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Technology and the Glass Imagination:
Isolation and Closeness from the Window to the Screen

by

Sarah E. Welsh

A master's thesis submitted to the Graduate Faculty in Liberal Studies in partial fulfillment of
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Matthew Gold

Date

Thesis Advisor

Matthew Gold

Date

Executive Officer

THE CITY UNIVERSITY OF NEW YORK

Abstract

TECHNOLOGY AND THE GLASS IMAGINATION: ISOLATION AND CLOSENESS FROM THE WINDOW TO THE SCREEN

By

Sarah E. Welsh

Adviser: Professor Matthew Gold

In computer and cell phone screens, as in 19th-century architecture, glass employs a frame to show a specific picture, and keeps us at a distance from what lies behind it. Glass' dichotomies in technology (transparency and reflection, isolation and closeness) have become stronger metaphors for our experience with technology. This paper will look at the similarities between the language and metaphors created by glass in 19th-century architecture and 21st-century technology, and glass' role in connecting us to and alienating us from the world "outside." In so doing, the role of glass in the imagination and its impact on modernity will be explored through the lens of Charles Baudelaire's *Paris Spleen* and Walter Benjamin's *Arcades Project*. Paying due attention to the historical and psychological theories of the screen from Anne Friedberg and Sherry Turkle, and incorporating Isobel Armstrong's literary and material history of glass, this paper will then explore glass' impact as an instrument of technology.

The unique properties of glass have impacted the future and the imagination, always transforming how we interact with the [virtual] world. Glass is now, more than ever, both connecting us to and distancing us from our surroundings.

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Glass in Technology, Then and Now

Glass, in the form of windows, has always kept us at both an elusive and physical distance from the object it frames or encases. While we can see what is on the other side of the panel, the transparency creates a false proximity; we cannot directly access what's on the other side, but we do have some means of distant interaction through bodily gestures. In 19th-century architecture, walls were becoming windows, and viewers on one or both sides were given a clear and directed view. This same phenomenon continued with the use of glass cases in museums, glass in store windows, glass in camera lenses, and so forth, and a new, ubiquitous voyeurism was born. Glass is something that we use to “see”, rather than something that we “see through.” Whether an object is magnetized, reflected, or simply framed, it creates a whole new way to look.

Glass can be transparent, translucent, or opaque. It can hold thousands of gallons of water in an aquarium, but it can also shatter to pieces with a single blow. We store vast amounts of information behind glass computer and cell phone screens, but dropping the device can allow what feels like our whole world to vanish. Such disparate dichotomies have pervaded the language of glass since its beginnings in architecture, creating a multitude of phenomenological metaphors in literature and in everyday life. Glass, by the nature of its simultaneous, opposing properties, has fundamentally altered our interactions with the world around us. Through its persistent use in technology that advances and develops the human race and how we interact (computer and cell phones), glass continues to propel us further into the future. The way humans have used glass has accelerated change and technology almost immeasurably, and glass is now, in the form of the screen, is both connecting us to and distancing us from the world “outside.”

As a material in technology, glass has provided a link between successive inventions, and has been constantly remediated. Remediation in this sense is borrowed from Jay David Bolter's definition of the word as a key to understanding the historical development of new media: Glass, from its early incarnation in the lens to later computer and cell phone screens, is one physical element that has been consistently reused as an active vessel for remediation, continually propelling technology forward. The dichotomies of glass: transparency and reflection, isolation and closeness, are still an important part of understanding the human experience and our relation to the history of technological change. These simultaneous yet opposing properties have become stronger metaphors for our experience with the computer and subsequently, with the internet. There are striking parallels between the language used to describe the experience of windows in the 19th century, when these architectural marvels were perfected, and the language used to describe our experience with the computer and the internet, parallels that can partially be explained by the recurring glass panel. Glass, especially the nature of its transparency, is such a part of the human experience that it is mentioned in rhetoric about the computer screen and window almost as an afterthought, with inherent metaphors that have been absorbed into consciousness.

A Brief History of Transparent Glass

Understanding the history of transparent glass helps explain the development of (and development of necessity for) a transparent material in technology, and how metaphors for transparency have persisted from architecture to technology. Anne Friedberg suggests that a technical history of glassmaking situates the prolific development and abundant use of windows

in architecture and their effects on “the experience of the built environment from inside and out” (105). A history of glassmaking also helps situate developments in technological history as a kind of branch to the history of windows and architecture.

Glass’ utility both in architecture and technology can first be attributed to its transparency. Transparency is a quality that is described both in terms of its materiality, as “being pervious to light and air,” but also as “an attribute of personality—the absence of guile, pretense, or dissimulation” (Rowe, 91). Glass carries inherent metaphorical qualities that have become almost culturally inseparable from the material itself, and so it has grown to be a tangible metaphor with a multitude of contradictions in its physical being and ethereal evocations.

Glass occurs naturally in the form of obsidian, but glassmaking is estimated to have begun in Mesopotamia (Iraq) as early as 3500 or 2500 BC (Friedberg, 107). According to Alan MacFarlane and Gerry Martin in *Glass: A World History*, in the early days of glass, people were much less concerned with its utility than they were with its beauty (3), but the Aztecs realized that obsidian was useful for make weapons and tools (Friedberg, 108). Glass blowing techniques were developed (also with unknown origins or an exact date) by the Romans, which allowed for the introduction of transparent glass, enormously increasing its versatility and quickly replacing pottery as a main output for artistic production (MacFarlane and Martin 14). In Rome, it was quickly understood that in order to appreciate the colors of wine it was necessary to see through translucent tableware. Another development with great implications for the future was the “realization that clear glass was both useful and beautiful” (MacFarlane and Martin 14). Despite this desire, the technology was not yet available to make glass fully transparent.

In the eleventh century, glassmakers in Germany figured out how to blow glass into cylinders, which were cut and the ends laid flat. There were still many imperfections in the finished product, which was relatively opaque and uneven. Windows were eventually developed in northern Europe after the fall of Rome because the technology was more useful in cold climates—whereas, in Rome, window glass was virtually nonexistent, except in the form of thick, greenish-blue discs (Friedberg 107).

Christianity is thought to have made a huge impact on glass' development, where references to stained-glass windows have been found as early as fifth-century French texts. Throughout the history of the church and Gothic architecture in particular, glass was primarily used to illustrate biblical scenes to churchgoers who could neither read nor write. However, biblical scenes could have just as easily been illustrated on walls or in oil paintings, so glass was chosen primarily for its aesthetic, illuminative qualities. By AD 1000, "painted glass" is frequently mentioned in church records, and the Benedictine monks are cited by MacFarlane and Martin as being the group in particular "that gave the impetus for window glass" (20). Between 1100 and 1700, windows in religious buildings and European homes grew increasingly common, the quality and size of mirrors improved, and glass was developed for lenses and eyeglasses: "Windows, mirrors and optical glass would change the knowledge base of Europe. None of these were manufactured to any extent elsewhere in this period" (MacFarlane and Martin 20).

By the nineteenth century, window glass began to look more like what it is today, allowing for a transparent, yet physical threshold between two objects; the world had a new way to see that physically and metaphorically permeated everyday life. In *Victorian Glassworlds*, Isobel Armstrong describes that in the nineteenth century, "glass became a third or middle term: it interposed an almost invisible layer of matter between the seer and the seen—the sheen of a

window, the silver glaze of the mirror, the convexity or concavity of the lens” (3), or as Friedberg explains, the window became “a membrane between inside and outside, and light was the material that modulated this relation (111). The development of lenses opened up more ways for light to be refracted and for objects to be magnetized. Eyeglasses were invented in the middle ages, and were common by the thirteenth century. Some years later, in 1590, the microscope was invented, supporting the development of biology and medicine, and in 1608 the telescope was developed.

Glass, in the form of windows, glasses and lenses, was both physical and transparent, signifying both an absence and a presence, bringing forth a host of contradictions in its mediation of space. For Armstrong, what differentiated glass culture of the nineteenth and twentieth centuries were the traces left by the artisan: bubbles, scratches, imperfections. Glass was not yet manufactured by machine, only by breath, but as technology developed machines took over the process. Glass made primarily by machine is much more transparent than glass blown by breath.

Transparent glass windows brought the natural world into the private world, and demands only increased as glass technology improved. In the 1600s King Louis XIV’s palace at Versailles helped increase the demand for fully-transparent, flat glass. The mirrors in Versailles’s Galerie des Glaces reflected the views from the windows opposite, creating their own “virtual windows” (Friedberg 109). By bringing the exterior into the interior, both denying and granting access to the outside, glass was beginning to create a world that was both framed and unmediated.

Greenhouses became common in Europe in the 1800s as urban spaces to house exotic plants, and winter gardens were enjoyed as a respite from the urban environment. When the positive effects of public garden spaces in gritty urban areas were realized, glass gave the impetus for the modern-day city park—spaces that were reserved only for palace grounds and the

very wealthy in the 19th century—as well as covered public spaces such as the arcades in Paris. Glass had also just begun to show up more frequently in architecture, and its uses had permeated culture with eyeglasses, microscopes, mirrors, glass panels in the daguerreotype and more. There was a new awareness of glass' potential that had utopian implications for some, and was fraught with anxieties of modernization for others, like Walter Benjamin, whose *Arcades Project* notes often revolved around the recognition of a new commodification of culture.

