“Sensitive Emulsions:
Hawthorne’s Proto-Photography”

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In Nathaniel Hawthorne’s 1838 tale “Foot-prints on the Sea-shore,” the narrator walks along a New England seashore, marveling at the sun, the sand, and the surf, as well as the occasional stranger. He is particularly interested in the borders where physical elements intersect, noting:

Near the water’s edge there is a wet margin, which glistens brightly in the sun-shine, and reflects objects like a mirror; and as we tread along the glistening border, a dry spot flashes around each footstep, but grows moist again as we lift our feet. In some spots, the sand receives a complete impression of the sole—square toe and all; elsewhere, it is of such marble firmness, that we must stamp heavily to leave a print even of the iron-shod heel. (452)

Light, moisture, and tracks on the sand combine to form an impermanent record of activity. The narrator admits the changing nature of the sand’s surface is beneficial for speaking the heart’s secret truths, since “almost ere the sky has looked upon them, the sea will wash them out” (454-55). Although the marks are ephemeral, the narrator concludes that by tracing one’s own footprints, “we track our own nature in its wayward course, and steal a glance upon it, when it never dreams of being so observed. Such glances always make us wiser” (454). The narrator appreciates the value of these tracks, yet realizes that depending upon them to understand human nature is problematic because the record is fleeting.

Several of Hawthorne’s stories exhibit a desire to stabilize phenomena in order to record human behavior accurately. This desire is evident in “Foot-prints on the Sea-shore,” as well as in “Fancy’s Show-Box” (1837) and “The Birth-mark” (1843). The desire is also present in the late-eighteenth and early nineteenth-century search for a viable process to record and stabilize an image. In these tales, Hawthorne explores issues similar to those being encountered by proto-photographers—those artists and scientists experimenting with optics and chemistry in the
search to successfully stabilize and preserve a detailed image—in the days prior to the 1839 "invention" of photography. In a letter to Sophia Peabody (11 December 1839), Hawthorne expresses his curiosity: "I wish there was something in the intellectual world analogous to the Daguerreotype (is that the name of it?) in the visible—something which should print off our deepest and subllest, and delicatet thoughts and feelings, as minutely and accurately as the above-mentioned instrument paints the various aspects of Nature" (384). This passage displays the author's interest in the new medium, but Hawthorne's preoccupation with achieving a reliable "glance," or stable visual record, precedes this letter to Sophia.

Who is responsible for photography's invention? Nicéphore Niépce? Louis-Jacques-Mandé Daguerre? Henry Fox Talbot? Nathaniel Hawthorne? Pinpointing the scattered experiments that led to the 1839 "invention" of photography has rarely been a simple issue. In his 1997 book Burning with Desire: The Conception of Photography, Geoffrey Batchen explores the importance of what he terms "proto-photographers," those artists and inventors who, between 1790 and 1839, conducted experiments that would result in the "invention" of photography, a discovery typically attributed to Daguerre and Talbot. For Batchen, early photography is the collective product of European and American cultural activity in the decades before the late 1830s. In an attempt to locate evidence of an early "desire to photograph," Batchen articulates a central critical problem:

We have to account not just for the unconscious or conscious actions of one or two gifted individuals, but for the yearnings of an entire social body. In doing so, we have to go beyond the clichés that too quickly concede that 'photography was in the air' (What was that air? How was it constituted? Where exactly was photography located in it?) ... to articulate a moment of origin that produced these individuals even as they reproduced it through their various thoughts and actions. (53)

Whereas Batchen's interest lies in the photographic desire evident in the philosophical discourse of the time, I point to Hawthorne as engaging in "conceptual and metaphoric" proto-photographic production in these tales. Although it is safe to say Hawthorne is not among those technically responsible for the inception of photography, he was clearly
interested in the technical and conceptual challenges of early photography.

