only a narrow margin of difference, or a sliver of similarity. In the last chapter of *Flesh of My Flesh*, I suggested that there is something inherently photographic about analogies in which there is only a little difference.[47] The analogies that link one print of a negative to all of the other prints of the same negative turn on variations so slight that we have a hard time seeing them, and we sometimes find it difficult to distinguish a photograph from its referent, even though we know very well that they belong to different registers.

I explore this kind of analogy here as well, and explain why some photographs—like the famous "Winter Garden" portrait of Barthes's mother in *Camera Lucida*—seem ontologically connected to their referents. But I also address analogies in which there is an overwhelming amount of difference, which is bridged through reversible reversals, or what Maurice Merleau-Ponty calls "chiasmus." This, too, is a quintessentially photographic kind of analogy. Photography models it for us through the inversion and lateral reversal of the camera obscura's image stream, the positive print's reversal of the reversal through which its negative was made, the two-way street leading from the space of the viewer to that of the stereoscopic image, cinema's shot/reverse shot formation, and the cross-temporal practices of some contemporary artists. I say "model" because we, too, are bound to each other through reversible reversals, and because it is there, and only there, that the promise of social happiness can still be glimpsed.

Not only is the photographic image an analogy, rather than a representation or an index, but analogy is also the fluid in which it develops. This process does not begin when we decide that it should, or end when we command it to. Photography develops, rather, *with us*, and *in response to us*. It assumes historically legible forms, and when we divest them of their saving power, generally by imputing them to ourselves, it goes elsewhere. The earliest of these forms was the pinhole camera, which was more "found" than invented. It morphed into the optical camera obscura, was reborn as chemical photography, migrated into literature and painting, and lives on in a digital form. It will not end until we do.

Chapter 1

THE SECOND COMING

IT IS AS IMPOSSIBLE to know when photography began as it is to know when our first ancestors opened their eyes, but if we were able to locate one of these events, we would not have to search long for the other. The two photographic processes that were unveiled in 1839 by Louis-Jacques-Mandé Daguerre and William Henry Fox Talbot built on a number of earlier chemical experiments and discoveries, even the most cursory survey of which would include Angelo Sala's 1614 discovery that a nitrate of silver darkens when exposed to sun, Heinrich Schulze's 1724 realization that this darkening can be used to make an image, Thomas Wedgwood's late-eighteenth-century attempts to do just that, and John Herschel's 1819 discovery that hyposulphites can dissolve the unreduced salts of silver, which led to the invention of "hypo," a photographic fixer. Pride of place, though, would be given to Joseph Nicéphore Niépce, whose chemical experiments resulted in the first photographic image.[1]

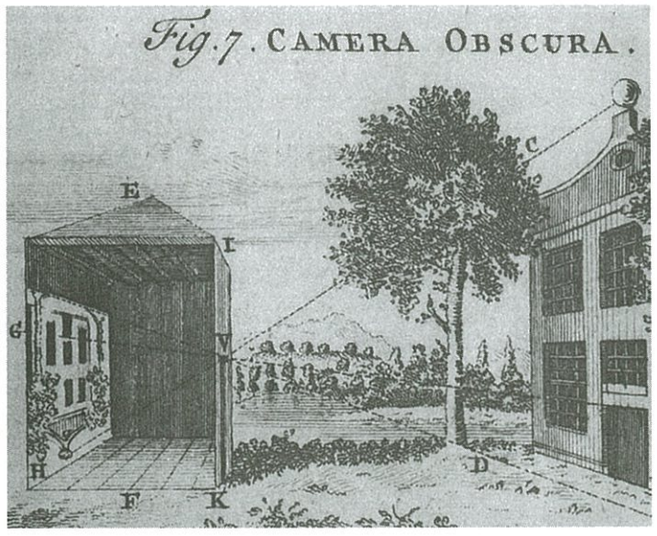

Figure 5. Thomas Jeffreys, Illustration from *A New and Complete Dictionary of the Arts and Sciences*, 1754.

Daguerre and Talbot also relied on a much older optical device: the camera obscura.[2] The classical camera obscura—the one that was the norm from the thirteenth to the seventeenth centuries—was a darkened chamber with a small aperture through which light entered, bearing a reversed and inverted stream of images that both originated in the external world and analogized it. This continuous flow of mobile and evanescent images existed only in the "now" in which it appeared, and since the viewer had to enter the camera obscura in order to see it, the two were spatially as well as temporally *co-present*.

This device formalized optical principles that had been accidentally discovered centuries earlier and that are as old as light itself. In the fifth century B.C., the Chinese philosopher Mo Ti noted the "image-making properties" of a small aperture.[3] A century later, Aristotle was struck by the many crescent-shaped images of the sun that appeared on the ground beneath a tree during an eclipse of the sun, and attributed them to the small spaces between the leaves.[4] In the eleventh century, the Arab scholar Alhazen discovered the same principles while investigating the formation of images in a darkened room, and he viewed the sun during an eclipse from a similar place. He described the latter experience in the following way: "If the image of the sun at the time of an eclipse—provided it is not a total one—passes through a small round hole onto a plane surface, opposite, it will be crescent-shaped . . . If the hole is very large, the crescent shape of the image disappears altogether and the light [on the wall] becomes round if the hole is round . . . with any shaped opening you like, the image always takes the same shape . . . provided the hole is large and the receiving surface parallel to it."[5]

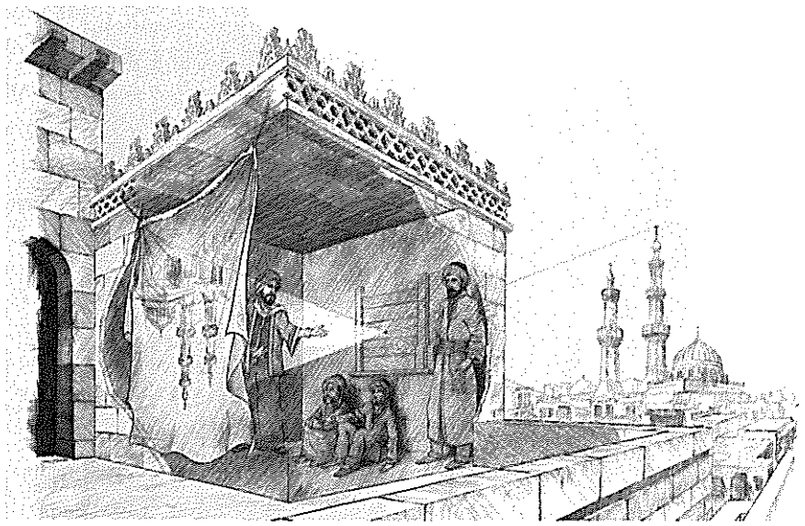

Figure 6. Alhazan and his camera obscura in Cairo, Egypt, in the eleventh century. Courtesy of Ali Amro. © Muslim Heritage, Ltd.

"Receiving surface" sounds odd to a contemporary ear, since it suggests that the optical device that figured so prominently in the early years of chemical photography was *receptive*, rather than *productive*, but Alhazen is not the only early commentator who speaks in these terms; receptivity is a recurrent trope in pre-1700 accounts of the camera obscura. "When at the time of an eclipse of the sun, its rays are *received* in a dark place," John Peckham observes in *Perspectiva communis* (1279), "through a hole of any shape, it is possible to see the crescent-shape getting smaller as the moon covers the sun."[6] "When the images of illuminated objects pass through a small round hole into a very dark room [and] you *receive* them on a piece of white paper placed vertically in the room at some distance from the aperture," Leonardo da Vinci writes in Manuscript D, "you will see all those objects in their natural shapes and colors."[7] "If you have a piece of white paper or other material upon which [the images] of everything passing through the aperture may be *received*, you will see everything on the earth and in the sky with their colors and forms," Cesare Cesariano remarks in a note in his 1521 translation of Vitruvius's *Treatise on Architecture*.[8] "The visible radiations [of] all [of] the objects without are intromitted, falling upon a paper, which is accommodated to *receive* them," Sir Henry Wotton writes in his famous 1620 letter to Francis Bacon about Johannes Kepler's tent camera obscura.[9]

Since the viewer had to enter the classical camera obscura in order to see its images, he was also a receiver.[10] This would have been hard to ignore, because the device had no focusing mechanism. The only way the viewer could render its often hard-to-see images more legible was to move around the sheet of paper on which they were received until he found the point at which they came into focus—i.e., to participate in the reception process. Daniele Barbaro describes this practice in his 1568 book, *La Pratica della perspettiva*. "If you take a sheet of paper and place it in front of the lens," he writes there, "you will see clearly on the paper all that goes on outside the house. This you will see most distinctly at a certain distance, which you will find by moving the paper nearer to or farther away from the lens, until you have found the proper position."[11]

For centuries, the camera obscura was primarily used to watch solar eclipses, and it was put to this purpose because the human eye cannot tolerate the amount of light that floods into it when it looks directly at the sun.[12] It consequently testified to the external source not only of the images that appeared on the screen, but also of those perceived by the human eye. So long as Christianity and Platonism were the dominant forces within Western thought, the notion that light enters the human eye from outside was unproblematic; illumination was, after all, a privileged signifier for both God and the demiurge.

