Yale University Press, 1989), 197.

¹⁷⁵ David Hockney, *Secret Knowledge: Rediscovering the Lost Techniques of the Old Masters* (New York: Viking Studio, 2001), 23.

As with Vermeer, several Canaletto scholars have conducted experiments with camera obscuras in an attempt to duplicate his work. Decio Gioseffi in his 1959 monograph on Canaletto experimented with a camera obscura that he had made that held an interiorized observer.¹⁷⁶ Following these experiments, he concluded that Canaletto likely used a camera obscura because the drawings he obtained were very close to several sketches in the Accademia sketchbook. Others, however, such as W.G. Constable, doubt whether it is even possible to detect the use of the device in a drawing or painting.¹⁷⁷ Constable does concede that “it is reasonable to suppose that Canaletto occasionally found a camera useful for rough sketches which he no doubt destroyed.”¹⁷⁸ Following Gioseffi’s experiments it seemed that many were initially convinced by his evidence, but over time, contrary arguments began to surface.

Terisio Pignatti experimented around the same time as Gioseffi with a camera obscura held by Venice’s Museo Correr¹⁷⁹ that purportedly belonged to Canaletto (fig. 23).¹⁸⁰ After his experiments, Pignatti concluded that there is a “probable relation between the diagrammatic drawings and the use of the camera ottica.”¹⁸¹ However, he was not completely convinced. Instead, he argues that the camera obscura was used to establish the parameters of a composition before beginning to draw.¹⁸² The device was primarily a means for Canaletto to abstract and

¹⁷⁶A device that holds an interiorized observer is one that encloses an observer within it, such as a tent-type camera obscura, versus one that is exterior to the observer such as a hand-held box-type device.

¹⁷⁷ Constable, *Canaletto*, 162.

¹⁷⁸ Constable, *Canaletto*, 163.

¹⁷⁹ In 1901, the Museo Correr received a donation of two camera obscuras, one with the name ‘A. Canal’ inscribed on the protective cover and the other with ‘F. Guardi’ inscribed, but there is serious doubt that the attribution of these two devices is authentic. Lüthy points out that these camera obscuras only produce inverted images, so it is unlikely that these were the devices specifically used by Guardi and Canaletto. Lüthy, “Hockney’s Secret Knowledge, Vanvitelli’s Camera Obscura,” 322.

¹⁸⁰ Terisio Pignatti, *Il Quaderno di Disegni del Canaletto alle Gallerie di Venezia* (Milan: Edizioni Daria Guarnati, 1958), 20-22.

¹⁸¹ As quoted in Constable, *Canaletto*, 162.

¹⁸² As quoted in Constable, *Canaletto*, 162.

distort reality and allowed him to paint images that were not seen by the naked eye, such as the wide-angle or fish-eye view. As Pignatti explains:

We have a series of 'impossible views' in which the use of the optical chamber instead of serving to adhere more closely to reality, provided the artist with a tool for abstraction, permitting him to distort perspectives as he wished and to compose as he wished and to compose views different from those dictated by reality.¹⁸³

Similarly, Antonio Morassi's view is that Canaletto made use of the camera obscura as an aid to perspective and framing his compositions, but after deciding what to include, he would have put aside the device. He argues that Canaletto was "not a slave to nature, still less to the camera obscura."¹⁸⁴ In addition to correcting distortions that were inevitable with this device, he made changes to the topography as it suited him for the sake of creating a more pleasing composition.

Scholars have also raised reasonable objections to the notion that Canaletto used a camera obscura. One of the arguments is that some of Canaletto's drawings must have been executed from a boat travelling down the Grand Canal, and it would have been very difficult for him to use a camera obscura that was not held stationary (fig. 24). J.G. Links concedes that Canaletto may have used the device for some of the more complicated sketches that involved many campanili and chimneys, and that it is possible that he "sought inspiration for some of his compositions by seeing them reflected in the eighteenth-century equivalent of such a lens, a convex mirror."¹⁸⁵ However, some of his views are from impossible angles or a bird's eye view and there would have been nowhere from which anyone could have set up a camera obscura to view the scene.¹⁸⁶ If the paintings are from viewpoints that are not easily accessible and

¹⁸³ Terisio Pignatti, *Canaletto* (New York: Barron's, 1979), 44.

¹⁸⁴ Antonio Morassi, "Problems of Chronology and Perspective in the Work of Canaletto," *Burlington Magazine* 97, no. 632 (1955): 350.

¹⁸⁵ Links, *Canaletto and His Patrons*, 60.

¹⁸⁶ Viola Pemberton-Pigott, "The Development of Canaletto's Painting Technique," in *Canaletto* (exhibition catalogue) by Katherine Baetjer and J.G Links (New York: Metropolitan Museum of Art, 1989), 54.

Canaletto was not capturing a scene that ‘literally’ existed in reality, a camera obscura would not have been of any benefit to him.¹⁸⁷

Links, who devoted his career to studying Canaletto’s work, concludes that the camera obscura played an “insignificant part” in his production.¹⁸⁸ Both David Bomford and Links refer to Canaletto’s reliance on simple geometrical tools in his artistic practice such as the straight-edge, rulers, dividers and compasses. Pinpricks are found in his canvases just as in Vermeer’s but for a different purpose. In Canaletto’s case, the pinpricks were created by the compass that was used to produce the curves in the corbels.¹⁸⁹ Canaletto obviously relied on some mechanical instruments, so it seems plausible to some scholars that he would have used a camera obscura if he felt it was useful; but Links argues that Canaletto only used the “well-understood rules of perspective, his own eyes and his immense talent for illusion rather than the camera.”¹⁹⁰ Because Canaletto’s paintings look so realistic, Links contends that his contemporaries assumed that he must have used the camera obscura to achieve these effects; however, they were deluded, “as so many others had been and were to be,”¹⁹¹ and over time, this supposition became accepted as fact.

Canaletto’s use of the camera obscura is a highly contested issue. This ongoing debate has had significant implications for disciplines beyond art history. Canaletto’s paintings have been used recently by the scientific community to investigate the rising sea levels in Venice. The presumption that Canaletto used a camera obscura has led theorists to conclude that his paintings

¹⁸⁷ Examples of these impossible vantage points include *The Molo: looking West, Ducal Palace Right; The Molo: looking West, Library to Right; London: Westminster Bridge from the North on Lord Mayor’s Day*, 1746. J.G. Links, “Biographical Sketch,” in *Canaletto* (exhibition catalogue), 14.

¹⁸⁸ Links, *Canaletto*, 119.

¹⁸⁹ David Bomford and Gabriele Finaldi, *Venice Through Canaletto’s Eyes* (London: National Gallery Publications Ltd.), 57.

¹⁹⁰ Links *Canaletto and His Patrons*, 62.

¹⁹¹ Links *Canaletto and His Patrons*, 62.

are equivalent to photographs. In turn, scientists are looking at his work to measure the algae belt on the buildings along the Grand Canal to help them determine sea levels prior to the first recordings in 1872.¹⁹² It is important to stress that the assumptions made by the researchers about the usefulness of the camera obscura may lead them to false conclusions.

The Wide-Angle View and Venice Altered

Although it has been generally accepted by art historians that Canaletto made use of the camera obscura in some capacity, there is no consensus as to how he may have used it and how significant it was as a tool in his artistic practice. Canaletto's wide-angle or panoramic views from the 1730s and 1740s, when he was at his busiest, are usually cited as evidence of the use of the optical device because such views are vaster than the eye can naturally see (fig. 25). In these wide-angle views, Constable explains that the "angle subtended at the viewpoint is well over 90 degrees" with sharp foreshortening.¹⁹³ As this angle of vision is not how the eye naturally sees without assistance, the assumption is that Canaletto used a camera obscura to construct these panoramic scenes. Some of his drawings from this period also show the same wide-angle viewpoint and exaggerated foreshortening as the paintings (fig. 26).¹⁹⁴

Canaletto often manipulated the rules of perspective in his paintings, so such examples of wide-angle or panoramic views may suggest the use of the camera obscura. Although Canaletto's paintings appear to be based on reality, he frequently made alterations to the topography and structure of Venice.¹⁹⁵ For example, he often increased the height of the campanile in the piazza

¹⁹² Dario Camuffo, "Canaletto's paintings open a new window on the relative sea-level rise in Venice." *Journal of Cultural Heritage* 2, no. 4 (2001): 277–281.