To claim Hawthorne's engagement with photography is nothing new. Many critics, Alan Trachtenberg, J. Gill Holland, Carol Shloss, Shawn Michelle Smith, Susan S. Williams, Ronald R. Thomas, and Ann Wilsher among them, have focused on Hawthorne, arguing that *The House of the Seven Gables* (1851) and its daguerreotypist Holgrave represent one of the most important early literary engagements with photography. When discussing the cultural impact of the medium, historians of photography who make mention of Hawthorne, typically with reference to *Seven Gables*, include Robert Taft, Vicki Goldberg, Alma Davenport, Heinz and Bridget Henisch, and Jane M. Rabb. In *The House of the Seven Gables*, Hawthorne's most sustained examination of photography, he writes at a moment when daguerreotypy, so dominant in the 1840s, was being replaced by a new technology, the ambrotype. Hawthorne's interest in photography is also evident in his earlier writings. In the late 1830s and early 1840s, Hawthorne, in "Foot-prints on the Sea-shore," "Fancy's Show Box," and "The Birth-mark," displays an interest in the optical and chemical experiments that would lead to the invention of photography. These stories demonstrate that Hawthorne was not simply reactive, but also part of the search for a working process. Even after photographic processes were invented, Hawthorne returned in his writing to the early days of proto-photographic experimentation in an effort to grasp its significance.

Hawthorne's 1837 tale "Fancy's Show Box" deserves study as a literary site of proto-photographic desire because it employs hyper-accurate picture records, because it addresses the question of how to fix unstable phenomena, and because it raises the sophisticated issue of attaching written captions to images in order to clarify or direct meaning and context. Largely ignored by criticism, "Fancy's Show Box" offers perhaps the most fully expressed literary engagement with proto-photographic elements. The tale begins with the question and answer: "What is Guilt? A stain upon the soul," and commences to offer a case study in order to determine if contemplating a sinful act is enough to endanger the soul (220). The venerable Mr. Smith falls asleep while sipping wine alone in his apartment and dreams that three curious figures, Fancy, Memory, and Conscience, enter his chamber and approach. The trio conducts an
exhibition of pictures from Smith's past, supplied by Fancy, complete with written annotation of the images' context, added by Memory. As Smith is made to remember the forgotten scenes of his life where he considered but did not perpetrate sinful acts, Conscience stabs him with a dagger. After a series of pictures and punishments, Smith awakens to find his room empty.

The introductory lines of the story illustrate a central curiosity regarding the sensitivity of the soul, and how deeds not necessarily visible to the public eye remain latent in the individual. The narrator wonders "whether the soul may contract such stains, in all their depth and flagrancy, from deeds which may have been plotted and resolved upon, but which, physically, have never had existence" (220). Is the soul, then, capable of recording, in "all their depth and flagrancy," events that produce no outward evidence of their existence, and retaining those impressions until they are made visible? Is it, the narrator asks, the act of the hand which "set[s] its seal" upon the soul, or is it the guilty thought itself that registers? In designing his experiments on Georgiana in "The Birth-mark," Aylmer "shuts in the scene," blocking the sunlight from entering the chamber and allowing only the "empurpled radiance" of lamps to light the room (44). Similarly, for Smith, the show box of pictures played in a dim apartment, "where crimson curtains muffled the glare of sunshine, and created a rich obscurity" (221). Such dimming of the lights is a stock effect in "imaginary" literature and drama, yet also consistent with the need to keep sensitive emulsions safe from the destructive intensity of too much light.

Using the presentation of recorded images of the guilty moments, Fancy, Memory, and Conscience respectively present the evidence, corroborate the argument, and execute the punishment for Smith's crimes. Fancy, dressed as "an itinerant showman," carries "a box of pictures on her back"; Memory appears in the guise of a clerk, carrying a large manuscript, a pen and ink-horn, and Conscience sits "shrouded in a dusky mantle, which concealed both face and form" (221-2). An exhibition ensues, with Memory sitting at Smith's right hand and Conscience seated at his left, "so as to be next his heart" (222). Fancy conducts the show by placing her picture-box upon the table, with the magnifying glass convenient to Smith's eye: "We can sketch merely the outlines of two or three, out of the many pictures, which, at the pulling of a string, succes-
sively peopled the box with the semblances of living scenes” (222).