Towards the end of the nineteenth century there was rapid population growth within cities, and the desire for green space was palpable. While the desire for more such spaces grew, continued population growth conflicted with the desire for natural spaces of leisure: there was simply no room for it. In Paris for instance, the population grew “from 600,000 to over a million in the years between 1800 and 1853” (Kohlmaier and von Sartory 11). Introducing more green space, meant there was less living space, and thus the price of space increased. Gardens, reserved for the nobility, were seen as unnecessary for the general public, whose main purpose was to work: “In the cities of the eighteenth century there were few green spaces available to the public. Battlements and fortification walls, although tactically out of date, sharply separated the countryside from the town, which was consciously organized as a political, economic, and cultural center of power” (Kohlmaier and von Sartory 9). What green space existed was typically reserved for avenues and esplanades, with large gardens existing mainly outside the city space. The English Garden in Munich (opened in 1810) was one of the first public spaces within a cityscape.

Still, the desire for an Eden within the industrial city remained, and according to Kohlmaier and von Sartory this notion was plucked from Romantic ideas of nature and the soul. Human beings did not evolve in the industrial, claustrophobic space of a modern city, which is

one possible reason for desires to be close to the natural world. Reinhard Baumeister, an urban planner from Hamburg, wrote in 1876 that “the very favorable influence of such pleasure grounds in psychological respects has long been known, but even more important is the spiritual effect” (Kohlmaier and von Sartory 11). This influence had long been ignored by city officials, probably for economic reasons: the city, where industry and factories were, was also where people were supposed to work. The countryside was so removed from the city space around the time of the Industrial Revolution that to merge the two must have seemed unnecessary.

When greenhouses began to appear, industry and the desire to possess nature were merged: city-dwellers now had natural spaces at their fingertips. This unity of man and nature was previously unattained in the urban space, but with the introduction of technology (glass and iron), paradise could be achieved: “The glasshouse, with its greenery, was, as a symbol of the Garden of Eden on Earth, the convergence point of all nineteenth-century social utopias” (Kohlmaier and von Sartory 14). This longing for utopia was made possible by glass, and the development of what Kohlmaier and von Sartory call “artificial paradise” (5): the idea that nature and its essential forms become accessible through artificial (human) means.

Greenhouses were able to give nature back to the urban city-dweller, while simultaneously propelling modernity forward, with the introduction of new possibilities for architectural design, climate control, and living in general. As Kohlmaier and von Sartory argue: “The glasshouse, as a climate-enclosing shell that had to cover the scenery of a tropical garden, required for this purpose not only a wide structure of glass and filigree iron in a form that allowed the entry of the maximum amount of light but also (in comparison with other buildings) more advanced installations for heating, humidity control, and ventilation ” (3). So with glass,

came climate control: exotic plants could not exist in cold, northern climates without some help. Glass was the central figure in aiding this transition.

Still, in the early 1800s, the glass and iron architecture reserved for greenhouses was not seen as either practical or beautiful. Greenhouses integrated with homes were simply added on in a lean-to style, as architects struggled with how to incorporate glass and iron with stone, brick and traditional building materials. Greek and Gothic architecture was considered beautiful, but these new glass and iron structures were not, and so they were often covered with cement or stone. Transparent architecture alongside masonry was still seen by architects as problematic through the early nineteenth-century. And of course, the idea that glass and iron should not be visible when attached to a stone house was problematic for exotic plants because they were not exposed to sunlight. John Claudius Loudon, a botanist who was obviously well aware of the advantages of transparency that the combination of glass and iron held, made a plan to incorporate these structures, arguing that “beauty and function are of necessity bound together and mutually independent” (Kohlmaier and von Sartory 26). When greenhouses were allowed to stand alone, especially with filigree iron designs, their beauty was quickly apparent and the desire for larger “winter gardens” alongside homes arose as places where man could be on with nature. Iron was both instrumental to glass architecture and friendly to economics, allowing for curved glass coverings and opening up new possibilities for mass production. Door jambs, doors, rafters, beams and floors could all be made on-site, and the building itself could be bought and sold. The glass structures that emerged in the form of hothouses were in essence, glass and iron structures. In the nineteenth-century city, “Nature was perceived as an end product—for the dandy a picture or a poem, for the bourgeois man a commodity” (Kohlmaier and von Sartory 8).

The idea of glass as an integral part of public architecture was first conceived by thinkers with grand utopian visions like Charles Fourier, botanist John Claudius Loudon, and various others, rather than primarily by the architects themselves. Though John Paxton, one architect who posited that glass-and-iron structures should be divorced from homes entirely, created a new emblem of nineteenth-century modernity and set the wheels in motion for full glass architecture: the public conservatory. Paxton's Crystal Palace, built in London in 1851, was this idea fully refined for the public, a building that was revered by modern-day city dwellers as emblematic of the new utopia. Hothouses and larger winter gardens had served primarily for the preservation and growing of plants, but the conservatory was built for social purposes and for private contemplation (Kohlmaier and von Sartory 25).

Glass began to have a powerful ability to monetize what previously could not be contained: by keeping things visible, yet at a distance, a new kind of desire was created. The Crystal Palace was one of the first places where nature was contained and commodified, while also stirring a concurrent desire for more covered spaces to stroll (an artificial paradise). Furthermore, the state of industry existing around 1850 in Europe made it possible to mass-produce glass and iron structures themselves. Kohlmaier and von Sartory argue that it was "the giant buildings constructed for the Jardin D'Hiver in Paris (1848) and Paxton's Crystal Palace (1851) that acted powerfully on utopian fantasies and brought them to fruition" (17).

Glass keeps us out of the rain and away from nature, creating an artificial, climate-controlled utopia, but at the same time allows us to connect to the outside world through its transparency, where we can view nature from afar while protected by glass. Even when plants were introduced to winter gardens, they were usually non-native and tropical, and could not survive in a Northern European environment without the help of such technology. Crystal

palaces were glimmering man-made monuments to technology, trapping both nature and man in one commoditized box. In the arcades glass simply allowed capitalism to flourish, keeping the masses in a kind of crowd-and-shopping-induced trance that we still enjoy today in modern shopping malls (or through browsing internet windows): “World exhibitions glorify the exchange value of the commodity, They create a framework in which its use value recedes into the background. They open a phantasmagoria which a person enters in order to be distracted” (The Writer of Modern Life 36). The Crystal Palace and the arcades set off a new kind of commodification under and behind glass, creating a new way to experience a world that could be literally transparent.

In the arcades, built decades after Versailles and looking to greenhouses for inspiration, the technology for fully transparent glass was still developing, as was the technology to hold it up with iron. As Walter Benjamin notes in *The Arcades Project* about glass architecture in the mid-1800s:

“Glass before its time, premature iron. In the arcades, both the most brittle and the strongest materials suffered breakage; in a certain sense, they were deflowered. Around the middle of the past century, it was not yet known how to build with glass and iron. Hence, the light that fell from above, through the panes between the iron supports, was dirty and sad. (F1,2)

The arcades, as Benjamin noted, had still not seen glass at its most transparent. As glass technology developed, and transparency increased in windows, the elusive space between subject and object became more problematic. The tensions between inside and outside came more fully to the forefront

Transparency, the Glass Frame, and Longing

As the architectural and technological uses for glass were developing in the nineteenth century, the material became a tangible metaphor due to the multitude of dichotomies that exist in the physical, metaphorical, and ethereal phenomena it inhabits.

In their seminal essay, *Transparency: Literal and Phenomenal*, Colin Rowe and Robert Slutzky describe transparency as being defined by material qualities of being receptive “to light and air” but also as “an attribute of personality—the absence of guile, pretense, or dissimulation” (91). Transparency, both as an experience or idea, and as a material property, can be simultaneously physical and experiential: a transparent surface is defined and experienced in the same way that a component or characteristic can be experienced. In the nineteenth century, glass put transparency’s literal and metaphorical properties in constant dialogue, making room for phenomenological exploration of the material’s effect on the human experience and perception. Matthew Ziff expands on this point when he describes how glass evokes the physical and psychological in conscious experience. In an explication on the role of glass in architectural aesthetics, Ziff argues that glass “presents a vivid arena for emotional and intellectual stimulation and response.” That is, glass offers tactile and sensory excitement through the potential for breakage, it traps heat while providing light, and it creates an ambiguous relationship between private existence and public display. These descriptions are important to understanding how a phenomenology of transparency has carried over from the window to the screen, dependent on glass for its operation.

The phenomenological framework created by the transparency of a glass object in space is a motif in Baudelaire's nineteenth-century text, *Paris Spleen*, where the window provides a new way to "see" through a specific and directed lens: "No deeper, more mysterious, more fertile, more obscure, more dazzling object exists than a window lit by a candle. What you can see in sunlight is always less interesting than what transpires behind a windowpane" (77). Glass tells us what to look at, offering a narrow, yet intimate and unguarded view of inside worlds (homes), and of commercial objects (through shop windows). In the residential space, glass allows light in, creating bright and airy rooms in which to reside. The inhabitant gets a view of the outside world, where the window both protects and alienates the person on the inside from nature, and provides a connection to the outside through transparency. As Armstrong suggests, transparency enables one "to make a seemingly unbroken transit from subject to object" with its "visible invisibility" (11). The dweller can lose privacy because the public world is now more tangibly linked to private life, but also a space exists from which to observe, where, as Benjamin puts it, he could "surrender to my dreams quite undisturbed in this city of hundreds of thousands in which not a single soul knew of my existence" (On Hashish 110). The idea that the window creates an accidental (or deliberate) voyeurism from both sides is nothing new: we can see how the other half lives (and see what's outside) when the curtains are open. Private and public are more fully juxtaposed, and the line between the two slightly evaporates. The inside gazes out, and the outside gazes in, meeting in an ethereal middle, making glass both a barrier and medium.

For Baudelaire, the window creates a heightened awareness of people, where "life lives, life dreams, life suffers" (*Paris Spleen* 77). In "Windows," Baudelaire watches an older woman inside her home, projecting meaning onto her life from the little he is actually able to observe:

“Beyond the billowing rooftops I notice a mature woman, already wrinkled, poor, always bent over something, and who never goes out. With her face, her clothing, her gestures, with almost nothing, I have refashioned that woman’s history, or rather her legend, and sometimes I tell it to myself weeping” (77).