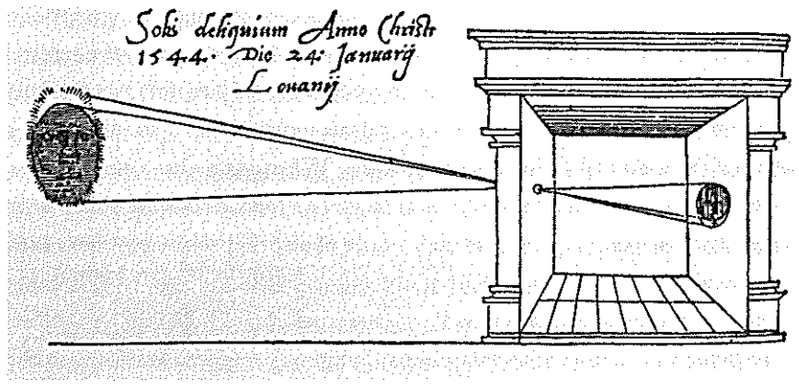

Figure 7. Illustration from Gemma Frisius, *De radio astronomico et geometrico liber*, 1554. Courtesy of the National Media Museum/SSPL.

Since both systems of thought emphasize how blinding this divine light can be, the fact that a solar eclipse could be safely viewed only from the refuge of a camera obscura was also neither noteworthy nor particularly disturbing. And since the images that appeared within the device issued from a higher agency, they could be presumed to be a reliable source of information about what was happening in the external world.

However, in 1490 Leonardo noted that the human eye also resembles a camera obscura—that rays of light enter its dark "chamber" through a "small aperture," just as they do in the latter device, and that they also bear an inverted and laterally reversed stream of images.[13] Because he was a largely secular thinker, he realized that both image streams originate in and refer back to a terrestrial source.[14] He was also alive to their aesthetic properties. Leonardo likened the camera obscura's images to "paintings,"[15] and searched for other unauthored art works in the external world. "Cast your glance on any walls dirty with such stains or walls made up of rock formations of different types," he advises his fellow artists in *Ashburnham I*, "If you have to invent some scenes, you will be able to discover them there in diverse forms, in diverse landscapes, adorned with mountains, rivers, rocks, trees, extensive plains, valleys, and hills."[16]

I say "unauthored works of art" because Leonardo did not view image making as a strictly human activity. He believed that there is an aesthetic capacity in all worldly things that allows them to generate images of themselves. "Every body fills the surrounding air with infinite images of itself," Leonardo writes in one notebook entry. "All bodies together, and each by itself, give off to the surrounding air an infinite number of images . . . each conveying the nature, color and form of the body which produces it," he observes in another.[17] This activity is self-presentational, and our look is its "lodestone." Bodies give themselves

to be seen by us by sending us analogies or "portraits" of themselves. Leonardo was also interested in a different kind of human art making—one that would begin with the acceptance of this gift. "The mind of the painter must resemble a mirror, which always takes on the color of the object it reflects and is completely occupied by the images of as many objects as there are in front of it," he observes elsewhere in *Ashburnham I*.[18]

Ancient scholars had two conflicting theories of vision. For some, as James S. Ackerman explains, "the eye was passive and simply received emanations from the outer world," but for others it was "active and cast out rays or a spirit to touch the seen object."[19] When Leonardo urges painters to let their minds be "filled by as many images as there are objects before it," he might seem to be drawing on the first of these theories. In fact, though, he is only describing the initial stage in a complex process—one that is as much about giving as receiving. This process begins when the world conveys a visual analogy of itself to the human eye. The viewer receives this gift by relating it to similar things within his own memory reserve. Leonardo's artist goes one step further: he generates an external analogy for the one created through the "marriage" of the world's visual analogy with the viewer's mental analogy. This opens the analogical network to other viewers.

Paul Valéry provides an excellent description of this process in "Introduction to the Method of Leonardo." "At first the process [of receiving something] is undergone passively, almost unconsciously," he writes, "as a vessel lets itself be filled: there is a feeling of slow and pleasurable circulation. Later . . . one assigns new values to things that had seemed closed and irreducible, one adds to them, takes more pleasure in particular features, finds expression for these; and what happens is like the restitution of an energy that our senses had received. Soon the energy will alter the environment in its turn, employing to this end the conscious thought of a person."[20] Daniel Arasse also talks about the unusual dynamism and reciprocity of Leonardo's analogies, and says that the result is an "unfinished universality"—one oriented to the future.[21]

Leonardo isn't the only early-modern viewer of the camera obscura who compares it to the human eye. Johannes Kepler also likens the inverted and laterally reversed images that enter this organ to those that enter the camera obscura, and he pushes the comparison a step further: he characterizes the retina as the ocular equivalent of the camera obscura's "receiving screen." "Vision . . . occurs through a picture of the visible object at the white of the retina and the concave wall," he writes in his 1604 book, *Ad Vitellionem paralipomena*, "and those things that are on the right outside, are depicted on the left side of the wall, the left at the right, the top at the bottom, the bottom at the top."[22]

Kepler calls this reversed and inverted "picture" the "retinal image," and refuses to posit a higher visual faculty that would rectify its "deformations." "Vision occurs when the image of the whole hemisphere of the world that is before the eye . . . is set up at the white wall, tinged with red, of the concave surface of the retina," he declares in another passage in *Ad Vitellionem paralipomena*. "How this image or picture is joined together with the visual spirits that reside in the retina and the nerve, and whether it is arraigned within by the spirits . . . to the tribunal of the soul or of the visual faculty . . . I leave to the natural philosophers. For the arsenal of the optical writers does not extend beyond this opaque wall."[23] Kepler thus refuses to argue that the blindness of the seeing eye can be overcome through the clarity of mental representation.

Like Leonardo, Kepler is also obsessed with analogies, or what he calls "correspondences," and he sees the camera obscura as the agency of their disclosure. His analogies, though, are divinely authored, and they operate synchronically rather than diachronically—as elements within a vast and already fully articulated system—a finished rather than an unfinished universality.[24] He also gives his retinal discovery a stabilizing name; it is an "image," rather than a "flow of images." Finally, he conducted his cosmological observations with a camera obscura whose inversions and reversals were "corrected" through two convex lenses.[25]

René Descartes seemingly picks up where Kepler leaves off in Discourse 5 of the *Optics*. He urges those who do not believe that the inverted and reversed images of the external world appear on the surface of the retina to peel away the back layers of the eye of a dead person or animal, insert it into the aperture of a camera obscura, facing outward, enter the camera obscura, and look at the retina from the other side. They will then perceive images just like those that appear on the camera obscura's receiving surface.[26] But as we can see from the accompanying diagram, the experiment described by Descartes is calculated to *disprove* rather than to *prove* Kepler's claim. By placing a lifeless eye in the aperture of the camera obscura, Descartes renders the retinal image both visible and mechanical, and by positioning the viewer in front of this image, he transforms the latter from a blind receiver of external images into a knowledgeable observer of what he sees. A few pages earlier, he flatly declares that "it is the mind which senses, not the body."[27] As Maurice Merleau-Ponty observes in "Eye and Mind," Descartes's *Optics* is "the breviary of a thought that wants no longer to abide in the visible and so decides to construct the visible according to a model-in-thought."[28]

This is hardly surprising. Certainty was the defining attribute of the subject Descartes aspired to be, and there was only one foundation on which he was willing to base his beliefs: himself. The retinal image discredited this "self," since it showed that the images that our eyes receive do not correlate in a one-to-one way with the objects from which they derive. There is also a disconnect between the retinal image and what we "see," which means that there must be an agency within us that reverses its reversal and inverts its inversion before we perceive it. Shutting one's eyes and closing one's ears might block out the external world, but it offers no protection against this internal "other."