Because Hawthorne describes a box of many images, “successively” moving before a spectator who looks through a glass and sees the pictures “at the pulling of a string,” it is tempting to suggest Hawthorne anticipates not only photography, but Edison’s kinetoscope, an early moving picture device that rapidly flipped pictures to simulate motion. It would be more accurate to argue that Hawthorne exhibits an interest in the visual technologies of his day, including Daguerre’s diorama, a predecessor of both photography and film. Moreover, Hawthorne’s creation of Fancy’s show-box of pictures depends upon the Coleridgean interpretation of fancy’s role. To Coleridge, the fancy is not the same as imagination or memory, but is instead, in the words of M. H. Abrams, a “mechanical process which receives the elementary images—the ‘fixities and definites’ which come to it ready-made from the senses—and, without altering the parts, reassembles them into different spatial and temporal order from that in which they were originally received” (61). The imagination can create, but fancy rearranges and reassembles; such is the function of Hawthorne’s Fancy, who reassembles and mechanically presents originally received images in a “different spatial and temporal order” to reacquaint Smith with his past transgressions. Each time an image is revealed, Smith protests. Each protest is followed by Memory’s corroboration of the old man’s guilt, and results in Conscience’s doling out another punishment.

Although he resists the truth of the annotated pictures, Smith finds it hard to deny the visual evidence arrayed against him. His defense is weak: nothing bad occurred because he did not act on his sinful thoughts. Hawthorne’s describes Fancy’s images as ones that record significant moments of Smith’s life, even if the results are somewhat chimerical:

A dull, semi-transparent mist had been thrown over the surface of the canvass, into which the figures seemed to vanish, while the eye sought most earnestly to fix them. But, in every scene, however dubiously portrayed, Mr. Smith was invariably haunted by his own lineaments, at various ages, as in a dusty mirror. (224)

As he studies each image, Smith’s eye desires stabilization, a fixing which eventually and inevitably settles upon the representation of himself “as in a dusty mirror” (224). Smith attacks the artist not because the im-
ages are inaccurate, but because they depict him in less than flattering terms—that is, because they depict him at all:

One after another, Fancy displayed her pictures, all of which appeared to have been painted by some malicious artist, on purpose to vex Mr. Smith. Not a shadow of proof could have been adduced, in any earthly court, that he was guilty of the slightest of those sins which were thus made to stare him in the face. (223)

Smith's reputation rests upon the suppression of memory and the confidence that no record of wrongdoing exists. But Memory has brought Fancy to Smith's apartment, and Fancy mechanically displays a visual record of Smith's transgressions. With little defense but to attack the author of the images, he misses the point that there is no common artist. Smith fails to imagine the existence of a picture-making process sensitive enough to record the "awful pictures" of his mental sins, but Fancy confronts him with just such a device: "Painted by an artist of wondrous power, and terrible acquaintance with the secret soul, they embodied the ghosts of all the never perpetrated sins, that had glided through the life-time of Mr. Smith" (225). Fancy's process has isolated and reassembled the gliding ghosts into discernible visual texts that prove culpability, but Fancy is only working with the images supplied by "an artist of wondrous power," ones that unmediated representations of nature.