The window in a home is a problematic threshold, framing the scene for Baudelaire, who generalizes a woman’s life based on the few things he can see. This narrow view calls to mind the following from Benjamin: “Why does the glance into an unknown window always find a family at a meal, or else a solitary man, seated at a table under a lamp, occupied with some niggling thing?” (13,3). Benjamin was inevitably in conversation with Baudelaire, and other literature of the late 1800s that concerned itself with what Armstrong refers to as the “endemic image of nineteenth-century iconography” (Armstrong 11). With this in mind, Baudelaire’s image of the “old woman at the window” reads as satirical. Baudelaire, imagining a false existence, comments that he is “proud” of having lived vicariously through someone else, painting a somewhat pointed and sarcastic picture of the era’s voyeurism. The figure behind a window is a distraction, inconsequential except as a means to define one’s existence by an “other.” The window, while creating both a physical and metaphorical barrier between people, propagated a new kind of selfishness. With the window (thereby with glass) analogous to the nineteenth century’s technological advances, Baudelaire’s critique is on the idea that windows help us act on greedy impulses to make easy assumptions by watching from a distance. From the outside looking in, observers can lose themselves in the lives of others. As the century progresses, distraction becomes a major theme.

The store window was (and still is) a place where the gaze was deliberately, rather than tangentially, directed inward in order to create longing: “The commercialized window offers

public access to spectacle and display and a fantasmatic vicarious ownership of its contents” (Armstrong 4). To look in through a transparent layer is to experience a kind of false ownership; an opaque layer that denies possession has been removed but in its place is a *transparent* barrier. This works similarly in residential spaces, especially when one gazes from inside out: “The gazer from within claims ownership of the space not only in the room behind but also of the optical field of the street or park beyond the window” (Armstrong 7). Looking through a window in the nineteenth century allowed one to live vicariously in multiple ways, widening the appeal of a stroll through the marketplace and creating anxiety around a disputed private space, or according to Armstrong, “*the* disputed space of the century” (7).

Glass invites and then rejects physical communication, creating a museum effect: we are only allowed to look. To observe someone or something unfamiliar through glass is to project meaning onto an experience from a first-person perspective (Armstrong), and at the same time, this phenomenon creates a feeling of vicarious ownership. The closed window is protected observation (voyeurism) of an “other,” whereas according to Baudelaire, “He who looks from the outside through a window open never sees as much as he who looks through a window closed” (93). The window allows the eye to see something intimate and illuminates it, rather than allowing us full freedom to choose an object in space. In a similar way, looking out from a window provides a safe framework from which to observe. Walter Benjamin describes this sensation in *On Hashish*:

“Through the window opposite me, far below, I could see one of the narrow black streets of the port district that intersect the body of the city like marks of a knife. I was thus able to enjoy the absolute certainty that I could surrender to my dreams

quite undisturbed in this city of hundreds of thousands in which not a single soul knew of my existence” (110).

Benjamin’s description here also speaks to the loneliness and isolation of the window. A closed window (a transparent barrier) provides a false sense of security for the person inside: a glass barrier can shatter giving the outside world easy access to a protected, private space. An uneasiness takes shape for the inhabitant in that the interior space is not really “safe,” but the closed window signifies a space in which to dwell and relax. In Benjamin’s experiments in *On Hashish*, the interior, framed by a closed window, creates a similar unease: “The test subject urgently requests that the window be shut, no doubt because he is disturbed by the noises coming from outside. I close the window, and my action is greeted with a lively show of gratitude” (77). This dialogue between interior and exterior (barrier and medium) gives this physical object something of a perpetual state of anxiety, while at the same time providing the calm of an enclosed space.

Baudelaire’s “The Bad Glazier,” (ultimately a cautionary tale about satisfying destructive impulses) plays on the problematic space created by glass. While glass is protective, it is also a prison that is easily breakable. While glass is beautiful, the ability of the material to shatter invites anarchy and a satisfying release of turbulent emotions. For Baudelaire, glass summons this same inner tension: “One morning I had awoken sullen, sad, and worn out with idleness, and I felt impelled to do something great, a brilliant action. And I opened the window, alas” (Paris Spleen 14). Here, to open a window is to relieve imprisonment of the physical body and soul. While we can observe the world through glass, we cannot interact with it, an anxiety relieved by opening the window, or by breaking it, both of which invoke the primal satisfaction in the destruction of a delicate object.

Medium, Interface, Threshold

A “medium” is an intervening material or element through which impressions are conveyed to the senses, or a force that acts on objects from a distance. An interface is a point where two systems, subjects, or organizations meet and interact (Oxford). To be more specific, the interface is a boundary where two systems communicate with one another.

Traditionally, we think of things like canvases or modes of artistic expression as mediums, and computer screens as interfaces. Other interfaces include: books, newspaper pages, bathroom faucets, ATM machines and car dashboards (Drucker 12). Many televisions have recently become interfaces because they allow the user to interact more than just by changing the channels with a remote. Smart TVs, for example, come equipped with the internet and an interactive screen. A computer screen can present both an interface and a medium, but a paint canvas cannot be an interface, essentially because it provides only a one-sided interaction. In most cases, glass is a medium because it acts as an intervener between two systems (the human body and the computer’s physical makeup). Glass may encompass both of these definitions, in the sense that it is both an intervening substance and can also be a point where two “systems” (the inside world and the outside world, human bodies, etc.), meet and interact. In this way, glass acts as a medium, but only as a necessary part of an interface. The recurring presence of glass in architecture and in technological instruments like lenses and screens, points to the necessity created for this transparent material, which has carried the same deep-rooted psychological reactions.

In architecture, glass acts as a barrier in the form of windows because it often propagates some kind of human interaction on one or both sides. But glass also acts as a medium, just like it

does in the form of lenses and screens. The computer interface is also a medium, where we use commands to create the “new media object” (Manovich 27). The computer is made up of disparate elements, all present and physical, but with effects that are elusive, ethereal, and similar to the separation windows created in the 19th century. The most recent incarnations of the computer screen are critical to understanding the role of glass in the historical development of technology and subsequently, new media. The space created by glass permeates the way we experience art, architecture, technology, and, by extension, how we interact with the world.

In her essay “Humanities Approaches to Interface Theory,” Johanna Drucker defines the interface as a dynamic space where reading takes place. She says that in spite of the “overwhelming force of the ‘windows’ metaphor” we do not look through or past the interface, and the surface of the screen is not merely a portal “for access to something that lies beyond or behind the display.” Drucker anchors her exploration of the interface with a more theoretical/cognitive exploration of the computer interface, rather than a historical exploration, like Anne Friedberg’s in *The Virtual Window*, but it’s hard not to see the two in conversation. Looking at Friedberg and Drucker’s arguments in compliment to each other, that we do not “look through” the interface, but that the window is still somehow connected to the screen, one of the keys to understanding the way the interface affects human computer interaction must have something to do with glass. With Drucker’s argument in mind—that the screen does not act as a window or a portal in spite of the metaphor—we can continue to unpack some of the parallels that persist despite the changing nature of glass as a medium and maybe even as an interface itself. However, it might be most accurate to say that glass is a threshold: a point of entry and a space for beginning. In both the screen and the window, glass is an integral material component as well as an ethereal space between the private and public worlds. It separates the body from

cyberspace while connecting the mind, but it can also both separate and connect the body and mind from the world outside and beyond the screen. While always allowing us a glimpse to the other side, we can never be fully present with what lies beyond. Glass and the screen provide a constant push and pull.

Bridging an Aesthetic Divide: Glass and Separation in Modern Art

In museums, glass is used to communicate a firm message to the viewer: the work of art encased is delicate and valuable. Leonardo da Vinci's *Mona Lisa*, placed behind bulletproof glass in a climate-controlled environment in the Louvre, is a particularly strong example of how transparent barriers are used in an attempt to render the work physically but not emotionally or aesthetically inaccessible. But what happens when a glass barrier is purposefully made a part of the art object by the artist? The glass coverings of Joseph Cornell's boxes convey this same sense of delicacy and value, and yet his transparent panels are an integral part of the visual poetry in his works. Considering the window as a documented inspiration in his waking life, Cornell's works can be easily linked to a store window: glimmering with light and purposefully engaging, the works invite the viewer to extend the gaze.

Arne Svenson is another artist whose work uses glass to explore notions of privacy, isolation, and closeness. His series "Neighbors" (2012) will be discussed in tandem with Cornell's work, a set of photographs the artist took of his neighbors with a telephoto lens. "Neighbors" brings multiple layers of glass into play: the glass lens, the windows of apartment buildings, and the glass of the display frame in the gallery. Both Cornell and Svenson, like most

artists, are observers, but their work incorporates glass in a way that helps create a way to think about closeness and isolation in ways that help develop a theory of the screen.

The works of artist Joseph Cornell, famous for his boxed assemblages, help to illustrate a phenomenology of glass that bridges an aesthetic divide in an exploration of literature and 20th century technology. His work, crafted between 1940s and until his death in 1972, links 19th-century windows and glass with 20th century ideas out privacy and ownership. Cornell was constructing his boxes just before the computer changed the course of history, when glass had grown to be an obvious presence and continued to be a fascination for the world; Benjamin's wish image of the collective was again at work. Both Baudelaire and Benjamin found glass to carry ethereal and metaphorical properties that had greater implications for modernity's development, and Cornell's boxes illustrate the phenomenology of both the window and the screen. Cornell, always looking to the past, was similarly aware of the transparent panels between himself and the rest of the world; whether they were shop windows, windows in his home, or glass panels between himself and girls at ticket counters, this experience of distance and closeness through glass was important to his art and all around aesthetic. With their transparent coverings, Cornell's boxes work to metaphorically distance us from and connect us to reality. Glass is again both a barrier and a medium: a transparent pane sits between our bodies and the object behind glass, just like it does in the invisible threshold between dream and reality. The glass pane is absolutely instrumental to Cornell's boxes because if it were to be removed, there would be nothing standing between the viewer and the object, or the dream and reality.