¹⁹³ W.G. Constable, *Canaletto*, (Toronto: F. Newfeld, 1965), 126.

¹⁹⁴ Constable, *Canaletto*, 126.

¹⁹⁵ Bernard Aikema and Boudewijn Bakker, *Painters of Venice: The Story of the Venetian 'Veduta'* (The Hague: Rijksmuseum and Gary Schwartz, 1990), 151.

of S. Marco or altered the number of its windows. If it suited his artistic sensibilities, he would shift structures, omit others altogether, or compile two views in one scene that would have been impossible in reality. Rather than passively recording topography, Canaletto sought to “impose [order] on visual experience.”¹⁹⁶ He constructed a virtual or conceptual version of the city that was marketed to the visitor, not the resident of Venice. He thus created an illusion of reality that appeared to be a faithful reproduction. British art dealer and theatrical impresario Owen McSwiney, writing to the Duke of Richmond in 1727, extolled Canaletto’s virtues with the words, “his Excellence lyes in painting things which fall immediately under his eye.”¹⁹⁷ Likewise, Alessandro Marchesini (1664-1738), art agent for collector Stefano Conti (1654-1739) of Lucca, wrote to his patron in July 1725 recommending he purchase a painting by Canaletto as he “astounds everyone in this town who sees his work, which is like that of Carlevarijs, but you can see the sun shining in it.”¹⁹⁸

In the late eighteenth century, British visitors to Venice were already familiar with the city’s most popular sites from paintings by Canaletto, which they would have seen in England. After being exposed to Canaletto’s idealized version of the city, the sight of the real city often resulted in disappointment. In 1788, one such visitor, Arthur Young, wrote, “The city, in general, has some beautiful features, but does not equal the idea I had formed of it from the pictures of Canaletti.”¹⁹⁹ Never one to feel bound by reality, Canaletto freely altered the architecture of

¹⁹⁶ Levey, “Canaletto as Artist of the Urban Scene,” 20.

¹⁹⁷ J.G. Links, *Canaletto* (Oxford: Phaidon, 1994), 20.

¹⁹⁸ “Sig.r Ant. Canale, che fa in questo paese stordire universalmente ognuno che vede Le sue opere, che consiste sul ordine di Carlevari ma vi si vede Lucer entro il Sole...” This recalls Kenyon Cox’s remarks upon seeing Vermeer’s *View of Delft*: “It is real sunlight and air and out-of-doors...” (see footnote 1). Francis Haskell, “Stefano Conti, Patron of Canaletto and Others,” *The Burlington Magazine* 98, no. 642 (Sep. 1956): 297. “

¹⁹⁹ Arthur Young, *Travels in France and Italy during the years 1787, 1788 and 1789*, London/Toronto 1927, quoted in Aikema and Bakker, *Painters of Venice*, 17.

Venice whenever it suited his artistic aims. He successfully maintained a fine balance between idealizing Venice and imitating it in both its physical structure and intangible atmosphere.²⁰⁰

In the eighteenth century, the Venice that Canaletto painted was itself a city of illusions. The former glory of the Venetian Republic had given way to political and economic decline, and the opulence and gaiety hid a less desirable side in the years leading up to the French invasion of 1797. The seedier side of the city, including gambling houses and prostitution, was the backstage of the show put on for the wealthy tourists, mostly from Britain, who came to Venice as a stop on their Grand Tour to enjoy the entertainments the city had to offer. Eighteenth-century Venice may have appeared to be a time of decadence, but this was a carefully constructed illusion created for its audience. Canaletto also created his own unique version of the city for visitors to take home with them as souvenirs. For those who were exposed to Canaletto's Venice outside of the city, these images superimposed any they may have held previously in their memories or imaginations. Canaletto must have understood the process of perception and memory because he distorted reality in order to focus on those aspects of a scene that would have impressed the first-time visitor. The camera obscura became a mediating device that allowed Canaletto to see his city differently. As Michael Levey writes, "...in the *camera* [obscura] the world was mirrored while the viewer watched, himself withdrawn. Life became a peepshow, and the painter himself was no more part of what he saw than somebody looking through a keyhole is part of what he sees."²⁰¹ Through the camera obscura, Canaletto was able to detach himself from the city he knew intimately with all of its faults and signs of decay, and create an illusion of reality for his patrons. His use of the camera obscura also allowed him to observe the city objectively and with

²⁰⁰ Aikema and Bakker, *Painters of Venice*, 18.

²⁰¹ Michael Levey, *Painting in XVIII Century Venice* (London: Phaidon Press, 1959), 72.

fresh eyes, and subsequently, to instill order on the chaos of Venice's ad-hoc town planning.²⁰²

As French pioneering photographer Gaspard-Félix Tournachon (1820-1910), known as Nadar, discovered in 1900 when he first saw the city of Paris from an aerial perspective, “there is nothing like distance to remove us from all ugliness.”²⁰³

One of the differences that Levey sees in the eighteenth century between Northern and Southern Europe is that Northern painters emphasize the “moment of actuality”; that they painted what their “eye fell upon” which gave their townscapes the quality of being “embalmed in a glass paperweight.”²⁰⁴ Italian art, on the other hand, “lifts its subjects outside of time.”²⁰⁵ This quality of timelessness can be seen in Canaletto's painting. Art historian Peter Galassi is in accordance with Levey's views in comparing Italian to Dutch images. For Galassi, the Dutch add a specific slice of time and experience of everyday life in their paintings, while the Italian image is one of timeless perfection. According to Galassi, it is important to understand that the way Canaletto conceived of the role of vision in art is what lies behind his manipulation of perspective.²⁰⁶ In other words, Canaletto felt he had the freedom to make adjustments to reality as he saw fit.

Philosophies of Perception and the Camera Obscura in Eighteenth-Century Italy

Following the philosophy of John Locke (1632-1704), one of the first British empiricists, it was held that knowledge came from experience and observation guided by reason. For the discovery of truth, observation of nature was required rather than the study of authoritative texts. Crary

²⁰² Links, *Canaletto*, 34.

²⁰³ Nadar 1900: 77-78 as cited in Michel Frizot, “Another Kind of Photography – New Points of View,” in *A New History of Photography* (Köln: Könemann, 1998), 391.

²⁰⁴ Levey, *Painting in XVIII Century Venice*, 73.

²⁰⁵ Levey, *Painting in XVIII Century Venice*, 73.

²⁰⁶ Peter Galassi, *Before Photography: Painting and the Invention of Photography* (New York: Metropolitan Museum of Art, 1981), 13.

compares Locke's conception of the observer within the camera obscura, which "allows the subject to guarantee and police the correspondence between exterior world and interior representation and to exclude anything disorderly or unruly."²⁰⁷ For Locke, the camera obscura was a metaphor for the human mind and understanding. In *An Essay Concerning Human Understanding* (1689), he compares the mind to a "dark room" or camera obscura, where ideas, in lieu of images, are projected on the back wall of the mind:

I pretend not to teach, but to enquire; and, therefore, cannot but confess, here again, that external and internal sensation are the only passages I can find of knowledge to the understanding. These alone, as far as I can discover, are the windows by which light is let into this dark room. For, methinks, the understanding is not much unlike a closet wholly shut from light, with only some little openings left, to let in external visible resemblances, or ideas of things without; would the pictures coming into such a dark room but stay there, and lie so orderly as to be found upon occasion, it would very much resemble the understanding of a man, in reference to all objects of sight, and the ideas of them.²⁰⁸

The ignorant mind, like the dark chamber of the camera obscura, needs a passage or window to let in the light, or ideas, in order for understanding to take place.

In Crary's view, the camera obscura is "a metaphor for the most rational possibilities of a perceiver within the increasingly dynamic disorder of the world."²⁰⁹ As Geoffrey Batchen explains:

By the eighteenth century, the camera obscura had become both a dominant metaphor for human vision and a crucial and ubiquitous representation of the relation of a perceiving subject to an external world. In this representation, subject and world were understood as pregiven, separate and distinct entities. Consequently the act of seeing was passively transparent to the world being seen and in that sense sundered from the physical body of the observer. The optical geometry at the heart of the camera obscura, at once ideal and natural, was taken as an empirical confirmation of the truth of its Enlightenment worldview.²¹⁰

²⁰⁷ Crary, *Techniques of the Observer*, 42-43.