For Hawthorne, such image-making capacity represents a dreadful prospect, and also something of an opportunity. The tale suggests all men are sinners either in act or thought, and that the stains of guilt register upon the soul even if no one else can discern them. Such knowledge recommends humility and generosity in all things, since no one will approach eternity with an "unspotted life" (226). Referring to Fancy's pictures, the narrator asks: "And could such beings of cloudy fantasy, so near akin to nothingness, give valid evidence against him, at the day of judgment?" (225). Just as photographs grew to become the index of truth as the nineteenth century progressed, Fancy's pictures offer testimony on Smith's true soul. In Hawthorne's story, fixed pictures call a character to task when presented and verified by a written record. In a March 1839 letter about his visit to Daguerre's studio, American inventor Samuel Morse noted a problem with the French inventor's new process, writing: "Objects moving are not impressed" (12). In 1837,
Hawthorne imagined a process that would record and secure images using sensitive emulsions.

A brief historical glimpse at the work of proto-photographers provides a useful context for situating Hawthorne’s subsequent literary preoccupations. Sir Humphrey Davy, one of Batchen’s designated proto-photographers, conducted chemical experiments with Thomas Wedgwood, and together they published “An Account of a Method of copying Paintings upon Glass, and of making Profiles, by the Agency of Light upon Nitrate of Silver,” in the *Journals of the Royal Institution of Great Britain* in 1802. The paper was the first published record of experiments to produce images via the action of light upon salts of silver. Wedgwood and Davy produced shadowgraphs, essentially profiles of objects laid on paper and leather sensitized by a silver nitrate solution. The trouble was that the images were fleeting; while the scientists had produced pictures via the action of light on sensitized surfaces, they had not discovered a process to arrest the chemical reaction once the image was made to appear. The images appeared, then immediately darkened beyond recognition. What was needed was a way to remove the unexposed silver salts to stabilize the image at the proper degree of development. Davy concludes the paper: “Some experiments on this subject have been imagined….Nothing but a method of preventing the unshaded parts of the delineation from being coloured by exposure to the day is wanting, to render the process as useful as it is elegant” (16). Had Wedgwood and Davy been able to produce a fixed image, photography would have been inaugurated. Still, the 1802 document is significant in that it, in Batchen’s words, “fully articulated photography (as it much later came to be called) despite their inability to make their images permanent” (112). At the very least, Wedgwood and Davy had, in 1802, articulated the central and final obstacle to achieve a working process, so much so that Talbot, in his 31 January 1839 report on “Photogenic Drawing” declared that he had surmounted the difficulty of Wedgwood and Davy.

John Szarkowski, begins his history of the medium, *Photography Until Now* (1989), by describing the elements necessary for the nineteenth-century invention of what came to be known as photography. Prior to then, the camera obscura had existed for centuries, but no technology existed that would retain images illuminated by the sun. According to
Szarkowski, the emergence and ultimate “invention” of photography “depended on the confluence of three streams of thought. Two of these tributary sources had long histories as scientific disciplines called optics and chemistry; the third was the poetic idea that it might be possible to snatch from the very air a picture formed by the forces of nature (11). Although this third stream (leading materially to the efforts to discover a means to “fix” images) is most relevant to the contribution of writers to photographic invention, mastering chemistry and optics was essential to make material the “poetic idea” of snatching an image. This struggle was a subject of concern not just for the scientist, but for Hawthorne as well. Think, for example, of Hawthorne’s optics-driven 1831 story, “Sights from a Steeple,” with its narrator whose “eyes roam so coldly,” from a distant watchtower (196). Still, Szarkowski rightly points out that “the camera is central to our understanding of photography”; that is, the disparate experiments with optics and chemistry do not photography make (15). Only when they all coalesce does the new art/science finally “arrive,” and this event, historically, is not until the close of the 1830s.