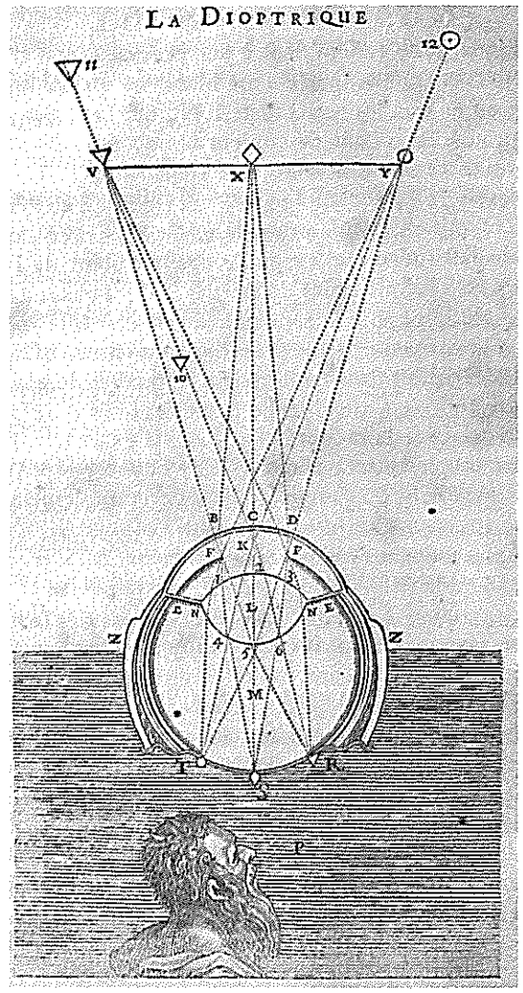

Figure 8. Illustration from René Descartes, *Discours de la Méthode*, 1637. Courtesy of the Fisher Rare Books Library, University of Toronto.

Descartes is clearly haunted by this thought, because he spends as much time in the *Meditations* and *The Discourse on Method* worrying about whether he is deceiving himself as he does worrying about whether others are deceiving him. He tries to banish it by transforming the device that Kepler compares to the human eye into a signifier for a new kind of interiority—one befitting a sovereign subject. The heated room to which he retreats in his search for truth is like the isolated space of a camera obscura, the darkness into which he is plunged when he closes his eyes like the darkness of that enclosure, and the mental representations that he places before his inner eye like the images that pass before the eyes of its viewer. Unlike the images in the physical camera obscura, or the mind described by Leonardo, though, those that appear within Descartes's mental camera obscura are stable, and he is both their producer and their viewer.

John Locke also invokes the camera obscura when describing *his* version of the modern subject. Since he believed that "external and internal sensations" were the "only windows" through which the light of understanding could

enter into the "dark room" of the mind, he could not simply dispense with the outer eye, as Descartes had done, so he transformed the analogy between the physical device and its mental counterpart into a contrasting set. Like the camera obscura, the mind is a chamber into which images come, Locke argues, but what happens thereafter is very different. In the former, images enter and leave in a disorderly fashion, because perception reigns supreme. In the latter, though, what arrives is conceptually organized, and remains where it has been put, because understanding governs perception. "The *understanding* is not much unlike a closet wholly shut from light, with only some little opening left . . . to let in external visible resemblances, or ideas of things without," Locke writes in *An Essay Concerning Human Understanding*, "would the pictures coming into such a dark room but stay there, and lie so orderly as to be found upon occasion, it would very much resemble the understanding of a man."[29] The "orderliness" described by Locke could be secured only by immobilizing the external world, and suspending the associative faculty through which we respond to its images.

Gottfried Leibnitz quotes this last passage in chapter 11 of *New Essays on Human Understanding*, but he disputes every one of its assumptions.[30] Kepler's discovery cannot be neutralized by privileging the mind over vision, he argues in the following paragraph, because they are both part of the same system. The defining attribute of this system is also the one that Kepler dramatizes through the retinal image: receptivity. But the "brain," as he calls it, isn't an empty vessel into which images of the world flow; it is "diversified by folds representing items of innate knowledge and . . . this screen or membrane, being under tension, has a kind of elasticity or active force." It consequently "acts (or reacts) both to past folds and to new ones coming from impressions of the species." These actions and reactions consist of "vibrations or oscillations," like those we see when a cord is "plucked," and produce "something of a musical sound."[31] Leibnitz's account of perceptual reception is thus as dynamic, reciprocal, and analogical as the one Valéry presents in his reading of Leonardo.

LEONARDO also isn't the only early-modern commentator who talks about the aesthetic properties of the camera obscura's images. Barbaro notes the "gradations, colors" and "shadows" of these images, and encourages his readers to trace their outlines on a sheet of paper, so that they will have "the entire perspective."[32] G. Battista della Porta recommends the same thing, and explains how to achieve this goal in the first edition of his popular book *Magiae naturalis*. His instructions, though, are very different from the ones Leonardo offers to his fellow painters. Instead of encouraging his readers to make paintings that

correspond with the images that appear inside the camera obscura, della Porta urges them to outline those images with a pencil, so that all that they have to do is "lay on the colors."[33]

Since the epistemological crisis that was precipitated by the discovery of the blind spots at the heart of human vision was partially resolved by adapting the camera obscura to the psychic exigencies and representational demands of the modern subject, it was increasingly relegated to the category of a "tool." In the sixteenth century, lenses were placed in the aperture of the camera obscura, making its images larger, clearer, and brighter. In the seventeenth century, mirrors were used to render them upright.[34] They could then be "reflected downwards onto a drawing-board with paper," and traced, permitting even those who were not skilled to produce a satisfactory drawing.[35]

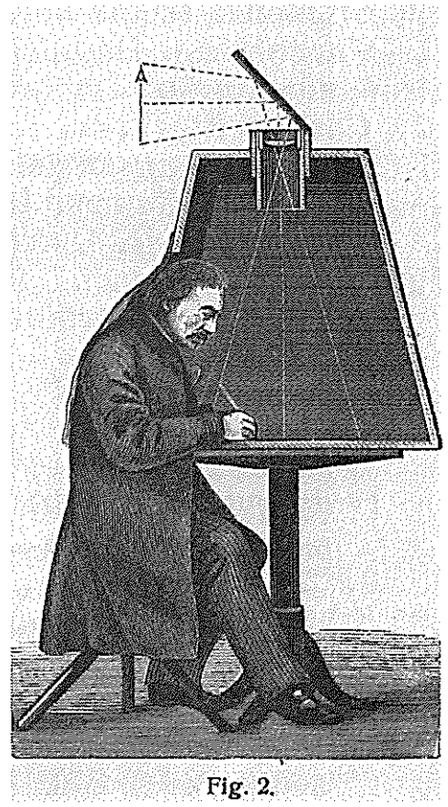

Figure 9. Illustration from Otto Lueger, *Lexikon der Gesamten Technik*, 1926.

The camera obscura also became portable,[36] and later in the century it was transformed from a receptacle that contained the viewer into a much smaller box, whose images were available to an external eye, through either an aperture or an arrangement of the sort described above. It was equipped with better lenses that enlarged its images, and in 1685, Johann Zahn designed a camera obscura that could be manually focused by moving the lens, instead of relocating the screen.[37] In the eighteenth century, the device was incorporated into tables and desks, where one could sit and draw, and added to sedan-chairs and carriages, so that it could be enjoyed in transit. It was also used as a sketchpad by scientists and travellers, as well as artists.[38]

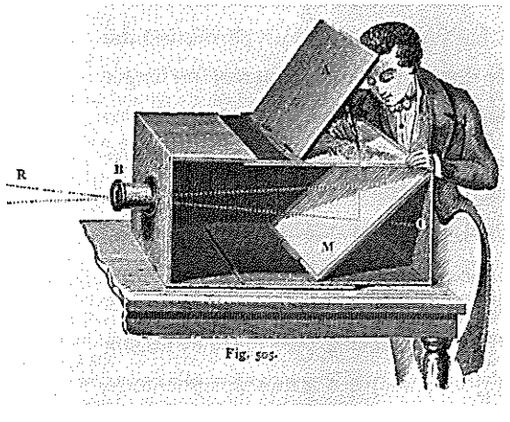

Figure 10. Illustration from Adolphe Ganot, *An Elementary Treatise on Physics*, 1882.

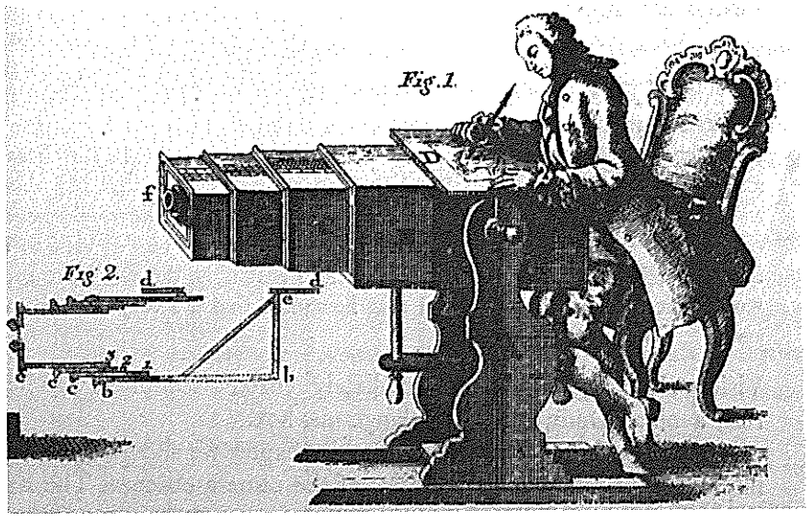

Figure 11. Illustration from G. F. Brander, *Wissenschaftliche Instrumente aus seiner Werkstatt*, 1769 (detail).