²⁰⁸ John Locke, *An Essay Concerning Human Understanding* (London: 1825), 109-110.

²⁰⁹ Crary, *Techniques of the Observer*, 53.

²¹⁰ Geoffrey Batchen, *Burning with Desire: The Conception of Photography* (London: MIT Press, 1997), 82.

In this way, vision was decorporealized and hence could be trusted to be truthful and objective. According to Foucault, “to observe, then, is to be content with seeing – with seeing a few things systematically.”²¹¹

Crary explains the relationship between the eye and the camera obscura as “essentially metaphoric” during the seventeenth and eighteenth centuries: “the eye and the camera obscura or the eye and the telescope or microscope were allied by a conceptual similarity, in which the authority of the eye remained unchallenged.”²¹² Canaletto was a keen and astute observer, who recorded his observations in his sketches which were done on site, therefore, he must have spent many hours walking around his city while actively engaged in looking. He researched his environment continuously and may have used the camera obscura for the purposes of focusing his vision in order to see beyond the chaotic and haphazard nature of Venice and impose his own sense of order on the urban landscape. He recorded these views often with notes and references to details such as colours and textures that would help him recall what he had observed. He was constantly adding to his inventory of knowledge about his city, imprinting these scenes in his memory that could be easily called to mind when referring to the sketches when he was ready to paint a scene on canvas in the studio. He relied on and trusted his sense of vision. Canaletto’s eye was “sharply sensitive to everything he needed for his art.”²¹³ He was still observing and recording his city of Venice after he returned from London in 1755, and his eyesight remained strong into his later years. When he was 68, he noted with pride on a sketch of singers in the

²¹¹ Michel Foucault, *The Order of Things: An Archaeology of the Human Sciences* [English ed.] (London: Routledge, 2002), 146.

²¹² Crary, *Techniques of the Observer*, 31.

²¹³ Levey, “Canaletto as Artist of the Urban Scene,” 23.

interior of San Marco that he drew it without spectacles: “anni 68, 1766, senza occhiali.”²¹⁴

Canaletto’s acute vision would never have allowed him to be a passive onlooker.

Conclusion

As we have seen, the use of the camera obscura as an artistic tool in the seventeenth century is dubious, and the scant evidence that exists is controversial. At the beginning of the eighteenth century, more evidence comes to light, but it is still not conclusive and crucial details are missing. Canaletto’s wide-angle views are usually cited as evidence that he used a camera obscura because the angle of view is impossible to see unassisted. However, not all historians agree that this is necessarily the case. Some, but not all of Canaletto’s drawings in the sketchbook held by the Accademia seem to indicate that they were possibly traced using a camera obscura, although there is no consensus among art historians on this issue as well. Instead, what we have is Canaletto using the camera obscura for the purposes of mediating his vision of a city he knew intimately in order to distance himself and see it with a tourist’s gaze. In the next chapter, as we move towards the end of the eighteenth century, we will find ourselves on more solid ground. There is recorded evidence supplied by artists themselves on their use of the camera obscura in their work. While the evidence that we have of Canaletto’s use of the camera obscura is still debatable, the strongest indication of its use in artistic practice will be forthcoming in the next chapter, which focuses on topographical artists in Britain.

²¹⁴ Links, *Canaletto*, 234.

CHAPTER THREE

BRITISH LANDSCAPE PAINTING AND THE CAMERA OBSCURA IN THE LATE EIGHTEENTH CENTURY

“This is but a codicil to my last, but I forgot to mention in it a new discovery that charms me more than Harlequin did at ten years old [...] It is such a perfecting of the camera-obscura, that it no longer depends on the sun, and serves for taking portraits with a force and exactness incredible; and serves almost as well by candlelight as by day. It is called *the delineator*, and is invented within these eighteen months by a Mr. Storer, a Norfolk man, one of the modestest and humblest of beings. Sir Joshua Reynolds and West are gone mad with it, and it will be their own faults if they do not excel Rubens in light and shade, and all the Flemish masters in truth. [...] I think it will perform more wonders than electricity, and yet it is so simple as to be contained in a trunk, that you may carry in your lap in your chaise, for there is such contrivance in that trunk that the filbert in the fairy tales which held such treasures was a fool to it. In short, it is terrible to be threescore when it is just invented; I could play with it for forty years; when will you come up and see it? I am sure you will not go back without one.”²¹⁵

-Horace Walpole (1717-1797) in a letter to Rev. William Mason dated 24 September 1777.

Roslin Castle: Formal Analysis

In the painting *Roslin Castle, Midlothian*, c. 1780 (fig. 27), by Paul Sandby (1731-1809), we see a landscape of hills and trees in the Scottish Highlands with the partially ruined castle recognizable in the background.²¹⁶ The ruins rise above the cliffs into which the castle was built, with the high bridge that gives access to it creating a strong horizontal line that is echoed by the footbridge across the river. The round arch of the bridge is almost directly in the centre of the composition acting as a focal point. The hill sloping from the left creates a diagonal that leads directly to the footbridge support which then guides our eye directly to the main figures. The standing figure, Lady Scott (1750-1817), an amateur artist, is concentrating on sketching the scene in front of her with a camera obscura, while Lady Elliot, sitting leisurely on the ground, is

²¹⁵ *The Letters of Horace Walpole, Earl of Oxford* (Oxford: Clarendon Press, 1903), 115-116.

<https://archive.org/details/lettersofhoracew10walpiala>. (Accessed 8 March 2020).

²¹⁶ Located in the county of Midlothian in Scotland, which lies in the east-central Lowlands and bordering the city of Edinburgh, Roslin Castle dates to the fourteenth century, but by the late eighteenth century it was a dilapidated ruin.

aware of our presence and looks out directly at us. These two ladies are the focus of the composition, while the other figures fulfill the role of ‘staffage,’ people caught in their daily activities, a common element of Paul Sandby’s work.²¹⁷

The camera obscura that Lady Scott is using to sketch the landscape is not aimed in the direction of the castle ruins. Instead, she seems to be sketching the scene across the river that is visible to her but not to us. The camera obscura is most likely William Storer’s Royal Accurate Delineator patented in 1778. This device functioned by allowing light rays to enter through a small aperture at the front of the unit, which then passed to a mirror that was placed at a 45-degree angle, projecting an image to the underside of the glass surface at the top where a sheet of transparent paper would be placed so that the user could trace the outline of the forms.²¹⁸ The two ladies are engaging in the practice of picturesque touring, which evolved from the Grand Tour but was focused on travel in Great Britain after the unification of England and Scotland. From this point forward, there was a desire on the part of the English to explore their own country, boosted by the fact that travel within Great Britain was more accessible to a larger number of people who would not have been able to afford going further abroad. The landscape in *Roslin Castle*, described as “beautifully wild and awfully sublime,”²¹⁹ attracted many visitors participating in picturesque tourism, and the castle’s romantic associations and extraordinary architecture drew poets, writers and artists to the area as well. As depicted in this painting, those in search of the picturesque often experienced these views through a camera obscura, resulting in the technological mediation of the tourist’s gaze.

²¹⁷ Julian Faigan, *Paul Sandby Drawings* (Sydney: Australian Gallery Directors' Council, 1981), 80.

²¹⁸ Stéphane Roy, “Curatorial Comment for *Roslin Castle, Midlothian*, ca. 1780,” Yale Center for British Art, Paul Mellon Collection, <http://collections.britishart.yale.edu/vufind/Record/1666089> (accessed 8 March 2020).

²¹⁹ Christopher White, *English Landscape, 1630-1850: Drawings, Prints & Books from the Paul Mellon Collection: An Exhibition, April 19-July 17, 1977* (New Haven: Yale Center for British Art, 1977), 25-26.