All three of Szarkowski’s formative elements—optics, chemistry, and the poetic idea of possessing an image written by nature, as well as the ultimate ability to stabilize or “fix” the image—made historically undeniable in 1839—are present in Nathaniel Hawthorne’s 1843 short story, “The Birth-mark.” Although set in the late-eighteenth-century, a short paragraph in the middle of “The Birth-mark” clearly identifies the character Alymer as a proto-photographer, one of the many scientists in Europe and America experimenting (and, in this fictional case, succeeding) with nascent photographic processes. Alymer searches his scientific knowledge in vain for a method to exert control over his wife’s capricious birthmark: “…he proposed to take her portrait by a scientific process of his own invention. It was to be effected by rays of light striking a polished plate of metal” (45). Clearly Hawthorne has invested Alymer with the ability to make an image very much like the daguerreotype; yet beyond the story’s two sentences, there is no overt mention of what is an obvious reference to the popular (in 1843) process. Alymer has turned to “his own invention” when other processes fail to cure his “marked” wife Georgiana, and as such, his early portrait taking is presented as just one in a string of scientific failures. Yet he does record Georgiana’s image successfully, using a head brace to arrest her movement during
the long period of exposure. In the end, Aylmer seems capable of little besides spectral tricks and caustic potions. Little except, perhaps, photography.

Critics have generally considered the brief mention of daguerreotypy in the story as little more than an early indication of what becomes, by 1851 in *The House of the Seven Gables,* Hawthorne’s more mature interest in photography, represented in the person of Holgrave, the daguerreotypist/hero. The issue’s significance in the story typically rates little more than a passing mention. Alison Easton, for example, has noted Aylmer’s “quasi-magical recreations of actual life” and “attempts at photographic art merely reproduce his own obsessions and whose book is ultimately a record of his disasters” (142). John Gatta, Jr. remarks that Aylmer’s “visual wonders…may have reminded the author of more recent nineteenth-century inventions” (405-6). H. Bruce Franklin, in the essay “Hawthorne and Science Fiction,” clearly links the story’s visual “miracles” with three inventions—the diorama, the stereoscope, and the daguerreotype—available by the 1840s:

The alert mid-nineteenth-century reader would recognize Aylmer’s anticipation of Daguerre’s co-invention of the diorama in 1822 and daguerreotype in 1835 and Sir Charles Wheatstone’s invention of the stereoscope in 1832; he presumably would see evidence of two things: Aylmer’s marvelous inventiveness and the ephemeral achievement of that inventiveness. (122)

I agree with Franklin’s observations, but he stops short of detailing his claims with a close analysis of story specifics. Instead, photographic inventions for Franklin serve as a kind technological fodder which comes and go, quickly withering from wonder to relic before those who, like Aylmer, invest too much in the latest of inventions. I value Franklin’s brief notice of early photographic technologies in “The Birth-mark,” but there is a great deal more about photography at work in the story.

On the one hand, since Hawthorne transplants 1840s technology into a tale set in the late 1700s, “The Birth-mark” may be fairly termed “science fiction”; on the other, it is rich in photographic reference, especially if read in the context of photographic inception and proto-photographers. The story is set “in the latter part of the last century” in an attempt to situate the action in the context of the search for the process that would come to be known as photography (36). In addition to
this connection to the historical moment, the text engages with optics, chemistry, and the actions of light, and perhaps above all, the handling of sensitive emulsions.

“The Birth-mark” tells the story of Aylmer, an imbalanced man of science who uses technologies of his own design to attempt to improve upon nature. The offending natural anomaly is a reddish birthmark in the shape of a human hand on the cheek of his beloved wife, Georgiana. Aylmer reads the mark as an imperfection on an otherwise perfect visage and convinces his wife it must be removed. The scientist/inventor confines his wife during his experiments and, although he boasts his scientific prowess will ensure its safe destruction, he fails to remove the mark in a series of attempts. Eventually Aylmer, with the help of his henchman Aminadab, concocts the proper chemical mixture to eradicate the mark. Georgiana drinks the draught Aylmer has prepared and, as the birth-mark fades from Georgiana’s cheek, she dies from the treatment.