People began thinking of the camera obscura as a mechanism for "taking likenesses," instead of receiving them. In 1694, Robert Hooke presented a paper about a camera obscura of his own design to the Royal Society in London. In this paper, which he called "An instrument of use to take the Draught or Picture of anything," he told his listeners that "any Person shall be able to give us the true Draught of whatever he sees before him," by "nimbly running over, with his Pen, the Boundaries or Outlines" of the image that emerges within its darkened chamber.[39] In a 1773 letter to his partner, Josiah Wedgwood offered to travel to London with a camera obscura, in order to "take a 100 views upon the road."[40] And in a 1777 letter to the Reverend William Mason, Horace Walpole not only substituted the verb "to take" for the verb "to receive"; he also described a camera obscura that dispensed with, and improved upon nature, permitting the artist to produce rapid, strong, and precise drawings.[41] This apparatus "no longer depends on the sun, and serves for taking portraits with a force and exactness incredible," he wrote. "This instrument will enable engravers to copy pictures with the utmost precision."[42] The original now exists only so that a copy can be made. The picture is "ready drawn for [man]," as Hooke put it, so that instead of laboriously drawing from nature, he can quickly trace its outlines. The copy also amplifies upon the "beauty" of the original.[43]

Like Descartes's "clear and distinct ideas," the drawings produced by tracing the outlines of the camera obscura's images transformed a mobile, ephemeral, and untotalizable flow into a single, stable, circumscribed representation. They also promoted the fantasy of a sovereign subject. "What [was] in its entirety,"

as Heidegger would say, was "now taken in such a way that it first is in its being and only is in being to the extent that it is set up by man, who represents and sets forth."[44] There was no room within this account for the aesthetic qualities of the camera obscura's image stream.

Fascinatingly, though, a counter-discourse emerged in the seventeenth century that foregrounded the pictorial properties of the camera obscura's images, and attributed them to the world. Athanasius Kircher characterized nature as a "painter" in his 1646 book, *Great Art of Light and Shadows*,[45] and in 1662, Constantijn Huygens wrote that "all painting is dead by comparison [with the camera obscura's images], for here is life itself, or something more noble . . . Figure, contour, and movement come together naturally therein, in a way that is altogether pleasing."[46]

This account of the camera obscura resurfaced in the eighteenth century. In 1704, John Harris wrote that if the sun is shining brightly on the objects outside the camera, "you will have the colors of all things there in their natural paint, and such an admirable proportion of light and shadow, as is impossible to be imitated by art; and yet I never saw anything of this kind that comes near this natural landscape."[47] In 1712, Joseph Addison observed that "the prettiest landscape" he ever saw was "one drawn on the walls" of a camera obscura.[48] In 1740 Benjamin Martin maintained that the camera obscura's images are "infinitely superior" to "the finest performance of the pencil."[49] And in 1764 Count Francesco Algarotti declared that "nothing is more delightful to behold" than nature's pictures.[50]

Alexander Pope not only echoed this praise, he also claimed that worldly things draw their *own* pictures with the "pencils" of light that emanate from them, and he located this action in a continuous present tense. Pope converted a grotto on his property into a camera obscura, and in 1725 he told a friend that "when you shut the doors of this grotto, it becomes on the instant, from a luminous room, a camera obscura, on the walls of which all of the objects of the river, hills, wood, and boats, *are forming* a moving picture in their visible radiations."[51] As we can see from this last sentence of this passage, "nature" had a broad meaning for Pope—one closer to what I am calling "the world" than to what we think of as nature.

It also had an expansive meaning for some of the other writers I have just mentioned, particularly for Algarotti, who equates it with "exterior objects" in an important passage in *An essay on painting*. He returns in this passage to Kepler's notion of the retinal screen, and uses it to underscore the receptivity of the human eye. "Nature is continually forming . . . pictures in our eyes," this passage reads. "The rays of light coming from exterior objects, after entering the pupil . . . proceed to the retina, which lies at the bottom of the eye,

and stamp upon it, by their union, the image of the object, towards which the pupil is directed."[52] Because the camera obscura functions in an analogous way, Algarotti observes, it is able to reveal this "grand operation" to us—an operation about which we might otherwise know nothing.

But the camera obscura is much more for this eighteenth-century writer than an instrument of self-knowledge; it is the agency through which we learn to see the world differently. "We cannot look directly at any object that is not surrounded by many others, all darting their rays together into our eyes, that it is impossible we should distinguish all the different modulations of its light and colors," Algarotti writes. "At least we can only see them in so full and confused a manner, as not to be able to determine any things precisely about them."[53] In the camera obscura, on the other hand, "the visual faculty is wholly brought to bear upon the object before it." This is due in part to the surrounding darkness—to the fact that the "light of every other object is, as it were, perfectly extinguished." But the camera obscura also inducts us into a new way of seeing through the "force and brightness" of its images.[54] In the passage that follows, Algarotti suggests that this "force and brightness" are the result of an aesthetic intensification; he praises the "justness" of these pictures' "contours," the "exactness" of their "perspective and of the chiaroscuro," the "vivacity and richness" of their colors, and the "infinite variety" of their "tints."[55]

This description of the camera obscura's images sounds like an early draft of Heidegger's "The Question Concerning Technology." We have exalted ourselves to "the posture of the lord of the earth," he writes there, and relegated everything else to the status of "standing reserve"—raw material for us to do with as we wish. We do not see that nothing can escape this instrumental logic, and that we are "at the point" where we ourselves "will have to be taken as standing-reserve."[56] But the essence of technology is nothing technological; it is, rather, "*poiēsis*" or "revelation." There are two kinds of *poiēsis*. The first is the product of human labor; it results from "the skills and activities of the craftsman," the "arts of the mind," and the "fine arts." The second kind of *poiēsis* has a very different source; it occurs through the "arising of something from out of itself." Heidegger compares it to "the bursting of a blossom into bloom," and calls it "*poiēsis* in the highest sense,"[57] because it houses a "saving power."[58] It has the power to save us because it resists our attempts to establish ourselves as its source—because it is so manifestly a "self-showing" and a "self-giving" on the part of the world. It is by "coming to presence into the beautiful" that something gives itself to be seen, Heidegger writes near the end of the essay, and he repeatedly associates beauty with illumination: with "light," "radiance," and a "shining forth."[59]

THE DRAWINGS that the modern subject produced with the help of the optical camera obscura satisfied his desire for a stable representation, but they did not halt the stream of images inside the device, or alter them in any other way. The experimentation that led to the heliograph and the daguerreotype was clearly driven by the desire for a more decisive victory—one that would allow man to "harness" the world's power, and force its drawings to obey his commands. Niépce described heliography as a "technique" for "taking views," "fixing" them "with the action of light," and "reproducing them by printing."[60] When extolling the brevity of his exposure times, Daguerre also reached for the verb through which some viewers described their relationship to the camera obscura after lenses and mirrors had been added to it, and that would soon become ubiquitous in photographic circles: the verb "to take." "By this process," he writes, "without any idea of drawing, without any knowledge of chemistry and physics, it will be possible to *take* in a few minutes the most detailed views" (my emphasis).[61]