Introduction

In this chapter, I will examine the use of the camera obscura in Great Britain in the late eighteenth century with a focus on the work of English artists Thomas Sandby (1721-1798) and his younger brother, Paul, who were both involved early in their careers in mapmaking and land surveying for the military wherein the camera obscura was used to ensure accuracy. I will situate the Sandbys' work in relation to British academic painting through an analysis of artist and critic Joshua Reynolds' (1723-1792) views on the camera obscura. As the first President of the newly founded Royal Academy in 1769, Reynolds delivered fifteen lectures, *Discourses on Art*, between 1769-1790 wherein he spoke on all aspects of artistic practice and by doing so established aesthetic criticism in England. In the *Thirteenth Discourse*, focused on imagination, Reynolds cautions artists against relying too heavily on the camera obscura. He himself owned a folio-type model that converts into a large book, currently in the collection of the Science Museum in London (fig. 28). Following, I will consider the advances that were made to the design of the camera obscura available to British artists in the late eighteenth century. Due partly to the improvements made to lenses, the camera obscura became smaller in size and as a result, more portable and practical, increasing its use by artists and amateurs. Despite more widespread use of the camera obscura, it is still difficult to determine the full extent of its use, as well as the perception of mechanical aids in artistic practice. Ultimately, I argue that the camera obscura in Britain in the late eighteenth century fulfilled the role of mediator or filter through which artists as well as amateurs experienced the newly unified British landscape. The camera obscura was used to take ownership and control over the landscape and impose order on nature, making it conform to a prescribed picturesque model. In eighteenth-century Britain, the camera obscura

continued to be a metaphor for vision, but it now also served as evidence of the popularity of picturing nature.

The Camera Obscura in *Roslin Castle*

The painting *Roslin Castle* is frequently cited as an apt illustration of the popularity of the camera obscura amongst eighteenth-century British artists. The identities of the two main figures, Lady Scott and Lady Elliot, are known to us because there is a preliminary drawing dated 1780 of the two women in the same poses on which there is an inscription with their names included at the bottom (fig. 29). Lady Scott and Paul Sandby were well-acquainted, and it has been presumed that Paul tutored her in sketching and painting.²²⁰ It has been suggested that this painting may have been produced as a commission for the family of Lady Scott, although its provenance indicates that, at some point, it passed into the possession of William Sandby (great-grandson of Paul's brother Thomas Sandby).²²¹ As a commissioned work for Lady Scott and her family, depicting her in the role of amateur artist using a camera obscura must have been an image they considered worthy of putting on display, celebrating the act of picture-making.²²²

The camera obscura was popular with British amateur artists and travelers who wanted to record their travels in pictorial form. During this period, as those with more leisure time began to engage in activities such as sketching landscapes, the line dividing the amateur and professional artist became less distinct.²²³ It was also not unusual for professional artists to use the works of amateurs to make finished drawings.²²⁴ In *Roslin Castle*, the professional artist is depicting the

²²⁰ Rosemary O'Day, "Family Galleries: Women and Art in the Seventeenth and Eighteenth Centuries," *Huntington Library Quarterly*, 71(2) (2008): 330.

²²¹ White, *English Landscape, 1630-1850*, 26.

²²² Gores, *Psychosocial Spaces*, 38.

²²³ Gores, *Psychosocial Spaces*, 39.

²²⁴ Faigan, *Paul Sandby Drawings*, 53.

amateur who is observing the landscape and in turn, we as observers are also sharing in the act of perceiving the scene along with Lady Scott and Sandby. Visual perception, spectatorship, and the use of instruments in painting are presented as central themes in this work where the act of viewing and the act of image-making coincide.²²⁵

Thomas and Paul Sandby

Like Canaletto who first trained in theatre design, both Paul Sandby and his older brother Thomas began their careers in a non-painterly profession as military draughtsmen. Training for military and topographical drawing, which involved the application of technical skills and the use of perspective, was provided at the Military Drawing Office of the Tower of London. Thomas began working for the Board of Ordnance in their drawing office in 1743, and he most likely secured employment for his younger brother Paul as one of three topographical draughtsmen on the Military Survey of North Britain. Here, Paul was engaged in mapping the Highlands after the Battle of Culloden, which ended the Jacobite Rebellion in 1746. In the four years he spent in this role from 1747-51, Paul helped to create the ‘Great Map,’ a huge undertaking on a scale of approximately one inch to 1,000 yards (1:36,000), that detailed the topography of Scotland, a country that was described by a military general as “so very inaccessible by nature.”²²⁶ The Great Map was produced in response to the military need for an accurate survey in order to explore and ‘lay open’ this rough terrain. But it was also “an act of political surveillance,”²²⁷ with the purpose of asserting control over the landscape.²²⁸ During the

²²⁵ John Bonehill and Stephen Daniels, “Designs on the Landscape: Paul and Thomas Sandby in North Britain,” *Oxford Art Journal* 40.2 (2017): 246.

²²⁶ William Roy, *Philosophical Transactions of the Military Survey for 1785*.

²²⁷ Carolyn Jane Anderson, “State Imperatives: Military Mapping in Scotland, 1689-1770,” *Scottish Geographical Journal*, 125:1 (2009): 18.

²²⁸ Helen Wyld, “Re-Framing Britain’s Past: Paul Sandby and the Picturesque Tour of Scotland,” *The British Art Journal* 12, no. 1 (2011): 29.

Jacobite Rebellion, the Hanoverian military commanders found themselves at a disadvantage without a proper survey. Thus, accurate maps were essential to thoroughly disclose and reconnoiter this remote region. They most likely made use of the camera obscura among other tools to ensure accuracy in their drawings during their travels in the service of the Military Survey. The camera obscura enabled military draughtsmen to draw the land in detail, which was the aim of the Survey.²²⁹ Thus, the camera obscura became “embedded in the early modern context of the production of reliable perceptual knowledge.”²³⁰ The act of looking through a camera obscura at the land for the purposes of surveying also involves taking measures to identify, categorize and order what is seen.²³¹ However, in 1785, when the Chief Surveyor William Roy recalled the experience of the Survey, he blamed the lack of funds and the inferior equipment for the result, which he considered more “a magnificent military sketch, than a very accurate map of the country.”²³² The work in which Paul was engaged with the Survey, undertaken with strategic and tactical purposes in mind, was in part also a plan for improvement of the area.²³³ He was trained to draw what he observed and in this way, he was engaged in documenting; however, it also included a form of evaluation. While observing and recording, Paul was also involved in planning and re-designing in the same way that Canaletto was engaged in creating his own improved version of the city from what he saw in front of him.

The training and experience that both Sandby brothers acquired while working as military topographical artists is evident in their work. Thomas Sandby was described as a “meticulous

²²⁹ Daniel Watson, “Some Observations concerning the Highlands of Scotland” (London: British Library), September 1747, as quoted in Bonehill and Daniels, “Designs on the Landscape,” 228.

²³⁰ Daniel Schmal, “Visual Perception and the Cartesian Concept of Mind: Descartes and the Camera Obscura.” In *Conflicting Values of Inquiry: Ideologies of Epistemology in Early Modern Europe*, Vol. 37 (2015): 71-72.

²³¹ Bonehill and Daniels, “Designs on the Landscape,” 227.

²³² William Roy, “An Account of the Measurement of a Base on Hounslow-Heath,” *Philosophical Transactions of the Royal Society of London*, no. 75 (1785): 387, as quoted in Bonehill and Daniels, “Designs on the Landscape,” 242.

²³³ Bonehill and Daniels, “Designs on the Landscape,” 225.

topographical draughtsman.”²³⁴ His drawing *Fort Augustus*, c. 1746 (fig. 30) may have been drawn using a camera obscura for accuracy. Fort Augustus was in a remote part of Scotland and it became a major military presence in the Highlands.²³⁵ This type of drawing follows the Dutch military topographical landscape tradition, as can be seen in the work of Constantijn Huygens II (1628-1697), son of Constantijn Huygens, the Dutch diplomat who was so enthused with Drebbel’s camera obscura in London that he brought one back with him to Holland. Huygens II was a draughtsman and lens maker and while serving under Willem III in 1672, he made a series of landscape drawings that may very well have been drawn in a camera obscura, such as *View of the Ijssel*, 1672 (fig. 31). The compositions of these drawings are similar in that the focus was set on the middle ground. The foreground would have been too blurry as seen in the device to depict accurately, therefore the objects in the middle distance are drawn with the most detail. Comparing this drawing to Thomas Sandby’s drawings of Fort Augustus, there is the same focus on the middle distance. The figures in the foreground of Thomas’ drawings act as repoussoirs and were likely added later by his brother.²³⁶

A non-military drawing by Thomas Sandby, *Windsor Castle from the Goswells*, c. 1760 (fig. 32), is a panoramic view comprised of four separate sections drawn on small sheets of paper (each sheet is 5 x 6 inches), with the addition of a light wash to indicate the shadows, depicting the town of Windsor as seen across the wide field of the Goswells. Thomas would have drawn one section at a time, pivoting several degrees to draw another section, and then pieced them together to form a whole. These drawings are similar to Canaletto’s drawings made on single sheets in his sketchbook, which when placed together form a continuous view of Venice’s Grand

²³⁴ Faigan, *Paul Sandby Drawings*, x.