Ostensibly a critique of a man who, like Mary Shelley’s Victor Frankenstein, has turned science into his religion only to lose the object of his love, “The Birth-mark” exposes the emptiness of the Enlightenment’s intellectual promise. Sounding the refrain of Emerson, who warned in “Nature” that “the understanding adds, divides, combines, measures,” Hawthorne advocates a deeper truth than his main character comprehends (37). The narrator marks Aylmer’s faith in the power of science as a relic, a belief from “those days, when the comparatively recent discovery of electricity and other kindred mysteries of Nature seemed to open paths into the region of miracle” (36). Aylmer’s deep embrace of science’s conquering promise is a cautionary tale of a man who has devoted himself “too unreservedly to scientific studies” (43). Indeed, if Aylmer loves at all, he loves an ideal he longs to author himself. To the end, he places his faith in the regenerative promise of science to “make new worlds for himself” (36).

“The Birth-mark” is also preoccupied with the components of nascent photographic processes. One of the best known critical essays on Hawthorne’s story, Judith Fetterley’s “Women Beware Science: ‘The Birth-mark’” identifies this canonical work as a lesson in “how to murder your wife and get away with it” (22). I share Fetterley’s contention that the story concerns the “realities that underlie the scientist’s posture of objectivity and rationality and the claims of science to operate in an
amoral and value-free world” (30). Here she anticipates cultural critics of science, including Richard Rorty, who see the problem in cultural perception as one of overemphasis: “It is not a question of debunking or downgrading the natural scientist,” Rorty notes, “but simply of ceasing to see him as a priest” (36). Surely Aylmer aspires to god-like abilities while failing in the most basic of human emotions. Fetterley rightly points to Aylmer’s “massive self-deception,” manifested, she argues, by his living “in an unreal world, a world filled with illusions, semblances, and appearances, one which admits of no sunlight and makes no contact with anything outside itself and at whose center is a laboratory, the physical correlative of his utter solipsism” (30-31). Aylmer’s world is one in which he imprisons his powerless wife.

I interpret Aylmer’s world somewhat differently than Fetterley. More than a man in deep crisis, Aylmer is also a character deeply immersed in proto-photographic materials and concerns. Aylmer’s world is an “unreal” one, partly because it “admits of no sunlight.” This is because Aylmer has constructed a kind of photographic darkroom, a safe space for storing his wife, whom he treats as a sensitive photographic emulsion. Aylmer has deliberately “shut in the scene...excluding the sunshine, which would have interfered with his chemical processes,” just as inventors discovered was necessary (44). Georgiana’s boudoir is built to admit no sunlight, and Aylmer has added a variety of lamps which emit “a soft, impurpled radiance” to provide subdued illumination. Aylmer is confident he has drawn “a magic circle round her” to protect Georgiana from “evil” (44). He achieved this by sealing the apartment and installing dark lights that allow visibility, yet will not wither Georgiana, his material (44).

Once installed in the managed light of the dark room, Aylmer proceeds to ease his wife’s anxiety by a “magic” performance of “light and playful secrets” (44). Although Hawthorne leaves this phenomenon unexplained, he clearly indicates its origins in optical invention and the production of images. The following extended passage contains clues to Aylmer’s immersion in these technologies as well as to Georgiana’s position within the process:

Airy figures, absolutely bodiless ideas, and forms of unsubstantial beauty came and danced before her, imprinting their momentary footsteps on beams of light. Though she had some in-
distinct idea of the method of these optical phenomena, still the illusion was almost perfect enough to warrant the belief that her husband possessed sway over the spiritual world. Then again, when she felt a wish to look forth from her seclusion, immediately, as if her thoughts were answered, the procession of external existence flitted across a screen. The scenery and the figures of life were perfectly represented, but with that bewitching yet indescribable difference which always makes a picture an image, or a shadow so much more attractive than the original. (45)