Cornell fell upon the idea for his boxes as he passed by an antique shop and saw a pile of compasses in a window: "I thought, everything can be used in a lifetime can't it, and went on walking. I'd scarcely gone two blocks when I came on another shop window full of boxes, all

different kinds...Halfway home on the train that night, I thought again of the compasses and the boxes. It occurred to me to put the two together” (Bourdon). This active recognition through glass was the beginning of a lifetime of gazing through glass, and asking others to look as well.

Walking the streets of New York City where he haunted antique shops and dime stores, Cornell amassed an immense collection of knickknacks, which he transformed into evocative artworks that reflected the poetic depths of memory. He is someone Michael Piggot describes as forming “a link between the Romantic, impressionist, visionary wanderer of the nineteenth century – the flâneur – and the Situationist psychogeographer, between entrancement and absorption in the spectacle of urban space and life, and the strategic subversion of the authorized usage of space via the *dérive*.” Wandering was an integral part of Cornell’s life, and an action that is clearly reflected in his works through a random but organized assembling of found objects.

Joseph Cornell wanted the gaze to capture ephemera, to signal a longing for the object behind glass. His wanderings through the city trace a clear path to Baudelaire’s flâneur, a character Cornell must have been aware of due to his familiarity with French poetry and literature. The flâneur, as Baudelaire described him, strolled along aimlessly, energized by the modern city: “For the perfect flâneur, for the passionate spectator, it is an immense joy to set up house in the heart of the multitude, amid the ebb and flow of movement, in the midst of the fugitive and the infinite” (*The Painter of Modern Life*). But while Cornell’s nature as spectator and collector aligns so perfectly with this 19th-century eccentric, especially in placing himself “in the midst of the fugitive and the infinite” (the ephemeral), Cornell is also Baudelaire’s “painter of modern life.” He does not walk idly by, strolling the streets for the sheer pleasure of, as Walter Benjamin would say, being “intoxicated” by the crowd. Cornell’s “abstract [feelings]

of geography and voyaging” (Caws, 98) were unavoidably purposeful in capturing memories of modernity in passing.

The transparent thresholds of glass punctured and separated experiences in Cornell’s waking life more obviously than they do for many of observers out in the world:

When he invited people to lunch, it was inevitably to the Automat, where the food is dispensed in glass-covered boxes. One of his greatest thrills was riding the elevated trains, speeding past tenement windows and glimpsing the interiors of rooms—rooms, he wrote once, of “an unexpected and confusing bareness...that etched the fragment of action of the occupants so strongly, like a memory of childhood. And it was over in less than a split second.” (Bourdon 63)

For Cornell as flâneur, glass was an integral part of how he saw the world, so for Cornell as artist, glass was a necessary part of capturing the stuff of transient experiences in an effort towards eternity. As Mary Ann Caws suggests: “Baudelaire, suspended as he was between Romanticism and Symbolism, conveys the full perfume of regret—the chance missed, the time lost—that hangs heavy in Cornell’s work” (29). Looking at a Cornell box, gazing at objects suspended between our bodies and a transparent pane, this longing to trap the ephemeral has been fully realized in the sense that found memories are forever preserved behind glass. This is clear in almost any of his boxes, from his 1936 *Untitled (Soap Bubble Set)*, to later, more austere works like *Untitled (Window Facade)*, ca. 1950-1953. Cornell has trapped these memories for us behind glass, allowing the viewer to gaze, while at the same time suggesting that we will never be able to capture our memories.

In his *Untitled (Penny Arcade Portrait of Lauren Bacall)*, ca. 1945-1946, where Lauren Bacall’s face, trapped behind a window, begs to be the *punctum* of the piece. Glass here is the key to representing distance, both sexual and physical, where Bacall is distanced and fractured. Her gaze meets the viewer's gaze, but the glass panes break the image of her face up into parts.

She peeks out from behind the window, and not a screen. Which of us is on the outside, looking in? And which is on the inside, looking out? Certainly because she is enclosed in his box, it's easy to assume that Bacall is the one behind the glass, and we are gazing in on her. The mysterious gaze depicted in this glamour shot does not read as emotionally honest, almost as if the actress is hiding something. Her face layered behind the window becomes less coy and erotically-charged than it is vague and distanced. To contain his admiration for starlets and ballerinas, Cornell immortalized traces of them in his boxes, and glass enhances a metaphorical distance between Cornell and the objects of his longing. The threshold, the glass panel, and simultaneous connection and disconnection through transparency are all at play in his works, whose boxes in the 1950s stood at some multiple threshold of the window, the TV and the computer screen. Cornell fully understood the dichotomies that are brought forth by glass in its mediation of space. With their transparent coverings, Cornell's boxes, like the glass screen, work to metaphorically distance us from and connect us to the outside.

Photographer Arne Svenson is another artist whose work uses glass in a way that connects past to present, commenting on privacy, isolation and closeness as seen through the lens of the camera. In a print series titled "The Neighbors," Svenson takes a more literal than metaphorical approach to observation than Cornell, with printed photos that document the lives of the people in his neighborhood, or at least what little he can observe from outside the glass with a telephoto lens. Unlike Cornell, who used literal glass panels to separate the museum viewer or observer from what is trapped inside, Svenson's work is multi-layered in a way that is more metaphorical. The structure of the windows, the notion of the glass window, and the glass display frame of the final print all work together to frame multiple private worlds. The world

Svenson saw through his glass lens, the world of his neighbors, and the purview of the observer in the gallery space.

In *Neighbors #16*, 2012, a man leans with his back against the glass window of his apartment, framed by the window panels, a partially opened curtain, and the glass panel of the display frame in the gallery. The man's shirt is pressed up against the glass, which also appears to be the glass in the display, making the observer the voyeur along with Svenson. In any of these pieces we never see the full body of the subject behind the glass, a faceless tribute to the subject of

The artist used a telephoto lens to observe and photograph neighbors near his apartment in New York City. In this series, people were photographed through a lens, behind the glass windows in their homes, and the images were then displayed in museums behind glass. Svenson purposefully obstructed the identities of these people by not photographing their faces, but one couple, whose children had been photographed, sued the artist in 2013 (Citation). Though people have been taking photographs without permission since the 19th-century, this case shows how private and public can conflict in an age of glass architecture and ubiquitous cameras.

When used in artworks, whether purposefully by the artist, purposefully by the gallery or the two in tandem, the metaphorical presence of glass is more obvious, more layered in meaning, and easier to see how it might work in the everyday experience of the glass screen. The screen, like the glass in the gallery space, works to keep us at a distance from what lies behind, but also brings us closer to the subject or the objet of observation. We are close yet far.

Glass and the Wish Image

Every epoch dreams the one to follow.

-Jules Michelet, "Avenir! Avenir!"

The above quote became a “historiographic motto” for a whole phase of Benjamin’s Arcades Project (Miller 241). The phrase points to Benjamin’s “wish image,” or the idea that new technologies inevitably reference previous technologies as history progresses. As Susan Buck-Morss explains: “Benjamin was struck by an indisputable, empirical fact: Consistently, when modern innovations appeared in modern history, they took the form of historical restitutions” (110). Rather than describe this phenomenon in purely historical terms however, Benjamin saw the progression of fashion, architecture, invention and technology as poetic and surreal: new technologies were dream-images of the collective. In the spirit of the dream-image (or wish-image), glass has moved into the future through various technologies, with inventors looking back, but never very far at a time.

The modern incarnation of the computer screen was preceded by centuries of imagining through glass: day-dreaming through windows, walking alongside exotic plants in covered glass hot houses, marveling at the transparent roofs of Parisian arcades, gazing through shop windows, staring into mirrors, framing reality through camera lenses, and watching actors behind film and television screens. The television and computer screen fit in as a branching off of the aesthetic lineage of the architectural window and the lens, combined with technical inventions meant solely for calculations.

The one necessary piece that connects the average computer-user to the inner mechanics of the computer, or the laptop, or the modern cell phone is the screen, and the screen’s essential

element in most contemporary technological models is the glass panel. The glass panel is the one material element that has transferred from ancient times to modern day, still existing and useful in modern technology. By the sheer presence of its materiality and all the history that comes with it, glass still carries the same inherent metaphors of transparency as it did when it was introduced as an architectural mainstay. It is for this reason that there are often similarities in the language of glass metaphors and the language of the screen, and similarities between the phenomenology of the window in the nineteenth-century and the window of the computer screen in the twenty-first.

A Brief History of the Display

The modern computer could be placed in line with the history of computing devices from the abacus, “the first computing device providing fixed decimal orders,” to Howard Aiken’s Mark I, a device that would solve mathematical problems too large to be undertaken with machinery available in the 1930s (Chase). But while this lineage makes sense with the essential programming and software “behind” the screen, it does not explain the development of the basic point of entry and interaction with the computer: the display. These machines (Babbage’s Difference Engine, the Standard Adding Machine, etc.), all had interfaces in the sense that there was a point of mediation between the human and the machine. But this kind of technology developed alongside display technology, rather than integrated with it, so a computational history can be constructed separately from a history of the graphical user interface (GUI). The computer as we know it today developed as something like Benjamin’s wish-image, when these two histories were internalized and then converged. Engelbart’s 1968 demonstration in San

Francisco, widely accepted as the first demonstration of a graphical display for personal computing, offers some evidence to this fact. In the report that accompanied this demonstration Engelbart explains the features of the display system with words like “TV approach,” and “closed circuit television system,” and “monitors.” He does not use the term “window” in any part of this demonstration, but retrospective descriptions do. As Friedberg suggests, “It is not clear whether the term ‘window’ was actually used at SRI [International] or whether now, in recovered memory, the inset screen was believed to always already have been a window” (225). In some sense, while drawing on a history of what had already been invented, many of these terms could have been almost implicit, because (as Benjamin would have it), we cannot move forward without looking back. As Friedberg puts it, the metaphor of the window “quickly entered into the terminology for computer operating systems as an inevitable component of computer ‘architecture’” (220). “Windows” was also promptly trademarked by Microsoft.