²³⁵ Anderson, “State Imperatives: Military Mapping in Scotland, 1689–1770,” 18.

²³⁶ Oppé, *Sandby Drawings at Windsor Castle*, 47.

Canal. In the same manner, Thomas created panoramic views by adding single projections together.²³⁷ Similarly, the drawings of Nottingham Market Square from the West and another series from the East by Thomas consist of four pieces of overlapping paper, each set forming a 180-degree view of the entire square (fig. 33 and 34). These panoramic views also show characteristics of having been drawn in a camera obscura, suggesting that Thomas stood in the marketplace tracing each view through the device before drawing the next section and overlapping the sheets of paper to form a continuous view. The characteristics indicative of the use of the camera obscura include the format, the size, the emphasis on the middle distance, and the empty scene devoid of people.²³⁸

Paul Sandby may also have used a camera obscura to create panoramic views of London that were influenced by similar paintings by Canaletto. When Canaletto arrived in London in 1746, he painted views of the city that show the same manipulation and control of the topography as his work in Venice. Similar to the way he dealt with the disintegration of his native city, any signs of decay that Canaletto may have seen in London were left out of his paintings. In fact, the city as seen by Canaletto was “tidied up, clean and neat, pristine like a glass paperweight.”²³⁹ Two paintings of the Thames that he painted in 1750-51 from Somerset House, *London, the Thames from the terrace of Somerset House towards the City*, and *London, the Thames from the terrace of Somerset House looking towards Westminster* (fig. 35 and fig. 36), create a panoramic view of the river when placed side by side, similar to Canaletto's wide-angled views of Venice's Bacino of San Marco. Paul Sandby was obviously influenced by

²³⁷ Carsten Wirth, “The Camera Obscura as a Model of a new Concept of Mimesis in Seventeenth-Century Painting,” (Berlin: Preprint of the Max Planck Institute for the History of Science, 2007), 151 (n. 9).

²³⁸ Alex Ault, “Exercises in perspective: A sweeping view of Nottingham Market Place by Thomas Sandby,” *British Library Newsletter*, 18 June 2019. <https://www.bl.uk/picturing-places/articles/exercises-in-perspective-a-sweeping-view-of-nottingham-market-place-by-thomas-sandby> (accessed 8 March 2020).

²³⁹ Pat Hardy, “Canaletto's London Legacy,” Transcript of speaking notes, Gresham College, Museum of London, 20 June 2016.

Canaletto when he depicted the same views in watercolour drawings (fig. 37 and 38). This pair, *View from the Gardens of Somerset House, Looking East* and *View from the Gardens of Somerset House, Looking West*, 1755-65, also forms a panoramic view when placed side by side. Like Canaletto, Paul Sandby was interested in capturing a wide-angle view spanning the Thames, giving the sense of London as an open and expansive city. In the view looking west, Westminster Bridge, Westminster Hall and Westminster Abbey are visible. In the view looking east towards the city, St Paul's Cathedral is recognizable above the other church towers. In the foreground, Paul has added figures promenading on the terrace of Somerset House.

Although there is no evidence that he used a camera obscura in composing these views, it can be surmised that he was in the habit of employing this optical aid in his artistic practice. The remarks contained in the memoirs of the late Paul Sandby from the *Monthly Magazine*, in 1811, two years after his death in 1809, refer to his artistic aims, which was to emulate the look of this device:

When the works of this master are considered, it should be remembered, that all his endeavours were to give to his drawings a similar appearance to that seen in a camera-obscura, and when looked at with this impression, their beauty becomes very conspicuous; the truth in the reflected lights, the clearness in the shadows, the aerial tint and keeping in the distances, and skies, will be found to have been generally got up to reach the artist's intention."²⁴⁰

Paul Sandby's intention was to arrive at a 'truthful' imitation of nature, and although his name is often associated with the use of the camera obscura, there is, surprisingly, little documentation from his contemporaries that discuss his use of the device.²⁴¹

²⁴⁰ "Memoirs of the Late Paul Sandby, Esq, R.A. Etc., Etc.," *Monthly Magazine*, No. 213 (June 1, 1811): 440, reproduced in Paul Oppé, "The Memoir of Paul Sandby by His Son." *The Burlington Magazine for Connoisseurs* 88, no. 519 (1946): 145-147.

²⁴¹ Greg Smith, *The Emergence of the Professional Watercolourist: Contentions and Alliances in the Artistic Domain, 1760-1824*, (Routledge, 2018), ch. 2.

Art historian Greg Smith argues that this lack of evidence may be due to a stigma that accompanied the use of aids such as the camera obscura:

The lack of written references to their use might stem from the fact that the practice was just too common to warrant notice, but equally, if there was a stigma attached to such aids due to their frequent employment by artisans such as surveyors and mapmakers, artists may have sought to play down the fact. A survey of exhibition reviews and other references, however, reveals a number of problematic associations with the *camera* that supports the latter option.²⁴²

Smith suggests that artists avoided disclosing their use of the camera obscura because it was frequently used by *artisans*. Artists such as Thomas and Paul Sandby, who began their careers as surveyors and mapmakers and continued to use the camera obscura in their artistic practice, may have perceived the use of mechanical aids differently, not attaching any stigma to it. Thomas Sandby recorded his use of the camera obscura directly on some of his drawings with a notation that the image was “drawn in a camera.”²⁴³ British-American painter Benjamin West (1738-1820), after he found fame, recounted to his biographer a romanticized version of how he was introduced to the camera obscura as a young artist in Pennsylvania in the 1750s.²⁴⁴ John Singleton Copley (1738-1815), in letters written from Paris and Rome to his half-brother, Henry Pelham (1748/49-1806), recommended the device to him for studying light, shade, and colour.²⁴⁵ Furthermore, the camera obscura was especially popular with amateur artists during their travels at home in Great Britain and on the Grand Tour in Europe.

²⁴² Smith, *The Emergence of the Professional Watercolourist*, ch. 2.

²⁴³ *Windsor Castle from the Goswells drawn in a Camera*, ca. 1760, Royal Collection Trust. T. Sandby sale July 18, 1799 included a “large Camera Obscura” in the last lot. A. P. Oppé, *Sandby Drawings at Windsor Castle*, 31.

²⁴⁴ “On his return soon after to his father's, he had a box made with one of the sides perforated; and, adverting to the reflective power of the mirror, he contrived, without ever having heard of the instrument, to invent the *Camera*.” John Galt. *The Life and Studies of Benjamin West, Esq., President of the Royal Academy of London, Prior to His Arrival in England*, Vol. no. 50123 (London: T. Cadell & W. Davies, 1816), 48.

²⁴⁵ Jenny Carson and Ann Shafer. “West, Copley, and the Camera Obscura,” *American Art* 22, no. 2 (2008): 25.

The Picturesque and British Nationalism

In the latter half of the eighteenth century, domestic travel increased precipitously in Great Britain due to conflict that disrupted the Grand Tour and much of the travel to the Continent. This resulted in a rise in what has been called ‘picturesque touring.’²⁴⁶ William Gilpin (1724-1804), an Anglican cleric and artist, published *An Essay upon Prints* in 1768 in which he defined the picturesque as “that kind of beauty which is agreeable in a picture.”²⁴⁷ Gilpin published several essays related to picturesque travel and sketching picturesque landscapes. The enthusiasm for the picturesque led tourists across the British Isles in search of natural vistas and rustic scenes which reminded them of paintings, and observers were encouraged to try their hand at painting or sketching what they saw.²⁴⁸ Popular destinations for the picturesque tourist included the Lake District of Northern England, as well as the more rugged or untamed areas of Wales and the Scottish Highlands. One consequence of the Military Survey was that Scotland gained greater exposure as a potential tourist destination.²⁴⁹ There was a sense of patriotism and nationalism evident in the search for the picturesque in the British Isles after the unification of Scotland with England and Wales.²⁵⁰ With improved infrastructure such as transport roads, this type of domestic travel was more accessible to a wider audience, especially for women, and Britons were encouraged to become acquainted with their own country and to take pride in it.