In this passage, Aylmer conducts a magic lantern show and utilizes the external projections of a camera obscura. Taylor Stoehr, in his book *Hawthorne’s Mad Scientists*, has noticed this as well, although his mention of these technologies is, again, no more than a passing remark: “He [Aylmer] entertains Georgiana with the fruits of some of his labors—a magic lantern show, a camera obscura, a daguerreotype—all mere illusions, it may be observed, rather than substantial accomplishments” (118). Stoehr’s naming these optical phenomena is helpful, although he clearly considers Aylmer’s achievements in this regard meager. Taken in the string of Aylmer’s scientific failures, Stoehr sees this dabbling in “mere illusions” as further evidence to condemn a “mad” scientist. I read Aylmer as proficient in proto-photographic technologies. In this case, “mere” images are powerful entities and evidence of the scattered technological concerns that become photography. Aylmer has constructed a darkroom and, in turn, uses the magic lantern, the camera obscura, and a daguerreotype-like process in a thematic prelude to his larger photographic experiment.

Unlike the daguerreotype, the magic lantern, one of the technological antecedents of photography, was in use during the time “The Birthmark” was set. Developed by Athanasius Kircher in the seventeenth century, the magic lantern was the forerunner of the slide projector and motion picture technology. Jonathan Crary’s explanation of the technology in *Techniques of the Observer* suggests the probable effect upon Georgiana: “Kircher devised techniques for flooding the inside of the camera with a visionary brilliance, using various artificial light sources, mirrors, projected images, and sometimes translucent gems in place of a lens to simulate divine illumination” (33). Such optical manipulation often produced audience reactions not unlike Georgiana’s near belief that “her husband possessed sway over the spiritual world” (45). Haw-
thorne may, in fact, have had in mind the phantasmagoria, an advanced kind of magic lantern first exhibited in Paris in 1800 by Etienne Robert and Paul de Philipstal for “image projections of ghosts, skeletons, and celebrities in a semi-darkened theater.” Aylmer is undeniably engaged in managing “optical phenomena,” converting “a picture” into a more memorable “image” by directing “beams of light.” The “airy figures” Aylmer creates represent the public’s early associations of photography with the occult, and the phrase “absolutely bodiless ideas” indicates not only the gulf of understanding between the one who generates and the one who views the image, but also describes photography’s shifting essence at this point in history.

Although his experiments fail to achieve the results he desires, Aylmer is hardly a failed scientist. Indeed, the vast bulk of experiments conducted by the best scientists result in “failure.” The important point here, beyond the tenacity of Aylmer in his work, is that he understands the experiments, and that he controls the situation in which Georgiana finds herself. Aylmer wields the power and, in this case, proto-photographic technologies are the weapon. John Berger in “Understanding a Photograph” notes that photography is “a means of testing, confirming, and constructing a total view of reality. Hence the crucial role of photography in ideological struggle. Hence the necessity of our understanding a weapon which we can use and which can be used against us” (294). Using proto-photographic processes, Aylmer tests, confirms, and constructs Georgiana’s reality according to his own vain desires. Georgiana, on the other hand, can only defer to her husband’s scientific prowess.

With her husband’s unnamed projections moving “across a screen” before Georgiana’s eyes, she reacts to the “perfectly represented” images by interpreting them as “a shadow” more arresting and “so much more attractive than the original” (45). As Georgiana watches the images dance “before her, imprinting their momentary footsteps on beams of light,” she sees a preview of her husband’s proto-photographic abilities. Through her vague fear of her husband, she cannot divine that she herself is the raw material he will soon expose and manipulate. Nor at this point does she suspect she is already encased, a kind of sensitized photographic plate. Early photographers were indiscriminate in their efforts to establish a working host material for an enduring image of nature.
They attached emulsions to a variety of substances, including wood, stone, cloth, metals, and paper. Aylmer conceives of his wife—or perhaps her imperfect cheek—as an imperfect emulsion, as a surface which needs alteration and chemical adjustment so it may reach the precise moment when the ideal Georgiana (sans birthmark) can be “fixed” or stabilized.