Computers began as room-sized mainframe units which then developed into beige boxes without screens. Unlike computing machines, the GUI interface conceals its inner workings and mechanisms and hides its programming. As they acquired screens, most likely modeled after military radar screen technology (Friedberg), new designs supplied an interface that could better interact with the user: “‘Interface’—a geometric term for the surface that forms the common boundary between two three-dimensional figures—was deployed to describe the human-computer relation once the user was literally ‘facing’ the computer” (Friedberg 220). In constructing both an aesthetic and experiential approach to the history of display devices, the modern graphical user interface is key, and along with the GUI came CRT and LCD displays constructed with glass. Corning, a prolific glass company that makes the majority of computer and cell phone screens, dates its involvement with LCD technology back to 1959, with the

invention of a “fusion overflow process” for liquid crystal display (Corning Incorporated) This process, where molten glass runs down two sides of a tapered trough and rejoins to form a thin sheet of glass, is similar to processes for making lenses. It was patented by the company and later perfected, while Corning continued to manufacture glass CRT tubes for televisions. Throughout the late 1970s and early 80s, Corning continued to experiment with the creation of ultra-thin glass for LCD technology.

The Xerox Alto was the first computer to use the desktop metaphor, a metaphor that “acquires near-materiality as a virtual object” (Friedberg 225). The desktop metaphor still prevails, of course, even though the term “windows” was trademarked by Microsoft. The Apple Lisa, introduced in 1983, was the first personal computer with a graphical user interface (GUI). Still developed for business use, the Lisa was very expensive even by today’s standards (about \$23,000 at the time of its introduction), and sold very poorly. In comparison with today’s laptops, it was still easy the Lisa’s boxy, boxy, bulky aesthetics were visually similar to a mainframe computer. The light and airy construction of today’s devices developed along with the improvement glass technology, which became thinner, lighter, and more transparent.

By 2000, Corning invented Eagle 2000 glass substrates, which provided very low glass density and high durability (Corning Incorporated). This allowed many laptops to be lighter and computer monitors to be less expensive. In 2003, the company ceased production of cathode ray tube glass, a process which the company had invented the mass production for in 1947. Corning, whose company landing web page proclaims that we have entered “the glass age,” has been the major player in the glass industry and has helped the advancement of display technology immeasurably. Corning also manufactures Gorilla Glass, used for iPhone screens. The claim that we are in the “Age of Glass,” keeping in mind that this statement is geared towards marketing

their products, still seems accurate if our era is placed in line with the Bronze Age and Iron Age. The desire and need for a material that is transparent has grown exponentially, shown in the proliferation of today's lightweight devices with thin but durable screens. Today's mobile devices, which have come so far from the telephone, are also aesthetically lost in the history of computing machines and mainframes. They are almost transparent in comparison with the Apple Lisa and the mainframe computer of the 1960s.

With the introduction and development of the internet, the computer became more of a window than a computing machine or a simple reflection of our menial tasks. In Doug Engelbart's famous 1968 demonstration of new tools including the mouse and hypertext, he introduced the computer as a new reflection of ourselves, somewhere we could write down grocery lists and configure numbers. But he also demonstrated shared-screen conferencing and opened up the possibility for networked systems. Since that day, the computer screen has developed into something we use to "see" the world, just as we use glass to "see" the world through windows and lenses.

Virtual Metaphors of the Screen

Walk down any street in America in 2015, and people will be starting into their screens. People stare into computer and cell phone screens, separating themselves from their present environment and connecting to a virtual environment behind a glass panel. The present generation of computer users are "living deep in their own virtually rendered elsewheres, and yet, like generations before them, they sit in front of the frame of a 'window.' Their interaction with the screen may be different, but if it is, it makes the intransigence of the frame a chilling

contrast, one with inexorable cultural power” (Friedberg 244). We are now taken to starting through a new kind of glass window, one with a wider view than ever.

Like the 19th-century image of the old woman at the window, the image of the man and his screen has already become a cliché. Or, as Friedberg suggests: “If the flâneur and flâneuse were models for nineteenth and twentieth century modernity, the multitasker is their twenty-first-century heir” (247). Even though Friedberg finished *The Virtual Window* in 2006, the multitasker still holds true in consideration of the fast pace of technological development because it accounts for all the windows we have open at any given time on our screens, the apps we use to navigate our lives and augment our experiences, and the multitude of devices we switch back and forth from throughout the day.

In examples of Baudelaire’s prose and Benjamin’s diaries and notes referenced earlier, glass and the window act as a space of contemplation and dream. This is especially obvious in Benjamin’s *On Hashish*, where the window is a problematic space of both private contemplation and interaction with the world outside. The parallels between mental/bodily experiences of the window during its uprising as a permanent architectural presence, and the experience of the computer screen are similar in the ways they affect and influence the human experience. Glass still, through computer hardware, acts as a catalyst to humanity’s mental/developmental progression and subsequently, as an agent of technological change.

We open new windows on our desktops, we demand “transparency” from government agencies peeking behind our screens, and we browse the internet as we gaze through shop windows. Glass interposes a layer between the seer and the seen, but anything behind glass is just another distant object if it cannot be physically interacted with. Anne Friedberg spends some

time with glass and its history but does not elaborate on the significance of glass in technology. For Friedberg, as for Turkle, glass becomes one with the computer. But glass's inherent and rich metaphorical tradition may help point to some of the reasons for complicated and nuanced interactions with technological devices.

The transparent barrier and physical and theoretical separation of 19th-century window glass is still present experientially in the cell phone screen. This separation is still literal, but now it is also virtual, both in the adjectival sense (nearly, but not completely), and the technological sense of the word (not physically existing but computer-generated). Phones separate us from our lives in all sorts of ways: "Here we are together, looking at little screens, interacting (at best) with people who aren't here. Looking at our hands instead of each other. Documenting instead of experiencing" (Swinder). But we can also be documenting while experiencing. In an often-quoted passage from "The Work of Art in the Age of Mechanical Reproduction," Benjamin describes the distraction created by film and art: "The ability to master certain tasks in a state of distraction proves that their solution has become a matter of habit...Reception in a state of distraction...finds the film its true means of exercise...The public is an examiner, but an absent minded one" (Illuminations) This still holds true in the age of the internet, where distraction and multi-tasking have become an essential part of how we work and interact. Sometimes when using a computer, it is necessary to have multiple windows open in order to complete a project.

Time is generally spent alone at a computer, even among a group of people in a crowded public place. It is rare that we work on one machine in a group, and we tend to share information between glass screens by sending emails that do not require physical interaction or communication. A group of friends can go to dinner together, and spend the evening on their phones, alone. In an effort to be more connected, the screen also enables us to be less present in

our immediate environments. The internet is a key piece to this puzzle, where most of the rhetoric of loneliness and isolation behind the screen first emerged. Even in 1998, when in its nascent stages, one study showed that the more people used the internet, described as a “social technology,” the lonelier they became (Kraut).

Distraction, a newly minted means of mental interruption Benjamin focused on in *The Arcades Project*, is still enabled by glass, almost inevitably, when the luminous surface draws our attention to what it encloses. Benjamin said that world exhibitions opened “a phantasmagoria which a person enters in order to be distracted.” He continues: “The entertainment industry makes this easier by elevating the person to the level of the commodity. He surrenders to its manipulations while enjoying his alienation from himself and others.” (Exposé of 1935, 7). His language about world exhibitions, first introduced under glass in the form of Crystal Palaces, a rhetoric of distraction and alienation, is the same thing we experience (and understand as consequences of) in computer and cell phone use. Of course, distraction and alienation can come from any number of places, but to call attention to these particular impetuses for distraction, both placed in a history of glass technology, highlights parallels in a lineage of distraction through “commodity glorification.”

With the advent of the twentieth century, glass and its inseparable metaphors only became more pervasive. Glass as an instrument of technology provides ample evidence to support Walter Benjamin’s theory that in constructing the future, we look to the past. Glass can be traced on a surface-level, from the illuminated light bulb to the computer screen; we can only move so far forward while looking back at inventions to build upon. As Lev Manovich explains in *The Language of New Media*, just as Benjamin described in *The Arcades Project* more than half a century prior: “Just as early fifteenth century Italian painters could only conceive of

painting in a very particular way —quite different from, say, sixteenth century Dutch painters — today's digital designers and artists use a small set of action grammars and metaphors out of a much larger set of all possibilities” (81). Benjamin’s idea of the collective wish-image is important in tracing glass through technology, because it is with the poetics of transparency that the metaphors come fully to the forefront. Glass is inseparable from its metaphors, and by extension, so is the computer screen and the way personal interaction with this technology affects conscious and unconscious mental processes.