There was a general demand for landscape painting in Britain beginning in the mid-eighteenth century; in particular, the art of sketching and painting in watercolour became very

²⁴⁶ The aesthetic term ‘picturesque’ is derived from the Italian *pittresco* which means ‘from a picture.’

²⁴⁷ William Gilpin, *An Essay upon Prints: Containing Remarks upon the Principles of Picturesque Beauty, the Different Kinds of Prints, and the Characters of the most Noted Masters, Illustrated by Criticisms upon Particular Pieces, to which are Added some Cautions that may be Useful in Collecting Prints* (London: J. Robson, 1768).

²⁴⁸ Gores, *Psychosocial Spaces*, 41.

²⁴⁹ Wyld, “Re-Framing Britain’s Past,” 30.

²⁵⁰ Jill H. Casid, *Sowing Empire: Landscape and Colonization* (Minneapolis, MN: University of Minnesota Press, 2005), 46.

popular.²⁵¹ Paul Sandby, designated “the father of English Watercolour,”²⁵² helped to popularize this medium, which became closely associated with the picturesque and amateur painting because it was more accessible than oil paints.²⁵³ The British love for nature was expressed in literature, poetry and philosophy of the period. The aesthetics of the picturesque added another dimension to the images of landscape, which had to conform to certain rules of composition and colouring to emulate landscapes by artists such as Nicolas Poussin (1594-1664), Claude Lorrain (1600-1682), or Salvator Rosa (1615 -1673). In *An Essay upon Prints*, Gilpin provided suggestions on the composition of scenes, and what to edit or change; however, amateur artists in search of picturesque scenery were still concerned with topographical accuracy because it was important for the locations to be recognizable.²⁵⁴

The print series entitled *Virtuosi's Museum*, published between 1778 and 1782, was the first topographical print series to cover all of Great Britain: Scotland, Wales, Ireland and England. One of its intended purposes was to act as a guide for tourists. Several of Paul Sandby's drawings completed when he was in Scotland in the 1740s were reworked for the *Virtuosi's Museum*. For these drawings, he used a high viewpoint and the format was more panoramic, giving a better sense of the entire landscape (fig. 39).

Gilpin's and other popular guides for picturesque travel directed the tourist's gaze to the proper stations from which to view the scenery, itineraries were detailed, and instructions were given as to which tools to use for sketching. Such directives included the use of the Claude glass, a small tinted convex mirror for viewing and painting named after French artist Claude Lorrain

²⁵¹ Gores, *Psychosocial Spaces*, 37.

²⁵² Luke Herrmann, *Paul and Thomas Sandby* (London: B.T. Batsford in association with the Victoria & Albert Museum, 1986), 11.

²⁵³ Gores, *Psychosocial Spaces*, 37.

²⁵⁴ Kitson, “Landscape in Britain,” 59.

(fig. 40). With this glass in hand, observers could stand with their back to the landscape and see the scene in muted tones with less detail, emulating the painterly style of Lorrain. Because the mirror was convex, an expansive scene could be reduced to a size that would be easier to reproduce in a small drawing. Like the camera obscura, the Claude glass is an example of a mediating device that filtered the tourist's view of the landscape.

Reynolds' Discourses and Eighteenth-Century Camera Obscuras

The central themes of Sandby's *Roslin Castle* include ways of seeing, spectatorship and the use of optical devices that mediate vision. Lady Scott is looking at a view through a camera obscura and we, as viewers of the painting, are observing her in the landscape. In this way we are also looking at the scene through Paul Sandby's eyes. Lady Scott is in the process of painting the landscape, but it requires mediation through a mechanical device in order to have it conform to the picturesque aesthetic. In turn, Paul Sandby's portrayal of Lady Scott confidently using a camera obscura legitimizes its use. The specific device Lady Scott is using, the Accurate Delineator by William Storer, was, for its time, a more sophisticated camera obscura, able to function in low light levels and with a wider field of focus. There were not many of these delineators produced, and they were not distributed broadly; rather, they were sold only to a select few, Lady Scott being among them.²⁵⁵

The English writer and connoisseur of art, Horace Walpole, youngest son of the first British prime minister, Sir Robert Walpole, also purchased one of William Storer's accurate delineators and included his firsthand experience with it in one of his letters:

"I have got a delightful plaything if I had time for play. It is a new sort of camera-obscura for drawing the portraits of persons, or prospects, or insides of rooms, and

²⁵⁵ Martin Kemp, "'Intellectual Ornaments': Style, Function and Society in Some Instruments of Art," in *Interpretation and Cultural History*, ed. Joan H. Pittock and A. Wear (New York: St Martin's Press, 1991), 147.

does not depend on the sun or anything. The misfortune is, that there is a vast deal of machinery and putting together, and I am the worst person living for managing it. You know I am impenetrably dull in everything that requires a grain of common sense. The inventor is to come to me on Friday, and try if he can make me remember my right hand from my left. I could as soon have invented my machine as manage it; yet it has cost me ten guineas, and may cost me as much more as I please for improving it.”²⁵⁶

Unfortunately for Storer, his device was considered by many as too complex to learn; consequently, it did not become as popular as he might have hoped. Even Walpole, who spoke so highly of it at first blush, lost interest in it: “from my own immachinality I can do little or nothing with it, which has abated something of my enthusiasm [...] The child has had his plaything broken to see what it was made of, and is weary of it.”²⁵⁷

Reynolds owned a folio-type camera obscura that could be kept discretely in a library when collapsed because it resembled a large book.²⁵⁸ When opened, like a suitcase, the sides extended and the lens and mirror were fitted into the accordion-like telescoping focal plane, with a dark room created to shut out the light (fig. 28). With this unit, it was possible to project images that were 18 by 24 inches. It is not known if Reynolds used this or any other camera obscura in his practice, but in a letter of 1777, Walpole claimed that both Reynolds and fellow academic painter Benjamin West had “gone mad” with Storer’s accurate delineator.²⁵⁹ Reynolds may have experimented with Storer’s version for a time, but according to a biography of the artist published in 1865, it was probably only a “nine-days’ amusement.”²⁶⁰ The folio-type

²⁵⁶ Letter dated 16 September 1777 from Horace Walpole to the Hon. H S. Conway in which he describes William Storer’s *Accurate Delineator*. In *The Letters of Horace Walpole, Earl of Oxford*, 107.

²⁵⁷ Walpole, *The Letters of Horace Walpole, Earl of Oxford*, 128.

²⁵⁸ When the device took the form of a book, the spine displayed the stamped title ‘Ancient History.’ Ann Wilsher, “Horace Walpole, William Storer and the Accurate Delineator,” *History of Photography* 4, no. 3 (July 1, 1980): 247.

²⁵⁹ Walpole, *The Letters of Horace Walpole, Earl of Oxford*, 115.

²⁶⁰ Charles Robert Leslie and Tom Taylor, *Life and Times of Sir Joshua Reynolds, with Notices of Some of his Contemporaries* (John Murray, London 1865), 200.

camera obscura Reynolds owned must also have been of little lasting value for him because he ultimately gave it away.²⁶¹

In order to better understand the perception of the camera obscura as a tool for artistic practice, it is useful to look at the art treatises available to artists in late eighteenth century Britain. Examples of these treatises are Robert Dossie's *Handmaid to the Arts* (1758) and Francesco Algarotti's treatise *An Essay on Painting*, published in an English translation in 1764.²⁶² While Algarotti's treatise contains an entire chapter on the benefits of the camera obscura for studying visual effects, Dossie's treatise recommends it for the purposes of direct tracing because of its ability to render more accurate perspective, but he also cautions against the distortions caused by the device.²⁶³ The subject of visual perception was also discussed in numerous eighteenth-century scientific treatises.²⁶⁴ As Steven J. Gores articulates:

much as the vogue for the picturesque defamiliarized English landscape and made it an aesthetic object, the interest in visual perception as an object of scientific inquiry defamiliarized it and—through the popularization of devices like the camera obscura that mechanically framed and re-presented 'reality' in a fashion analogous to the workings of the human eye—increased the public's awareness of the importance of vision in constructing ways of seeing the self, the nation, and nature.²⁶⁵

Gores sees the camera obscura as having the status of a cultural figure due to the popularity of the model pictured in the *Encyclopaedia Britannica* of 1794 that folded into a book like Reynolds' device, drawing an analogy between reading and viewing as "ways of seeing."²⁶⁶

²⁶¹ Reynolds gave his camera obscura to Lady Yates, an artisan who recreated paintings in needlework. Matthew C. Hunter, "Mr. Hooke's Reflecting Box: Modeling the Projected Image in the Early Royal Society." *Huntington Library Quarterly* 78, no. 2 (2015): 326-327.