Later in the same essay, Daguerre goes one step further: he installs himself

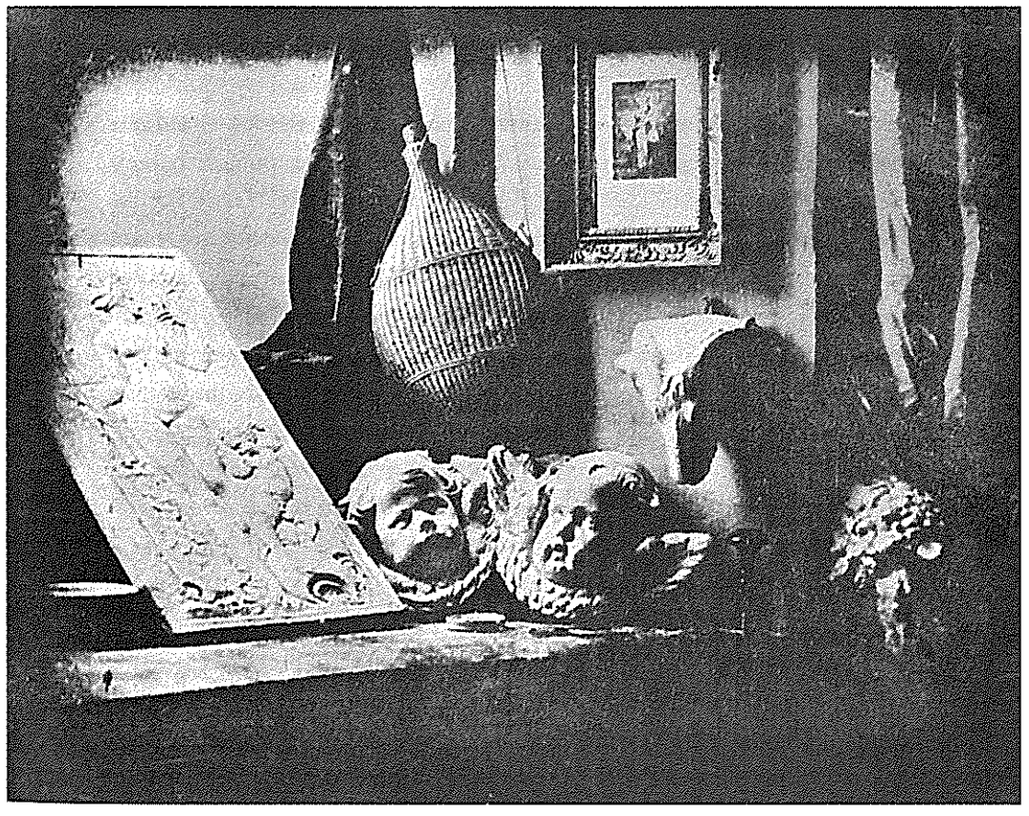

Figure 12. Louis-Jacques-Mandé Daguerre, *Intérieur d'un cabinet de curiosités*, 1837. Daguerreotype. Courtesy of the Société Française de Photographie, Paris.

in the position of the giver, and relegates nature to that of the receiver. "The DAGUERREOTYPE is not merely an instrument which serves to draw Nature . . . ," he boasts, "it is a chemical and physical process which gives her the power to reproduce herself."[62] Some early viewers not only repeated these claims but amplified them. In a lengthy 1839 review of the daguerreotype, Jules Janin compared Daguerre to God: "We have a fine passage in the Bible, God said, 'Let there be light' and light there was. You can say to the towers of Notre Dame, 'Place yourself there;' the towers obey. Thus have they obeyed Daguerre, who one bright day transported them to his home from the gigantic foundation-stone upon which they are built."[63] It is impossible "to command more imperiously," he declares a few paragraphs later. Another commentator maintained that "even a shadow, the emblem of all that is most fleeting in this world, [was] fettered by the spell of [Talbot's] invention."[64]

However, the verb "to receive" figures much more prominently than the verb "to take" in early accounts of photography. Daguerre uses it when talking about the part played by the camera obscura in the production of his photographs, and Edgar Allen Poe suggests that it is the defining attribute of the daguerreotype. Although the photographic plate "does not at first appear to have *received* a definite impression," he wrote in 1840, it later assumes "a miraculous beauty."[65] David Brewster also uses the verb many times in his 1843 account of the existing photographic processes,[66] and it is ubiquitous in both Talbot's writings and Lady Eastlake's 1857 article.

A number of the other tropes that eighteenth-century writers associated with the camera obscura also resurfaced in the first two decades of chemical photography.[67] Niépce called the images that emerged from his experiments "heliographs,"[68] and Holmes titled an 1863 essay about the medium "Doings of the Sunbeam."[69] Talbot wrote that "it is not the artist who makes the picture, but the picture which makes *itself*. All that the artist does is to dispose the apparatus before the image he requires. . . . At the end of the [allotted] time he returns, takes out his picture, and finds it finished."[70]

Many writers also conceptualized the source of the photographic image as a hand, rather than an eye. Talbot imputed the images that were generated through his technique to the "pencil of nature,"[71] and characterized the negatives that emerged from his cameras as "photogenic drawings;"[72] Daguerre described the daguerreotype as "the imprint of nature,"[73] and a contemporaneous reviewer attributed the photographic image to the "rectilineal pencils of light."[74] At one point in her 1857 essay, Lady Eastlake metaphorizes the light that generates the photographic image as an eye, but this eye is not human, and it behaves more like a stylus than an organ of vision. With a "wink," it traces

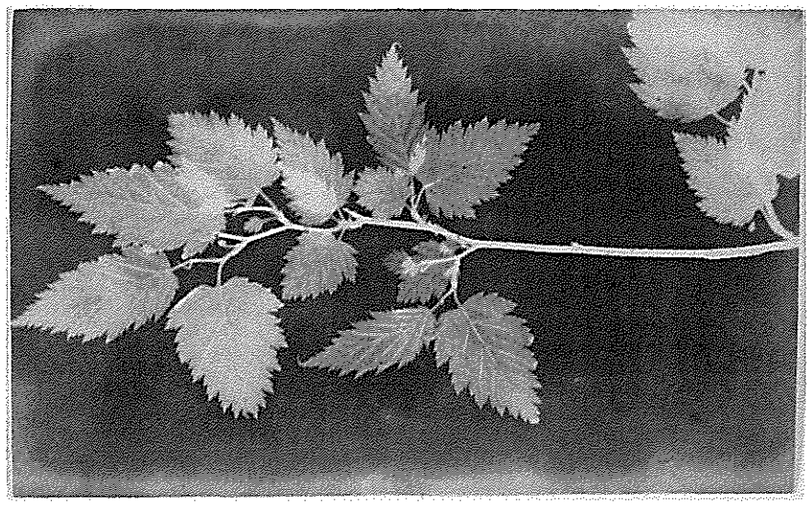

Figure 13. William Henry Fox Talbot, *Leaves on a stem*, 1842. Salted paper print. Courtesy of the National Media Museum/SSPL.

"the glory of the heavens, the wonders of the deep," and "the most fleeting smile of the babe."[75] In another passage from the same essay, Lady Eastlake calls it a "solar pencil."[76]

Talbot and his contemporaries were also amazed by the detail and precision of the photographic image, which revealed things they could not see. "The perfection and fidelity of the pictures are such, that, on examining them by microscopic power, details are discovered which are not perceivable to the naked eye in the original objects," Sir John Robison wrote in 1839.[77] "In a view up the street, a distant sign would be perceived, and the eye could just discern that there were lines of letters on it," Samuel Morse remarked the same year, "but so minute as not to be read with the naked eye." In the daguerreotype, by contrast, "every letter was clearly and distinctly legible, and so also were the minutest breaks and lines in the walls of the buildings and the pavements of the street."[78] "The perfection [of the photographic image] exceeds the accuracy of the eye as its judge," noted another commentator.[79]

Surprisingly, these early viewers and practitioners did not rush to resolve the discrepancies between what they saw and what the camera showed by establishing one as the truth and the other as an illusion. Neither did they conclude that sensory perception is duplicitous, or take epistemological shelter within the domain of mental representations. They understood that their look and the photographic image opened onto the same world—*their* world. I say "world" because the numerous references to nature in this literature once again show that it signified something much larger for its authors than it does for us.

Figure 14. "M. de Sainte-Croix," *Parliament Street from Trafalgar Square*, 1839. Daguerreotype. © Victoria and Albert Museum, London.

As can be seen from the constant references to drawing, painting, and engraving in the passages I have just quoted, many early viewers of the photographic image were also struck by its aesthetic qualities, and a number of them saw it as a superior kind of art making. Talbot tried to "take sketches" with the aid of Sir William Hyde Wollaston's camera lucida while traveling in Italy. He found them wonderful when viewing them through the prism of this device, but when he looked at the drawings directly, he found the marks left by his "faithless pencil . . . melancholy to behold." Talbot repeated the experiment with a camera obscura, but he was neither patient nor skillful enough "to trace all of the minute details visible on the paper." He abandoned his quest to become a better draughtsman, and began searching for a way of preserving these "fairy pictures."[80]

Commentators expressed similar sentiments after looking at the first daguerreotypes and "photogenic drawings."[81] An anonymous reviewer in an 1839 issue of the *United States Democratic Review* described the daguerreotype as a "master-piece" designed "by Nature herself."[82] The editor of an 1839 issue of *Belles Lettres* urged his readers to improve their draughtsmanship by making her

their "drawing-mistress,"[83] and another reviewer declared the medium to be "as great a step in the fine arts, as the steam-engine was in the mechanical arts."[84] Talbot extolled the "inimitable beauty of the pictures of Nature's drawing which the glass lens of the Camera throws upon the paper in its focus."[85]

Some commentators also linked photography to a specific *kind* of picture: the self-portrait.[86] One reviewer wrote that henceforth "every fixed object" would be able to paint itself with the "pencils of light," and transfer its "mimic image to the silver tablet."[87] Since many of Talbot's photographs were made by placing an object directly on a sensitized sheet of paper, and this object prevented the area beneath it from darkening when the paper was exposed to light, this object could be literally said to draw its own portrait, but commentators did not limit their claims to this kind of photograph. An anonymous reviewer wrote that "*all* nature, animate and inanimate, shall henceforth be its own painter," and also the "engraver, printer and publisher" of the resulting portrait, so that each of us can have our own "copy" (my emphasis). He also suggested that photography is the world's way of revealing itself to us, and of showing us how it wants to be seen—i.e., of awakening us from our Cartesian dream and reasserting