Tracing the computer screen back to the window has a fragmented historical lineage with poetic and phenomenological weight. The window has always been a space for the imagination, like the computer screen is now, but what makes the window so imaginative and rife for metaphor is its transparency. In constructing an argument about glass, the architecture and the frame is one of the most important aspects of a technical history. While clearly-established metaphors of the window (Microsoft Windows, etc.) are important connections, the overall architecture of the computer and its phenomenology links to windows through the glass screen. Because glass is a component of the screen, it makes sense that the same transparent metaphors would carry over. The idea that there is nothing “behind” the screen is true in literal comparisons to the window, but not in phenomenological ones. In talking about the computer screen, of course we understand that glass is not physically transparent because of the light behind it. Transparency is a cultural metaphor, carried over from the history of glass as a building material, to refer to obvious processes or inner-workings: “In a culture of simulation, when people say that something is transparent, they mean that they can easily see how to make it work. They don’t necessarily mean that they know why it is working in terms of any underlying process” (Turkle

42). For most of us without programming knowledge, computer processes are not fully transparent, and our understanding stops at the screen, mouse and keyboard.

While we are online, we open a new “window” to change our view or to toggle between ideas, articles, stores, emails, and perspectives, among a multitude of other options. The computer, with its glass screen, is a new window that we use to “see” the outside world, a world we can watch from a distance. Glass has continued to play a pivotal role in architecture and technology, and has become an instrument of modernity; glass’ unique properties and ability to transform itself and the world around it have created infinite possibilities for technology. The pervasiveness of its use in architecture and thus its absorption into human consciousness has provided a world so saturated with glass and glass metaphors that it is an integral part of the human experience itself.

The literal “windows” on the desktop screen were first trademarked as such by Microsoft in the 1980s. The computer window was an early component of the graphical user interface that referred not to the full computer screen but rather to an inset screen within the screen of the computer, one of many windows nested in its “desktop.” Anne Friedberg argues that “different from the metaphor of the window as a frame for perspectival view, the metaphor of the window in computer software relies on a different set of assumptions about the viewer and the view that the window provides” (2). Friedberg argues that the computer “window” shifts its metaphoric hold from the singular frame of perspective to the multiplicity of windows within windows, frames within frames, screens within screens. In keeping with poetic and artistic metaphors, she even argues that the modern-day screen has more in common with Cubism than it does with

architecture: "...not all digital space is designed to suggest three dimensions. Instead the vernacular space of the computer screen has much more in common with surfaces of cubism—frontality, suppression of depth, overlapping layers—than with the expended depth of Renaissance perspective" (2). Thinking of the desktop in this way, acknowledges the literal opacity of the computer screen, but fails to acknowledge more tangible aspects of the technology, like the glass screen itself. A screen is of course, opaque, which is where some, like Joanna Drucker, draw the line for comparisons between the computer and the window. Drucker says of the screen: "We do not look 'through' it (in spite of the overwhelming 'windows' metaphor) or past it. The surface of the screen is not merely a portal for access to something that lies beyond or behind this display" (12). Whether or not Drucker is arguing against "windows" metaphors, arguments that connect a computer screen to a window, like Friedberg's, do not suggest that the screen, like the window, is a panel we look through. Friedberg argues that the window in terms of the screen (Microsoft "Windows") has "a deep cultural history as an architectural and figurative trope for the framing of the pictorial image. The notion that we look "through" the screen, has no relevance to the argument because of course we look through a window but into a screen: "The 'windows' trope is emblematic of the collapse of a single viewpoint; it relies on the model of a window that we don't see through, windows that instead over-lap and obscure, and are resizable and movable (Friedberg 229). The windows argument then, has much more to do with history, framing and metaphor. Drucker and Friedberg's arguments help situate the screen within a historical framework among a long line of thresholds that we use to connect ourselves to (and distance us from) the world.

Because the computer screen isn't transparent on its own, does not mean that it can't draw phenomenological comparisons to the window. Like architectural glass metaphors, the

computer screen metaphor is multi-layered and historically connected to the architectural window. When Johanna Drucker argues that with the screen, “we do not look ‘through’ it” (12), this argument only takes the windows metaphor at face value, losing the historical lineage of the windows metaphor and its imaginative value. Drucker’s argument also negates poetics, which some of the most compelling arguments for a window/screen connection incorporate by necessity.

Unlike Armstrong’s “scopic” culture of the 19th century, glass in 20th-century technology has disappeared and become metaphorical, evaporating back into everyday rhetoric of perception and interaction. As Anne Friedberg explains:

Computer operating systems also rely on metaphor, as if we can imagine the future only in the familiar language of the past. Metaphors, of course, are already translators. Metaphors substitute one thing for another, performing an alchemy from a material referent to the immaterial tissue of language. But computer metaphors are not just descriptive figures, aloft in language; they are integral to the conversion of binary bits of information into words and images. (220)

The metaphorical role of glass in the computer screen is somewhat complicated by what is “virtually” behind it. Anne Freidberg attempts to mitigate this by connecting the screen, with its multiple windows and pixelated images, to Cubism: “Perspective may have met its end on the computer desktop...the vernacular space of the computer screen has much more in common with surfaces of cubism—frontality, suppression of depth, overlapping layers—than with the expended depth of Renaissance perspective” (2). This surface comparison here is both apt and imaginative, but Friedberg’s book, completed in 1998, was unable to take on the internet in its current incarnation, which has created a whole new set of metaphors less connected to painting than to the metaphorical notions brought forth by the architectural window. The computer, which

Friedberg takes on as a modern incarnation of the store window, has created a voyeuristic space of the internet behind glass where, like in the store window, ownership is deceptive and separation is inevitable.

The Computer as Mirror

Bodies are constantly reflected in glass, on dark screens, in mirrors, both in public and in private space. The observer sees himself in shop windows, glass doors, mirrored lobbies, hair salons, gyms, and public restrooms, constantly facing a reflection of the body. He gazes in a mirror to do one last check before he leaves the house, making sure that he is presenting what he wants the world to see. Looking in a mirror may also inherently reflect the past (to look in the mirror and see fading youth) or call to mind another's presence (to look in the mirror and to "see" your mother). Where on a surface-level, we just use mirrors as an instrument to see ourselves, they of course bring forth a number of inevitable complex metaphor and signifiers. The mirror cannot escape metaphors of reflection and introspection.

Sherry Turkle's investigations, indebted to Lacan and less historical than psychological, see the computer as more of a mirror than a window. In *The Second Self*, Turkle argues that "computational objects, poised between the world of the animate and the inanimate, are experienced as both part of the self and of the external world" (5) and "the metaphor of the mirror- producing substitutive, deceptive, illusory vision—and the metaphor of the window— producing direct, veridical, unmediated vision—imply very different epistemological consequences" (15). The fact that we are able to construct multiple "selves" behind the sheen of a screen, points to both the idea that we can both conceal a true identity (as one could never

know much about a person just by looking through a window), and have computer programs “reflect” our identities depending on how we construct and tailor various software and internet applications to communicate and satisfy our needs. Our computers can become direct or indirect reflections of ourselves, our interests, and our goals, or what we want to project those things to be: “When we step through the screen into virtual communities, we reconstruct our identities on the other side of the looking glass” (177).

Because the average user does not interact with the computer’s programming, our devices also act as two-way mirrors. While we communicate with the computer on one side, the other side is cooperating covertly with our commands. As it conceals its programming behind the screen, the computer takes on a life of its own. We talk to the computer and it talks to us, but there is always a physical separation, even though the screen has become more metaphorically transparent as technology has developed. When the computer was in its nascent stages, the link to the mirror was more evident. Doug Englebart’s 1968 demonstration, while networked, was more of a reflection of the self than it was an interaction. He demonstrated a space to make grocery lists and to solve problems; a digital version of the calculator and a paper notebook. The development of the internet brought about multitude of new ways to interact with the screen. By connecting us to the world beyond the immediate screen and computer programming, the internet creates a window in the otherwise mirror-like computer. While we see ourselves and our habits reflected back in the computer, the internet allows us to connect with what is on the other side through the screenic interface (the glass panel).

The Web Camera

“Webcams offer a window to your home.” – Wilson

The idea that the web camera can turn a computer into a window is almost metaphorically indisputable, but it is the *type* of window this camera creates that speaks to how technology and privacy have evolved. The laptop is the same square shape as the window, and adding a camera creates a window between inside (behind the screen) and outside. But unless a network is hacked, an observer can only look in or out with permission from the other side. Cell phones are increasingly used for the same purpose: we allow others to look in on our private lives. Metaphorically speaking, the webcam does not turn the computer into an open window because in order to do so, both sides would have to be able to see in. Rather, the webcam turns the computer into a window with the curtain closed, providing various ways in which the curtain can be lifted from either side.

Bolter and Grusin describe web cameras as “deeply revealing of the nature of the web as a remediator” because they “take up the monitoring factor of television and video” (204). By looking to the past in order to construct the future, the web camera calls back to photography and cinema. Even in the remediation of the name “web camera” from photography, similar to “notebook” from writing (in reference to a laptop), or “e-book” from the paper book, naming is an easy way to see old conventions and references to the past, or remediation in action. Writing in 1999, Bolter and Grusin also suggest that the web may “radically remediate its predecessors while failing to acknowledge them at all” (204). Taking a look at this statement from the web in 2015, it still seems like the internet hasn’t radically remediated its predecessors. Everything online, especially video-related, seems to be changing and remediating less so than functions are

perfecting and transforming. Now that the internet has become more robust than it was in 1999, or at least is more prolific and available than it was, images, videos and communication are becoming shorter more to the point. Videos are shorter and repetitive (Vine, Instagram, animated gifs). The internet is adapting to our need to do more things faster and all at the same time.