²⁶² Carson and Shafer, "West, Copley, and the Camera Obscura," 26.

²⁶³ Carson and Shafer, "West, Copley, and the Camera Obscura," 26.

²⁶⁴ Examples include Sir Isaac Newton's *Opticks* (1704), Robert Smith's *Compleat System of Optics* (1738), Benjamin Martin's *A New and Compendious System of Optics* (1740), Joseph Priestley's *History and Present State of Discoveries Relating to Vision, Light and Colours* (1772) and Joseph Harris' *Treatise of Optics* (1775).

²⁶⁵ Gores, *Psychosocial Spaces*, 40.

²⁶⁶ Gores, *Psychosocial Spaces*, 41.

However, Reynolds, in his *Thirteenth Discourse*, cautions artists against using the camera obscura to imitate without any attempt at idealization. Reynolds speaks about paintings of nature “represented with all the truth of the *camera obscura*, and the same scene represented by a great artist, how little and mean will the one appear in comparison with the other, where no superiority is supposed from the choice of the subject!”²⁶⁷ His remarks clearly reflect the use that amateurs like Lady Scott made of the camera obscura. Paintings copied directly with a camera obscura are lacking that which a great artist can bring to it by selectively choosing what he or she includes.

Reynolds’ views as exemplified in his fifteen *Discourses* mirror the general attitudes to art as well as the changes that occurred during the years of his addresses (1769-1790). Significant themes that resurface include the role of imitation and imagination in art. Reynolds derides the imitator as a “mere copier of nature [that] can never produce any thing great, can never raise and enlarge the conceptions, or warm the heart of the spectator.”²⁶⁸ However, the young painter must start with “the mere imitation of the object before him,”²⁶⁹ but over time, he advises that these artists “advance to the higher state.”²⁷⁰ The reason being that “it is not the eye, it is the mind, which the painter of genius desires to address.”²⁷¹

The camera obscura had a “dual nature” that Reynolds defined as the marriage of the real and the ideal.²⁷² We must keep in mind that Reynolds’ objective was to elevate the status of the painter, emphasizing that the painter’s aim was ideal beauty, and art should appeal to the imagination and the sensibility of the mind, but, at the same time, young artists were encouraged to imitate in order to learn. Reynolds acknowledges the apparent contradictions in these rules:

²⁶⁷ Joshua Reynolds, *Discourses on Art (Discourse XIII)* (Chicago: A.C. McClurg & Co., 1891), 316.

²⁶⁸ Reynolds, *Discourses on Art (Discourses III)*, 82.

²⁶⁹ Reynolds, *Discourses on Art (Discourses III)*, 81.

²⁷⁰ Reynolds, *Discourses on Art (Discourses XIII)*, 312.

²⁷¹ Reynolds, *Discourses on Art (Discourses III)*, 94.

²⁷² Carson and Shafer, “West, Copley, and the Camera Obscura,” 29.

“To clear away those difficulties, and reconcile these contrary opinions, it became necessary to distinguish the greater truth . . . from the lesser truth; the larger and more liberal idea of nature from the more narrow and confined; that which addresses itself to the imagination, from that which is solely addressed to the eye.”²⁷³ Direct imitation, which Reynolds saw and denigrated in Dutch art, can only satisfy the eye because their paintings “would have no effect in writing.”²⁷⁴ The artist, by virtue of imagination, “adds, retrenches, transposes, and moulds anew”²⁷⁵ the reality that he sees with his eye. Reynolds may not have been aware of it at the time, but this was precisely what Vermeer and Canaletto were able to achieve whether they looked through a camera obscura for information or inspiration, they made full use of their imagination. As we have discovered, their relationship with the camera obscura was more complex than merely imitating what they saw through this device.

Conclusion

In late eighteenth-century Britain we find more evidence of the use of the camera obscura in artistic practice, although the device is still far from a perfect tool for drawing. With the help of this device, however, mapmakers and military land surveyors were able to impose control and order on the newly unified topography of Great Britain. Amateur artists in search of the picturesque in landscape used this mediating device, as well as the Claude glass, to experience

²⁷³ Reynolds, *Discourses on Art (Discourses XV)*, 353-354.

²⁷⁴ "Dutch pictures are a representation of nature just as it is seen in a camera-obscura. After having seen the best of each master, one has no violent desire of seeing any more. They are certainly to be admired, but do not shine much in description. A figure asleep, with another figure tickling his or her nose, which is a common subject with the painters of this school, however admirable their effect, would have no effect in writing." Joshua Reynolds in a letter to Edmund Burke, dated August 14, 1781 from The Hague, quoted in Leslie, *Life and Times of Sir Joshua Reynolds*, 336.

²⁷⁵ Edmond Malone and Thomas Gray, *The Works of Sir Joshua Reynolds, Knight: Containing His Discourses, Idlers, A Journey to Flanders and Holland, and His Commentary on Du Fresnoy's Art of Painting, Volume 3* (London: T. Cadell and W. Davies, 1798), 109, "Notes on *The Art of Painting*," note XIII, verse 119.

views of the countryside. The camera obscura became a prominent “cultural figure”²⁷⁶ in visual representation, as evident in Paul Sandby’s *Roslin Castle*, which aptly displays the device as central to the scene of an amateur artist engaged in picturesque tourism. The Sandby brothers helped to legitimize the use of the camera obscura in artistic practice; however, Reynolds, through his *Discourses*, felt the need to caution artists against relying too heavily on it, warning that their work would suffer from it if they did not exercise their ability to choose between the real and the ideal. The camera obscura continued to be a popular metaphor for vision, but as we approach the early nineteenth century and the invention of photography, the response to this device altered significantly.

²⁷⁶ Gores, *Psychosocial Spaces*, 41

CONCLUSION

In the early modern period, vision was conceptualized as objective and independent of the body, and thus the camera obscura became the dominant paradigm. According to Crary, sometime after 1830, a “vast systematic rupture” disrupted this paradigm.²⁷⁷ The shift involved reconnecting vision to the corporeal body. Due to its defects, the camera obscura was no longer seen as objective; rather, its use was discouraged because it gave a false impression.²⁷⁸ Crary’s discussion of the camera obscura is based on “discontinuity and difference,” but Alpers’ argument contains notions of both continuity and identity.²⁷⁹ This difference in modes of observation can also be seen in the comparisons made between the camera obscura and the camera lucida which eclipsed the former in popularity.²⁸⁰ The camera lucida consists of a prism that when looked at from the correct angle, will result in two images: one enters the eye, and the other appears on the surface to be drawn (fig. 41). Because the camera obscura requires mediation and detachment, and in some models, enclosure in a dark tent, it was regarded as an archaic device.²⁸¹ The preference was to feel an active part of Nature, not separate from it. Nonetheless, for the inventors of photography, such as William Fox Talbot (1800-1877), and Nicéphore Niépce (1765-1833), their journey towards discovery began with a desire to permanently record the magical and fleeting images they saw formed in a camera obscura.

²⁷⁷ Crary, *Techniques of the Observer*, 13.

²⁷⁸ French artist Pierre-Henri de Valenciennes (1750-1819), a landscape painter who spent time in Rome, discourages artists from using the camera obscura for landscapes in his art treatise of 1800. In his opinion, the device gives a false impression and has too many defects to be truly useful. “La chambre noire donne toutes les lignes fausses par une raison bien simple : c’est à cause de la convexité du verre à travers lequel passent les rayons qui réfléchissent la Nature.” Pierre Henri Valenciennes, *Éléments De Perspective Pratique, à l’Usage Des Artistes, Suivis De Réflexions Et Conseils à Un Élève Sur La Peinture, Et Particulièrement Sur Le Genre Du Paysage* (France, 1820), 208.