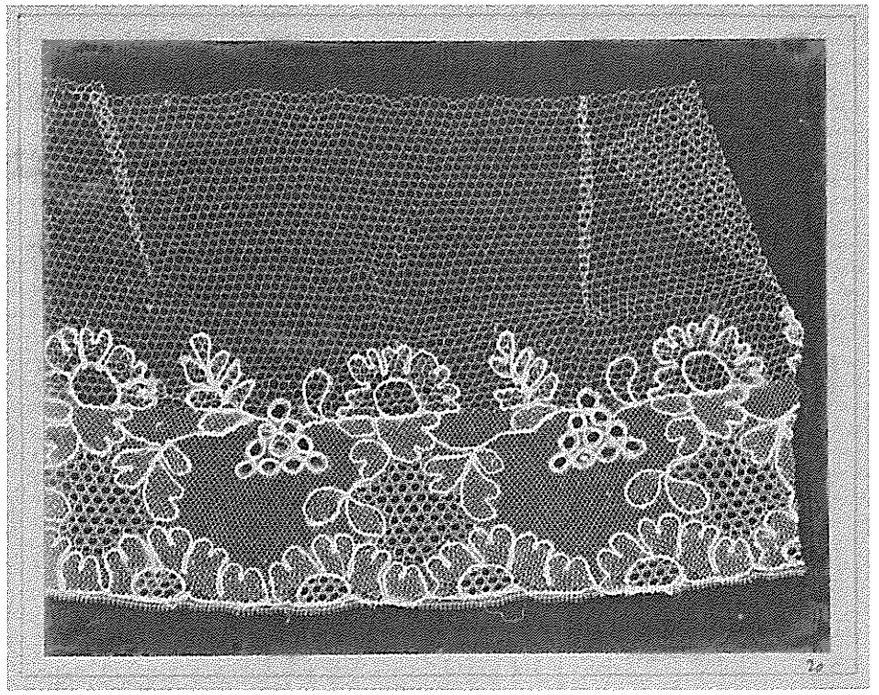

Figure 15. Henry Fox Talbot, *Lace*, 1842. Salted paper print. Courtesy of the Metropolitan Museum of Art, New York.

its primacy. "Ye artists of all denominations that have so vilified nature as her journeymen, see how she rises up against you, and takes the staff into her own hands," this extraordinary passage reads. "Your mistress now, with a vengeance, she will show you what she really is . . . Every church will show itself to the world without your help. It will make its wants visible and known on paper."[88]

IN A STRIKING PASSAGE in her 1857 essay, Lady Eastlake compares the appearance of the photographic image to the creation of the world, just as Janin does in his 1839 review, but she uses the verb "to reveal" twice in this passage, suggesting that the photographic image may actually have more to do with the *disclosure* of the world than with its *creation*. "The prepared paper or plate which we put into the camera may be compared to a chaos, without form and void, on which the merest glance of the sun's rays calls up image after image, till the fair creation stands revealed," it reads, "yet not revealed in the order in which it met the solar eye. For while some colors have hastened to greet [the sun's] coming, others have been found slumbering at their posts, and have been left with darkness in their lamps."[89]

Lady Eastlake also invokes a second biblical story in this passage: the parable of ten virgins who fall asleep while waiting for a bridegroom, and whose lamps go out while they are sleeping.[90] Five are able to relight their lamps when the bridegroom returns, because they have brought extra oil, but the others are unprepared. The bridegroom takes the "ready" virgins to the wedding banquet, but shuts the door on the others. In its scriptural context, this story is an allegory for the Second Coming. The wedding banquet stands for the Rapture, the bridegroom for Christ, the virgins with bright lamps for those who will ascend to heaven, and the others for those who will be left behind.

Since it is difficult to think of any nineteenth-century British context in which this parable would not have been viewed as embarrassingly anachronistic, Lady Eastlake's reliance on it is odd, to say the least. However, she wasn't the only prominent figure in the world of British photography who gravitated to the story. Julia Margaret Cameron based two 1864 photographs on it: *The Five Wise Virgins* and *The Five Foolish Virgins*. In each of these photographs, five women dressed in vaguely historical garb impersonate the virgins mentioned in the title. Although there are no references in either photograph to a bridegroom, a number of the story's other elements have been retained.

The figures in *The Five Wise Virgins* hold lamps, and because they are so tightly framed, particularly at the top of the photograph, they also seem to be ascending—an impression that is strengthened by the blur at the base of the image. The middle figure is distinguished from her companions through her clothing

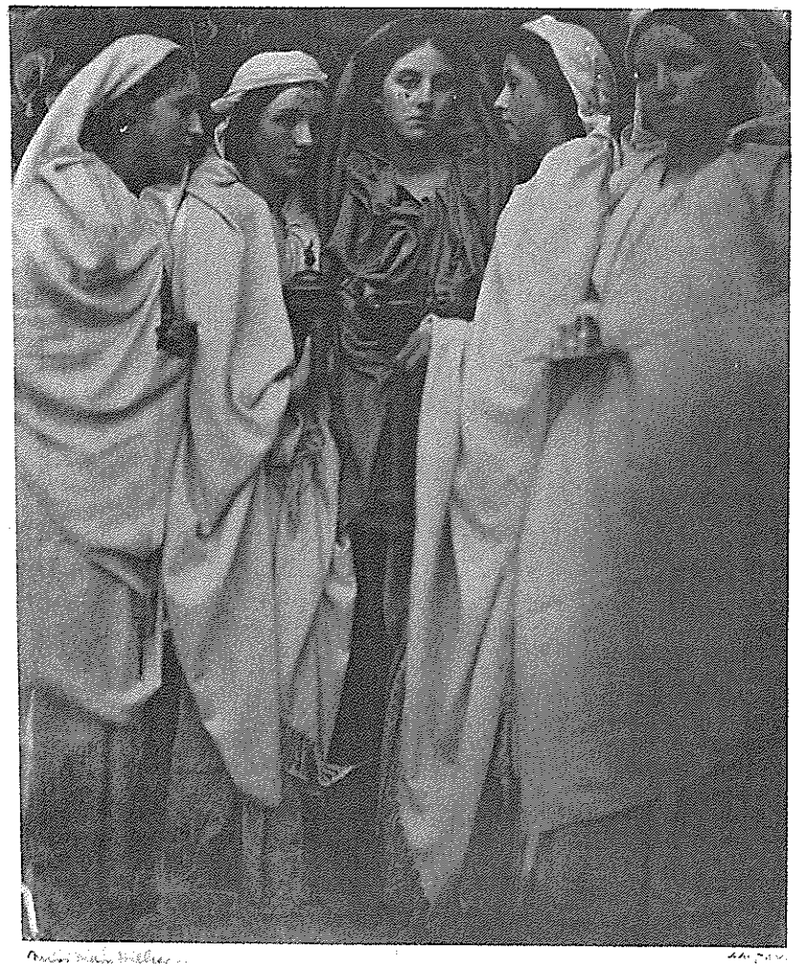

Figure 16. Julia Margaret Cameron, *The Five Wise Virgins*, 1864. Albumen print from collodion wet-plate negative. © Victoria and Albert Museum, London.

and demeanor, which centers the photograph both morally and compositionally, and three of the other figures turn toward her, as in a medieval triptych.

The figures in *The Five Foolish Virgins* also fill the frame horizontally—so much so that the figure on the left seems on the verge of being squeezed out of the picture. However, there is so much space above their heads that we can see part of the ceiling and a backdrop attached to the wall behind them. Their feet are cropped off by the lower frame of the image, but we know that they are standing on terra firma, because the backdrop tells us that they are in a photographic studio. *The Five Foolish Virgins* also has no moral or compositional center; all of the figures are dressed in a similar way, and their heads form a level band across the upper portion of the picture.