At the time *Remediation* was written, streaming video of nature scenes and everyday life had become a popular means of entertainment. Nature cameras especially, are used to “put the viewer in touch with the exotic or remote, a function performed by photography and film in the last hundred years” (Bolter and Grusin 205). The language used here to describe the function of online nature videos also calls back to the greenhouse, where nature was first enclosed behind glass panels, or to the Arcades, where one could stroll under glass despite the weather. Consider this excerpt Benjamin selected for the Arcades Project from Eduard Devrient’s *Briefe au Paris*: “Rain showers annoy me, so I gave one the slip in an arcade. There are a great many of these glass-covered walkways, which often cross through the blocks of buildings and make several branchings, thus affording welcome shortcuts...in bad weather or after dark, when they are lit up bright as day, they offer promenades...” [A3a, 4]. Glass has always kept us at a distance from the natural world, but we are still able to enjoy it while managing other tasks. Distraction again comes into play.

We still have shopping malls, but they are slowly going out of style and being replaced by online stores and e-commerce platforms. Where shopping was once conducted beneath a glass ceiling and behind glass windows, it is now conducted in one “window” on the computer screen while working in another, or behind the glass screen of a cell phone or tablet while scrolling through images. Streaming video also allows the viewer to avoid “rain showers,” or to avoid being outside altogether, but to still be somewhat connected to the outdoors. Of course, the

purpose of streaming video like this, much like the purpose of TV and similar to the original intention of the Arcades, is for entertainment. Seeing where the development of online video has gone in 2015 (short clips and “Vines,” Netflix “streaming,” etc.) the purpose is still moving towards entertainment and away from reality. But where screens are disappearing, a space is developing that is even more transparent: virtual reality.

Earthcam.com is one site that highlights multiple public spaces across the world, making a window of the screen to a place that wouldn't normally be available to the viewer without a visit to the physical location. Sites like these were more popular in the late 1990s and early 2000s, with cameras connected to the internet that pointed outwards, allowing the world to see in. In 2015, the “web camera” and streaming live feeds that offer a glimpse into quotidian life are less of a fascination than web cameras for personal communication (face time, Skype), short clips, and even photography itself. Websites are increasingly image-based, rather than text-based, and marketing efforts focus on the image to increase revenue, for example, because images are literally more visible than text. Even text messages on cell phones are becoming increasingly image-driven, with the latest IOS updates for Apple including the emoji keyboard to share image-based messages.

Though streaming live-video feeds are somewhat outdated (but still in use) in 2015, but the camera itself has not disappeared, and still connects us to (and disconnects us from) what lies on the other side of the screen. Because even though the observer can see the surf, an exotic landscape, or people going about their daily lives in cities around the world, these virtual transmissions cannot act as substitutes for the real thing. It's like looking through a glass window with no door in the room. The phenomenon is similar to the fascination with celebrities or the obsession with watching friends and acquaintances on Facebook: without first-hand insight from

personal physical interaction and context there is no way to really comprehend a personal experience. On Instagram, a platform that allows users to “follow” celebrities and receive updates from their daily lives, their families, what movie they are shooting next, comments and messages can be sent from followers with no personal connection to the person. The new voyeurism allows observers to have a front row seat to things that are usually so intimate (engagements, anniversaries, birthdays, births, diet plans, illnesses and deaths), that these apps and websites, more so than even reality television, make the observer feel as though they are part of these intimate experiences too. We have been given permission to have a direct glimpse into these experiences (normally a privilege for close friends and family) and we accept the offer whole-heartedly.

Most laptops now come equipped with a camera built into the screen, pointed in towards the user. Built into a laptop, this camera creates a window into a private world, allowing the outside to look in while the inside looks out, just like a glass window where both sides are able to move the curtain. To look out through a webcam, observers have to ask permission through any of various channels, including other people.

Any camera that is connected to a Wi-Fi network (an IP camera) can also provide a window into a private space. These cameras provide live video and audio feeds that can be accessed remotely by using a web browser and logging in to a network. However, the observer doesn't always have control over who is looking in. Some built-in computer cameras can be hacked through malware, which enables someone to watch through a laptop's glass camera lens almost uninhibited. The camera on a computer can turn into a curtain-less window without the owner knowing. There are even covers available that cover up the camera's lens on a computer, tiny curtains to keep the outside world from accessing interior space, virtually unhindered.

Psychotherapy conducted through video chat sessions is one way to see the relationship between communication and the screen, and how the physical screen (and glass) may play a role in simultaneous distance and closeness. Psychotherapist Joseph Burgo details the experience of a psychotherapy session over Skype: “the visual contact made possible by Skype video is necessary for work with new clients and allows us to get a “feel” for one another.” With the glass screen as a barrier between the client and the therapist, a number of factors must be working in order to properly help and diagnose each patient, including the reading of facial expressions, a basic component of human interaction. Imbued with poetics of distance and closeness through glass, Burgo begins the article:

“At 8 o’clock on the dot, I initiate the Skype video call. I can see my client’s face clearly, though the picture is a bit dark. He lives in a shared flat, he tells me, and doesn’t want to disturb his flatmates so late at night, so he is speaking to me from his parked car via iPad. A nearby streetlamp spills light through the windshield, enough to let me read his facial expressions...We connect.”

This word “connect,” so frequently used in the rhetoric of internet mechanics and online interactions, is multi-layered in every sense of its modern-day usage. Oxford defines the word as bringing “together into contact, so that a real or notational link is established.” The definition leaves ample room for metaphor, like many other words frequently used about the computer. To “bring together into contact,” online, does not mean that these two things will physically touch, similar to connecting two voices on the telephone, or bringing two objects or bodies into contact through a window. Through the glass screen, there is no way to physically “connect” which implies some kind of interlocking or touch, like pushing a plug into a wall socket. What makes the camera different from the telephone or email is the visual component, which creates the same kind of false closeness that transparency does. Even if a computer user touches the screen with a finger, there is no physical contact with the person or the object on the other side, in very much

the same way that the observer does not interact with objects behind a 19th-century (or present-day) store window.

In a therapy session, the therapist will rarely “touch” a client, but there is something to be said for physical presence and closeness that is lost through the glass during a Skype session. There are no handshakes or welcoming rituals, body language is hidden from the shoulders down, and there can even be a loss of context—the client (and the therapist) is better able to control how they present themselves. While the therapist can read facial expressions, he will not be able to see other body movements and motions, often essential to communication; the window of the computer is too small of a frame.

Therapist Jan Hoffman details the experience of therapists visiting with patients online in 2011, when the practice was still somewhat nascent. She explains some of the setbacks that are still viable issues in 2015 Skype video sessions: “Patient and therapist typically look at each other’s faces on a computer screen. But in many setups, the camera is perched atop a monitor. Their gazes are then off-kilter.” In a Skype session both sides must actively look into the monitor, and not at the reflection in the bottom corner, in order to maintain direct eye contact with the image of the person behind the screen. Both parties also have to prepare for the event that “connection” is literally lost, if the internet dies, at critical emotional junctures. Online, through the glass screen, it is possible to remain somewhat anonymous in ways that are not possible when you visit a therapist in person. It is possible to hide things like alcoholism, to hide where you are talking from, to hide bodily inflections and tics that might speak volumes to a therapist. The frame of the window, similar to the frame of the computer or the video screen, displays only what you want it to display.

A video conference with someone across a screen tricks the viewer into thinking they *do* see through this glass panel in our laptops or cell phones, and that they are indeed close to the person across the screen. The introduction of sight, versus simply hearing someone's voice on the phone, creates a false sense of closeness to the person on the other side. Very much like two people standing on opposite sides of the glass, being able to see each other, but not able to touch. Very much like someone passing by a shop window, seeing the object behind glass, but not being able to possess what's on the other side unless you step through the door.

Beginning romantic relationships online is yet another aspect of virtual life that connects the metaphors of glass windows to the experience of life behind the screen. In reference to a college student who had a relationship that was completely online, on the screen (and not physically present), Sherry Turkle suggests, "Relationships during adolescence are usually bounded by a mutual understanding that they involve limited commitment. Virtual space is well suited to such relationships; its natural limitations keep things within bounds" (206). When Turkle investigated the idea of meeting virtual strangers online, after Facebook began in 2004, it became less socially acceptable to not know who was behind the screen without meeting them first. Another writer explains: "Now that distrust of online strangers is embedded in the code of our most popular social network, it is becoming increasingly unlikely for people to interact with anyone online they don't already know" (Chen). Today, we are warned of con artists who create attractive online personae who, as Chen describes, wish to "to satisfy some sociopathic emotional need." The term that developed for this, "catfishing," or "catfish," is so widely used that if you Google it, the first few pages of results are about MTV's reality show about virtual deception and not the fish. Can you ever really know someone behind the screen without meeting them first? Can you every really know someone sitting behind the frame of a window? Life

behind a screen makes it very easy to present oneself and something other than one truly is: “In the real-time communities of cyberspace, we are dwellers on the threshold between the real and the virtual, unsure of our footing, inventing ourselves as we go along” (Turkle, 10).

Through the glass screen we have the ability to construct multiple “selves,” fracturing the unified body and mind we operate in our physical lives. In this sense, the computer recalls a multi-paneled opaque window, through which we project various parts of ourselves through to the other side without complete transparency. This is certainly the case in social media applications like Facebook or Instagram, because even when we do know the people on the other side of the screen in our waking lives, just like in the store window, we are all choosing what image we want to put on display.

Google Glass and the Future of the Screen

Our experience with a computer is embodied (using our hands to move a mouse, typing on computer keys with our fingers), but increasingly, glass in computer technology is becoming tactile: we use our fingers to touch the screen and manipulate what lies behind it, without seeing the code. What does this increasingly embodied connection to technology mean for our experiences with technology? The introduction of Google Glass links the machine closer to the body while still creating distance: “Our physically embodied and subjectively disembodied relation to the screen changes as we engage with the distant, large cinema screen with projected images; the closer and light-emanating television screen; and even closer computer screen, one that we put our faces very close to, often touch, one that sits on our laps and in our beds. Camera phones, BlackBerries, and other ‘mobile screenic devices’ add mobility to the screen’s face”

(Turkle, 7). Our hands move a mouse to point and click, and increasingly, we use our fingers to touch the screen. Our bodies determine how we interact with the physical object, and computers connect our bodies to the rest of the world, while the glass screen distances us from it. Thus, glass has made a significant contribution towards an embodied phenomenology of technology. Our experience with glass is multifaceted and metaphorical by default, helping us make sense of how we experience the world so relentlessly through this material and how it affects conscious processes.