²⁷⁹ Crary, *Techniques of the Observer*, 36.

²⁸⁰ Erna Fiorentini, “Camera Obscura vs. Camera Lucida: Distinguishing Early Nineteenth Century Modes of Seeing,” (Berlin: Preprint of the Max Planck Institute for the History of Science, 2006), 12.

²⁸¹ Fiorentini, “Camera Obscura vs. Camera Lucida,” 21-22.

In most histories of photography, the camera obscura is relegated to the role of a precursor to the photographic camera and a harbinger of the future, but there are potential blind spots that can arise when looking at the past through a contemporary lens. This limited view of the camera obscura does not consider that during the seventeenth and eighteenth centuries, the camera obscura had a profound influence on art and visual theory. In 1604, the device became a metaphor for vision with Kepler's publication of *Ad Vitellionem Paralipomena*, and it continued to affect the way artists saw the world for the next two centuries. While artists may not have directly copied the images seen in the camera obscura, the act of looking through the device would have influenced the way they viewed the world around them, revealing images which could be studied for the effects of colour and light. My aim in this thesis has been to add to the scholarship on the artists' complex relationship with the camera obscura. This device was more than a historical object used for entertainment or for observing solar and lunar eclipses. Once it became a metaphor for vision it was often referred to as an 'artificial eye' along with other dioptric devices such as the telescope and the microscope. These optical instruments were of central importance to the development of the Scientific Revolution in the early modern period and the Enlightenment, enhancing our understanding of nature. Such optical devices changed the way natural scientists, philosophers and artists saw the world, enabling the human eye to see things it was incapable of seeing unassisted.

Research is lacking on the use of camera obscura as an artists' tool and its impact on artistic practice over the course of the two centuries during which it enjoyed its greatest popularity. When treated only as a precursor to photography, scholarship overlooks the distinct influence of the camera obscura on art in the early modern period. This is especially true of the genre of landscape, as the camera obscura's role in composition of landscape extended to early

photography in this genre. As I have shown, the use of optical aids by artists during the two centuries leading up to photography was varied and by no means consistent. Since it was a popular device throughout Europe, its significance and meaning also varied along cultural lines. The device itself went through continuous improvements in design, and along with advances in lenses, it became more portable and practical. These developments also contributed to its increased use by both professional and amateur artists in tandem with the burgeoning tourist industry.

As I have demonstrated, even if artists such as Vermeer did not trace images using this device, they would have been influenced nonetheless by its existence. Indeed, the remarkable quality of verisimilitude that Vermeer achieved in many of his mature paintings was partly due to the northern ‘optical’ mode of representing nature, the belief that careful observation will lead to the truth. He spent time observing nature and the device may have played a role in Vermeer’s objective approach to painting, in his ability to paint what he saw in front of him, ignoring the known structure, but concentrating on the shapes of colour that make up form. The camera obscura changed the relationship between the artist and the world he saw around him, and it became a metaphor for the objectivity of sight as well as being an instrument of artistic practice.²⁸²

In Italy, Canaletto used the camera obscura to gain an objective view of his city of Venice. His clientele of tourists on the Grand Tour were eager for representations of Venice that would remind them of their time spent in this unique and enchanting city. Canaletto understood his market well; tourists had no need for topographical accuracy but what they wanted was the *appearance* of a faithful representation of the city, which they were only acquainted with, but

²⁸² Crary, *Techniques of the Observer*, 29.

which Canaletto knew intimately. His use of the camera obscura gave him the ability to see the city with a 'tourist's gaze.' Aspects of his paintings give the impression that they are staged scenes of everyday life set in an eternally luminous city of opulence and gaiety. The camera obscura afforded Canaletto the opportunity to distance himself from the less desirable side of the decaying city with its complex urban space and ad-hoc town planning. The camera obscura would have allowed Canaletto to impose his own sense of order and control over the topography to please his clientele.

In Britain, topographical artists such as Thomas and Paul Sandby used the camera obscura to also assert control over the landscape in their service to the Military Survey of Scotland. Several drawings by Thomas Sandby record the fact that they were drawn in a camera. Characteristics of these landscapes are important to note because they can be compared to other similar drawings showing the same aspects. These characteristics include a concentrated focus on the middle distance, with the foreground represented in a cursory and ambiguous manner due to it appearing too blurry to trace in a camera obscura. Careful observation and transcription of the physical landscape was necessary to gain knowledge of the environment. With this knowledge, the Board of Ordnance was able to assume military and political control over a previously unknown territory. Advances in the design of the camera obscura made it more practical and portable, which also made it possible for amateur artists to use it in recording their travels in search of picturesque scenery. Domestic tourism increased in the eighteenth century, especially since travel within Great Britain was encouraged and it was more economical and safer than going abroad.

The concept of the camera obscura as a tool in artistic practice can take on different meanings in different cultural contexts. For military topographical landscapes, it can be

considered a copying device, however the purpose of these landscapes was to gather information and not necessarily to create an aesthetic drawing. The camera obscura can also be considered as a tool if it is being used to observe nature and study the effects of colour and light. The drawing by Jurriaan Andriessen (1742–1819), *Artist with a Camera Obscura*, c. 1810 (fig. 42), depicts a man (possibly the artist himself) looking through a portable camera obscura. He appears to be leisurely looking at images of the landscape through the device; his stance, leaning against a door, one leg casually over the other, gives the impression that he is in no hurry, and he is engaged in a pleasurable activity for no other purpose than to enjoy the experience. This artist looking at a scene through this device is not preparing to directly trace what he sees, and he does not appear to be making immediate preparations to paint. Instead, he is looking for the pure pleasure of doing so, and if he plans to paint the scene, then he is currently studying what he is seeing for the light effects and the colours. This may have been the way that most artists used it—to study colour and light rather than for directly tracing what they saw.

Artists were encouraged to observe nature carefully and absorb what they were studying, not for the purposes of copying, but to have these images stored in their minds to use later in the studio. As Van Mander commented in his *Schilder-Boeck* (1604) of Pieter Bruegel the Elder (c. 1525-1569), that after acute observation of the mountains and rocks in the Alps it was as if he had swallowed them, and then when he returned home, he regurgitated them onto his canvas, “so faithfully was he able...to follow Nature.”²⁸³ The theories of direct copying associated with the camera obscura may derive from our contemporary understanding of what it means to ‘copy.’ There is a problem inherent in trying to decipher artistic methods from the past because our current knowledge gets in the way. This is illustrated in J.M.W. Turner’s (1775-1851) homage to

²⁸³ Karel van Mander and Hessel Miedema, ed., *The Lives of the Illustrious Netherlandish and German Painters, from the First Edition of the Schilder-boeck (1603–04), Vol. 1* (Doornspijk: Davaco, 1994), 190.

Canaletto, *Bridge of Sighs, Ducal Palace and Custom-House, Venice: Canaletti Painting*, 1833 (fig. 43), an oil painting in which he imagined Canaletto painting *en plein air* directly on canvas. Turner should have known how unlikely it would have been for Canaletto to paint outdoors in oils; nevertheless, he has placed the figure of Canaletto in the foreground on the left, standing at an easel with his back to the viewer, occupied with his work. Just as we look back at the camera obscura through our own experience with photography, Turner was looking back at Canaletto through his own experience as a painter *en plein air*. This demonstrates that, like Turner, we tend to imagine the past through the lens of the present.

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ILLUSTRATIONS

Figure 1: This plate, showing how Frisius Gemma observed an eclipse of the Sun on 24 January 1544, is thought to be the first illustration of a camera obscura. Plate originally published in Reinerus Frisius Gemma's (1508-1555) "De Radio Astronomica et Geometrico" (1545), 32 x 15 cm.

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Figure 3: Nineteenth-century illustration of a tent-type camera obscura similar to the one described by Sir Henry Wotton that was used by Johannes Kepler in 1620, in Adolphe Ganot, *Cours de physique purement expérimentale et sans mathématiques...* (chez l'Auteur, Paris, 1859).

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Figure 5: Portable camera obscuras, Fig. XXI in Johann Zahn, *Oculus artificialis teledioptricus sive telescopium* (Würzburg, 1685).

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