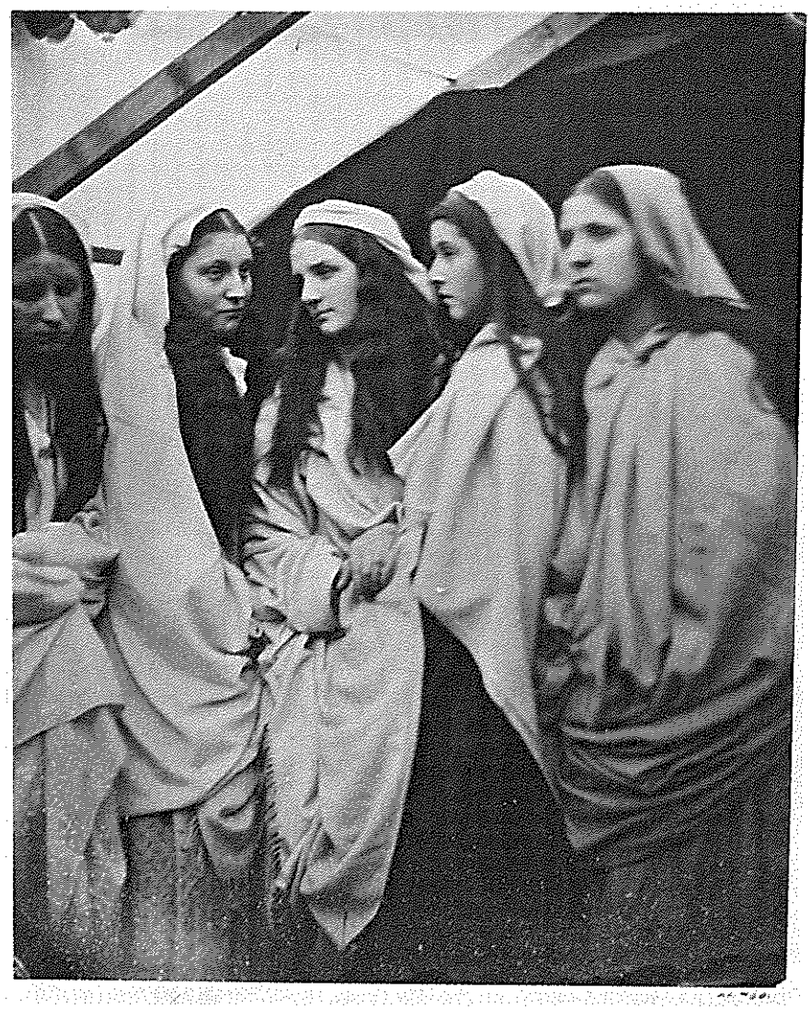

Figure 17. Julia Margaret Cameron, *The Five Foolish Virgins*, 1864. Albumen print from collodion wet-plate negative. © Victoria and Albert Museum, London.

But although the distinction between those who ascend to heaven and those who are left behind is clearly marked, it is also undermined in a number of ways. To begin with, the central figure in the first photograph looks more like a Madonna than a "wise virgin," which scrambles the interpretive wires in all kinds of ways, and disables the story's marriage premise. The poses of the figures who turn toward her are also misaligned, and their looks do not meet. Finally, the figure on the far right doesn't seem to be a member of this group. She turns away from the others, thereby preventing the photograph from actually becoming a triptych, and foregrounding its horizontal over its vertical axis. She also gazes directly out at us, both welcoming and returning our look.

Although this figure is compositionally marginal, she is the real center of the photograph.

On closer inspection, some remnants of a triptych can also be glimpsed in *The Five Foolish Virgins*. Although there is no "eyeline match," three of the five figures turn toward each other, and appear to be looking at each other. The figure on the left looks down, which pushes her even further out of the picture, but the one on the right is emphatically there, and utterly riveting. Unlike all of the other figures in this photograph, who are sharply delineated, she has Cameron's signature "blur," and she gazes intensely out-of-frame, at an unseen object. With the forward tilt of her body, she both signals its appearance, and anticipates its arrival. She thus occupies an analogous position to the one occupied by the figure who gazes out at us in *The Five Wise Virgins*, both conceptually and compositionally, and like the latter, she steals the show.

Lady Eastlake's apparent reason for invoking the parable of the wise and foolish virgins is unrelated to Cameron's photographs. She uses it to expand on the distinction between "laggard colors," like red and yellow, and "impatient" ones, like blue and violet, i.e., colors that are slow to inscribe their traces on the recipient plate and those that do so quickly.[91] However, the biblical story has nothing to do with slowness or quickness, and the distance between the colors described in this passage and the bridesmaids in the biblical parable is so vast as to be unbridgeable. The real reason why Lady Eastlake turns to this parable is because it is the pivot through which she shifts from her first account of photography to her second—from the notion that photography *creates* the world to the notion that photography *reveals* it. Although this might seem a trifling distinction, it is in fact profound. The world did not disappear when Descartes replaced his sensory perceptions with mental representations; it was still there, but it was no longer *present*. The heliograph, daguerreotype, and calotype were the means through which it attempted to rectify this situation—to "come forward," or "presence."

Lady Eastlake uses the story about the wise and foolish virgins to effect this shift because photography *is* a second coming, and the only one we are ever likely to experience: the second coming of the world. The parable also analogizes the other part of the photographic event: the part that has to do with us. Like the bridegroom, the photographic image arrives from elsewhere, hoping that we will see it. Unfortunately, though, this does not often happen, because there are two kinds of viewers: those who "hasten to greet it" and those who miss the encounter for which they should have been waiting. I will end this chapter with an artist who is as ready for that encounter as the figures on the right side of Cameron's diptych, but who requires no theological alibi: the Cuban American photographer Abelardo Morell.

IN 1991, Morell covered the windows of the living room in his Quincy, Massachusetts, house with black plastic and cut a small opening in the plastic. Light entered the room through this opening, just as it did in the first pinhole camera, carrying a reversed and inverted stream of images, but instead of landing on a screen in a space that was set apart for that purpose, or whose normal functioning was temporarily suspended, it spilled onto the walls, ceiling, and contents of what was still recognizably a domestic space. Morell then focused his camera on this visual palimpsest and exposed the negative.[92]

The exposure lasted eight hours—almost as long as the one that produced the earliest extant photograph—but Morell did not call the resulting photograph "View from a Living Room," or even "View of the Houses across the Street." Instead, he called it "*Camera Obscura Image of Houses Across the Street in Our Livingroom*,"[93] a title he later changed to *Houses Across the Street in Our Living Room, Quincy, Massachusetts*."[94] The first version of the title attributes the inverted image to the camera obscura, rather than Morell's camera or his look. The amended title links it to a specific place—Quincy, Massachusetts.

Figure 18. Abelardo Morell, *Camera Obscura Image of Houses Across the Street in Our Livingroom*, 1991. Silver-gelatin print. Image © Abelardo Morell, courtesy of Edwynn Houk Gallery, New York.

It also suggests that although the camera obscura played an enabling role in the creation of the photograph, the upside-down part of the image actually originated in the houses themselves.[95] They entered Morell's living room through what might be called an "ontological extrusion," and during the eight hours it took to make this photograph the living room and the houses were co-present, both temporally, and spatially.

The intimacy of this relationship is even more marked in a closely related photograph, whose name underwent a similar transformation. In this photograph, which was initially called *Camera Obscura Image of Houses Across the Street in Our Bedroom*,[96] and later *Houses Across the Street in Our Bedroom, Quincy, Massachusetts*,[97] the upside-down image extends from the wall behind a bed down to the pillows and coverlet below. The bed invites us to think about the people who sleep in it, and—through an almost inevitable extrapolation—those who sleep in similar beds on the other side of the street.

The photograph consequently functions as a receiving room for Morell's neighbors, as well as their houses. In the years since he made these two photo-

Figure 19. Abelardo Morell, *Houses Across the Street in Our Bedroom, Quincy, MA*, 1994. Silver-gelatin print. Image © Abelardo Morell, courtesy of Edwynn Houk Gallery, New York.

graphs, the artist has facilitated similar encounters in many other places. These venues are often bedrooms, but even when this is not the case, Morell thinks of the encounters as "couplings." "One of the satisfactions I get from making this imagery," he writes, "comes from my seeing the weird and yet natural marriage of the inside and outside."[98]

In 2005, Morell began making color camera obscura photographs. The first of these photographs welcomes an inverted and reversed image of the exterior of the Philadelphia Museum of Art into one of the museum's own galleries, and pairs it with a painting that performs the same action in reverse: Giorgio de Chirico's *The Soothsayer's Recompense* (1913). Part of the upside-down image of the museum's exterior also enters the de Chirico painting, establishing it as a co-creation. The same is true of the photograph in which the transformed painting appears. The interior and exterior meet, as Elizabeth Siegel puts it, "to form a new image."[99]

Around the same time that Morell turned to color, he began using lenses and prisms to sharpen the focus of the camera obscura's images and reverse its reversals.[100] He also started working with a digital camera. Since the images that