In *Reading Writing Interfaces*, Lori Emerson explains the problem of technological mediation, drawing on Alexander Galloway's articulation of the interface as the point of transition between different "mediatic" layers within a nested system "as a way to highlight the fact that while the interface does grant access, it also inevitably acts as a kind of magician's cape, continually revealing (mediatic layers, bits of information, etc.) through concealing and concealing as it reveals" (Galloway 13). Without saying it directly, Emerson articulates a pivotal idea in the historical lineage of glass as a technological instrument: "In reality, the glossy surface of the interface further alienates the user from having access to the underlying workings of the device." Not only do we not have access to the underlying mechanics, we do not have physical access to the people and objects behind the screen. Transferring words and images to the computer screen, sorting through pictures of loved ones, a family member across the country for instance, feels as though they are close and far at the same time. While they can interact with who or what is behind the screen, the nature of the interface creates physical separation.

Google Glass, is one step forward in virtually (nearly) removing these "mediatic" layers. Introduced to the market in its development stages, Glass was pulled from an open beta testing, also known as the "Glass Explorer" program, on January 15, 2014. This wearable device, more

transparent literally and aesthetically than a computer or cell phone, is still being tested behind closed doors by developers, and as of April 2015, there are multiple job openings on the Google jobs website calling for development team members. Google Glass (henceforth, “Glass”), was the beginning of the next reinventions of the glass screen: a fusion of the body and technology and elimination of glass altogether. The screen is becoming so transparent that it doesn’t even exist. Innovega, a company that develops wearable technology, is developing contact lenses with a tiny bump that serves as a microscope for content that can be streamed from the inside of a pair of glasses (Metz). This invention nearly eliminates any kind of screen altogether, while still augmenting reality.

Google Glass removes one more (glass) layer between the user and the outside world. The device allows a Glass-wearer to record and take photos covertly, despite the obvious presence of the device sitting across the user’s nose. Some models have actual lenses, and some only have a frame, projecting data and cues over the right eye. The device projects small windows over a frame of vision just like the windows in a computer screen: a song that’s playing listening to, driving directions, a recipe, what’s on the calendar. Google Glass fuses the body to the technology, placing a thin layer in between the user’s eyes and the rest of the world, or even no layer at all. Theoretically, if someone is wearing Google Glass and allows others to see from “their eyes,” an observer could watch and record what the Glass-wearer is doing all day from the comfort of their laptop or cell phone. The body becomes the screened surface.

Many accounts that describe the experience of the world through Glass speak even more tangibly to separation and alienation than rhetoric about the web camera and the internet. In a review of the problems facing Glass in its development, one user writes that many people objected to Explorers wearing Glass in public because the “built-in camera was viewed as a

potential breach of their privacy” (Kalinauckas). In another review after a year-long trial, one Explorer writes: “It’s rare that I encounter someone in public who asks about the hardware I’m wearing and doesn’t immediately follow their initial inquiry with some variant of ‘Are you recording everything right now?’” (Holly). From an outsiders’ perspective, wearing Glass is almost like standing outside a window where someone has forgotten to close the curtains. Speaking to the device’s failings, another user writes: “Glass annoyed other people largely because of its lack of utility: no one could understand why you’d want to have that thing on your face, in the way of normal social interaction.” The device, while connecting to the world through the frame over the user’s line of vision (providing driving directions en-route, or calling friends and family through voice commands), also separates the user from his or her present surroundings. While Explorers were told by Google to ask permission before filming or talking any pictures with the device, an unease still set in among people who felt like they were being watched and weren’t able to partake (Kalinauckas). Glass (the material) is again working to separate the inside from the outside, alienating those who do not have access. It is still a physical barrier and metaphorical barrier.

Despite this obvious separation, one Explorer describes that once the observed took the user’s place, what was once seen as a troublesome separation turned to excitement with the experience of an augmented reality: “I have never had a single person not impressed with what was on the other side of the display” (Holly). The choice of language here still enforces a separation, and the experience will always be one-sided. The user must share the physical device with the person they are observing in order to share the experience. When the observed can see through the user’s eyes, turning themselves into the voyeur, only then do they understand the magnitude of augmented reality through Google Glass.

But while some feel separated, others feel more connected: “If I had to pick what Glass helped me do the most, it would be that it helped me to connect. The social aspect of Glass, whether it be via the Hangouts, Glassware, the Livestreams, the communities—these are the things that drove me to connecting” (Swinder). But while this user felt connected, he only felt connected to those who were also plugged in to his own augmented reality on the other side of the lens. The physical device acts simultaneously as a window closed and a window open to the world outside.

It seems as if we are moving towards a world (however slowly) where everything is virtual, and the glass screen disappears entirely. There are some devices in development, like Innovega’s contact lenses or the Cicret Bracelet or that eliminate glass entirely. The Cicret bracelet, still in development, projects a virtual screen onto your forearm, almost eliminating the need for hardware and a physical screen, aside from the band around your wrist. One article even describes the ability of the bracelet to “turn your skin into a touch screen” (Arce). The body and technology are becoming enmeshed, however slowly, into a virtual reality that eliminates the need for glass. As Turkle suggests:

As human beings become increasingly intertwined with the technology and with each other via the technology, old distinctions between what is specifically human and specifically technological becomes more complex. Are we living life on the screen or life in the screen? Our new technologically enmeshed relationships oblige us to ask to what extent we ourselves have become cyborgs, transgressive mixtures of biology, technology, and code. The traditional distance between people and machines has become harder to maintain. (Turkle, 21)

Glass is one of the last materials in technology that is enforcing a separation between the body and technology. As the glass is slowly drawn back or eliminated, will this separation also

be lifted? As Isobel Armstrong says as she concludes her exploration of glass in the Victorian era: “The decisive shift from lens to screen (behind which there is nothing), from trace-filled transparency to the traceless presence of sheer glass, from material made by breath or cut by hand to a computer-controlled material floated on metal or gas, has generated another set of questions” (361). Every incarnation of new technology will generate new sets of questions, but if Google Glass and screen-on-skin technology is any indication, it is likely the glass screen will disappear, and we will all be standing behind our own glass windows, still separate but connected.

The New Voyeurism

“Is there a new logic to vision as our windows, frames, screens are ever more fractured and virtually multiplied? Which technologies will break through the frame and have us climb through the virtual window? And which will have us stay fixed-nose to the glass- in front of the windows, caught in the hold of an image, framed in display?” (Friedberg 242).

Metaphors found in glass’ transparency, exacerbated by inventions like the internet and Google Glass, help define our interactions with technology and the implications for its use. Staring into a computer screen, or opening multiple windows of an internet browser, the user can only interact with the world from a distance. The glass of the computer screen, like the glass window, creates a physical barrier, but the internet creates the same tension in Baudelaire and the new (now, old) voyeurism of the 19th-century window: we can see but we cannot touch. We can see the world on the other side and yet we are still isolated. As Sherry Turkle suggests, “We are

social beings who seek communication with each other. We are lonely beings as well. Despite our fear of having our essential humanity reduced through comparison with a machine, we begin to relate to the computer whenever it appears to offer some company” (19). Glass, via the computer, offers both connection to and alienation from the world on the other side of the threshold. The transparent threshold also complicates notions of privacy and ownership.

In a *New York Times* op-ed about suggestions to put body-mounted cameras on police officers in response to the spate of recent violence towards alleged criminals, David Brooks contemplates the potential of this practice to cause severe damage to privacy. He argues that privacy is important to the development of individuality because an interior space must exist within a person in order to define the exterior space: “All these concentric circles of privacy depend on some level of shrouding. They depend on some level of secrecy and awareness of the distinction between the inner privileged space and the outer exposed space. They depend on the understanding that what happens between us stays between us” (Brooks). As glass technology has developed, notions of privacy have changed dramatically in many ways, causing confusion about ideas of what is private and what is publically available. Photographer Arne Svenson, mentioned earlier, is another example that illustrates this confusion. As the physical separation of glass disappears, notions of privacy will probably become more complex.

Behind our computers screens we are on the outside, looking in, but we are also on the inside looking out. Through various glass panels we are alone and separate but more connected than ever. According to Turkle, the psychological implications of the glass panel in the screen can be both alienating and connecting. If the computer is a mirror, the internet has inserted a window: “We are learning to live in a virtual world. We may find ourselves alone as we navigate virtual oceans, unravel virtual mysteries, and engineer virtual skyscrapers. But increasingly,

when we step through the looking glass, other people are there as well” (9). The other people are “virtually” there, transmitted through code and pixels, but some websites and mobile applications (dating sites, as one example) are working to correct this separation by facilitating a physical connection to people on the other side of the glass panel.

In the new voyeurism of modern technology, always looking out from the inside, we are generally able to choose what we want to put on display with almost infinite freedom to choose what we want to see: “Computer screens are the new location for our fantasies, both erotic and intellectual. We are using life on computer screens to become comfortable with new ways of thinking about evolution, relationships, sexuality, politics and identity” (Turkle 26). In the 20th century, just like in the 19th, we are still looking through the glass into private lives from exterior and interior spaces. With some space between us and the world at large, new avenues and methods of communication open through the threshold. To change our view, it is possible to open or close the curtain from the inside as well as from the outside. We can also simply open another window.

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