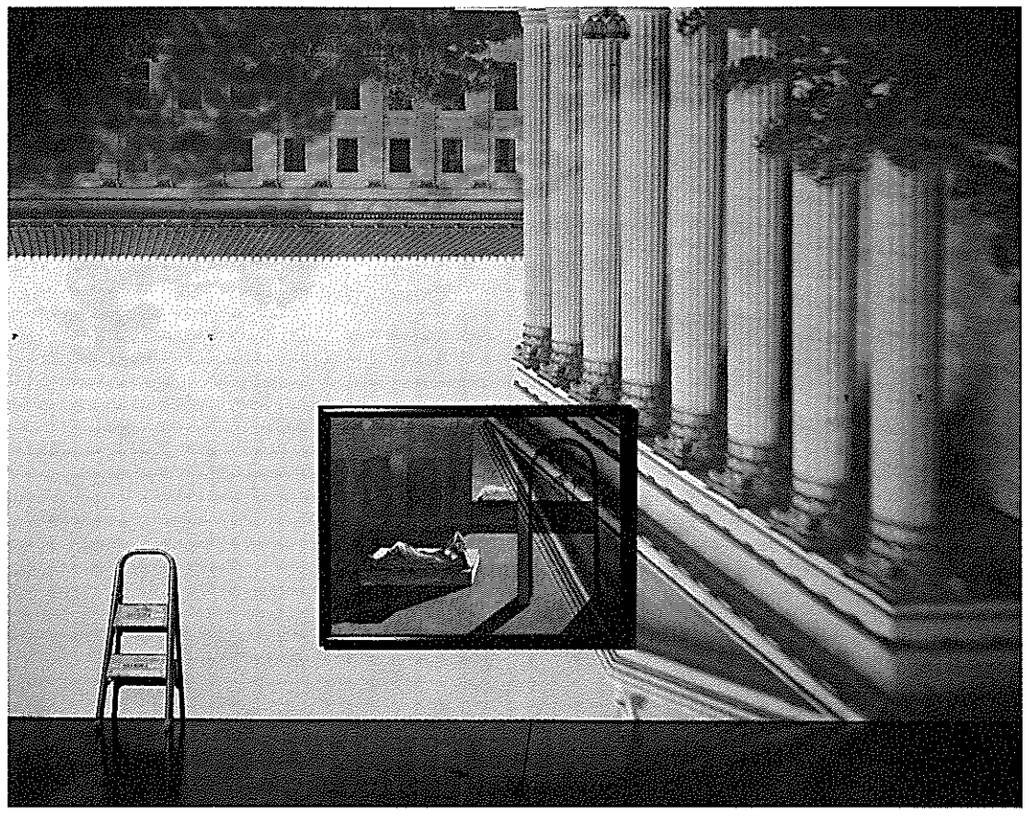

Figure 20/Colorplate 1. Abelardo Morell, *Camera Obscura: The Philadelphia Museum of Art East Entrance in Gallery #171 with a de Chirico Painting*, 2005. Inkjet print. Image © Abelardo Morell, courtesy of Edwynn Houk Gallery, New York.

enter the camera obscura are many-hued, Morell's shift from black-and-white to color photography can be seen as a logical extension of his original project, and although his lenses and prisms "upped" the technological "ante," they too have a historical precedent. Digital images, on the other hand, are generally assumed to be non-referential and non-indexical, and therefore discontinuous with the camera obscura and chemical photography. Morell, however, believes that digital photographs also have a disclosive potential, and that they may even have the capacity to render "the universe next door" *more* present than its antecedents could. "I have . . . been able to shorten my exposures considerably thanks to digital technology," he confides in a short essay on his website, "which in turn makes it possible to capture more momentary light. I love the increased sense of reality that the outdoor has in these new works—the marriage of the outside and the inside is now made up of more equal partners."[101]

It is perhaps for this reason that Pope's beautiful description of his grotto camera obscura always makes me think of one of Morell's more recent works, *Camera Obscura: View of Central Park Looking North—Fall* (2008). This work

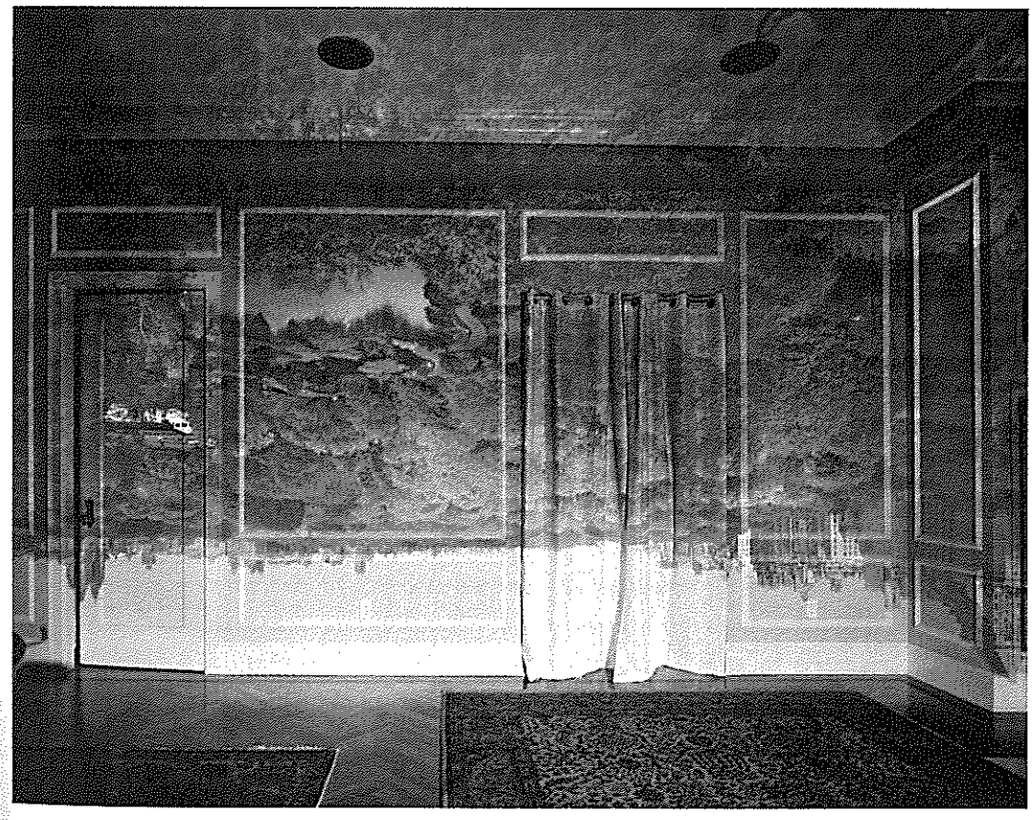

Figure 21/Colorplate 2. Abelardo Morell, *Camera Obscura: View of Central Park Looking North—Fall*, 2008. Inkjet print. Image © Abelardo Morell, courtesy of Edwynn Houk Gallery, New York.

is part of a series of photographs that were produced at different times of year in a New York City hotel, using one of its rooms as a camera obscura. Unlike the names that Morell gave his earlier camera obscura photographs, the name that he assigned to this one contains the word through which the photographic image was subordinated to the human look: "view." The photograph itself, however, completely redefines this word.

As Morell shows us by positioning his camera in front of a wall, instead of a window, the view to which the title alludes was not carved out of the world by the photographer's look, and then "captured" by his camera. It was drawn, rather, on the wainscoted wall of a darkened hotel room through the "visible radiations" of external objects: trees, lakes, and buildings. It was also a "moving" rather than a fixed "picture," and although this picture has now been incorporated into a photograph, it still is. Central Park's autumnal self-portrait retains this power because Morell waited for it to arrive, and embraced it when it did. Although he did not make it, he knew that it was good.

Chapter 2

UNSTOPPABLE DEVELOPMENT

THE TROPES that Alexander Pope and Count Francesco Algarotti associated with the camera obscura resurfaced in the 1830s and 1840s because chemical photography picked up where the camera obscura left off, both technically and ontologically. This might seem a puzzling claim, since unlike the images that appear inside the camera obscura, which are mobile and ephemeral, the defining attributes of analogue photography are immobility and permanence. The photographic image was, however, neither immobile nor permanent in the first decades of its history. It emerged slowly, through the gradual accretion of the traces inscribed on a "recipient-plate" by the light emitted by the external world, and it often disappeared shortly after it arrived.[1] And even when this image did not blacken or fade, there was an instability at its core.

Niépce began experimenting with chemical photography in 1814,[2] significantly earlier than either Daguerre or Talbot. He was drawn to it not for aesthetic reasons, but rather because he saw it as a potentially reproductive medium, like lithography—a vehicle for generating multiple copies of already existing images.[3] Niépce repeatedly tried to actualize this potential by waxing or oiling an engraving, placing it on a surface coated with a light-sensitive varnish, and exposing it to the sun. In 1822 he succeeded in making a permanent contact negative of an engraving of Pope Pius VII. Others followed, some of which he had acid-etched, in order to render them more reproducible, and from which he managed to extract a few faint paper contact positives.[4]

In 1816, Niépce also began trying to "obtain" a printable "view" of nature with the help of a camera obscura.[5] As we saw in the previous chapter, many seventeenth- and eighteenth-century users of this device also described their activities in this way, and for them, too, "taking" a "view" of nature meant arresting the camera obscura's image stream, and forcing the resulting image "to remain on the table."[6] They sought to become "takers" rather than "receivers" of these luminous images by tracing their outlines on a sheet of paper. In most of the devices that were designed for this purpose, the screen was a tabletop, on