The darkened chamber where Aylmer produces his dancing phantoms is essentially a camera obscura, funneling, as part of the show, images from beyond the room. A subtle transition from the magic lantern to the camera obscura occurs when Georgiana “felt a wish to look forth from her seclusion,” and “immediately, as if her thoughts were answered, the procession of external existence flitted across a screen” (45). Her thoughts are answered as Aylmer, a relentless observer, is ready with a new visual wonder of “external existence” when he notices his wife exhibit an independent urge. “Airy figures” and “beams of light” are replaced by the substantial reflections originating from beyond the enshrouded room. “The scenery and the figures of actual life were perfectly represented,” as the constructed darkroom doubles as camera obscura (45). Aylmer has momentarily arrested his wife’s attention with outside images thrown upon a screen, with Georgiana wholly unaware of her position within the oldest of cameras.

The short scene bridging the magic lantern/camera obscura show and Georgiana’s sitting for her portrait reinforces that she is an emulsion difficult to “fix.” Here Hawthorne explores the early struggle to capture images permanently. Aylmer directs his wife’s attention to a “magical” plant that sprouts and blooms before her eyes. He urges her to inhale its smell “while you may” and warns that the “ephemeral” flora “will wither in a few moments” (45). Although Georgiana is afraid to touch the plant, she follows Aylmer’s insistence, only to see the plant turn to ash. The plant’s death prefigures Georgiana’s and is a warning about human trespass onto inappropriate ground. The plant episode also identifies the dilemma faced by inventors in the late-eighteenth and early-nineteenth centuries regarding the fixing of fleeting shadows.

The chief difficulty for proto-photographers was that images could not be preserved inside a camera which, at the time, was merely an apparatus for viewing or aiding one to draw. By 1725 it was known that silver salts would darken when exposed to sunlight and, even though
it was possible to produce an image on a sensitized surface using sunlight, the rough image would then, because of its latent sensitivity, turn and blend into the darkness of the screen. Wedgwood produced what came to be known as “photograms” by placing objects such as leaves and insect wings upon sensitized paper and then exposing them to light, but retention of the image required it be kept in dark storage. In 1802 Wedgwood’s partner Davy, professor of Chemistry at the Royal Institution, described the status of the science in “An account of a method of copying Paintings upon Glass, and of making Profiles, by the Agency of Light Upon Nitrate of Silver. Invented by T. Wedgwood, Esq. With Observations by H. Davy.” He wrote, “Nothing but a method of preventing the unshaded parts of the delineation from being coloured by exposure to the day is wanting, to render the process as useful as it is elegant” (quoted in Litchfield 192-93). This difficulty is the essence of Aylmer’s struggle to perfect Georgiana’s visage. When Davy defines the problem as prevention of the “unshaded parts” from “being coloured,” he is describing the action of light on sensitized materials whose chemical impulse to darken cannot be arrested enough to retain the imprint of the objects before them. In terms of Georgiana’s sensitive cheek—“When she blushed it [The Birth-mark] gradually became more indistinct...But if any shifting motion caused her to turn pale there was the mark again, a crimson stain upon the snow”—the scientist’s challenge is to stabilize the mercurial emulsion so affected by external stimuli (37-8). The rapid dissolution of the plant, coupled with the fleeting images from the preceding magic lantern and camera obscura performances, suggest a preoccupation with the central obstacle of early photography.

From this last “abortive experiment,” Aylmer demonstrates, almost in passing, his mastery of the technology known to readers in 1843 as daguerreotypy. The irony, of course, is that Aylmer reads the successful if blurred portrait he takes as just another in a string of failures and not as an image grasped and held fast from fluid life. Instead, he “snatch[e]s the metallic plate” and tosses it into a jar of “corrosive acid” (45). Aylmer’s obsession blinds him to love, but it also blinds him to his successes in technological invention. The tiny, distinct hand appears clearly on the metal plate, mocking Aylmer’s attempts to produce an intact Georgiana without the mark, and his progress with photographic study ends, sending him back to his laboratory and his alchemic roots.
Hawthorne has embedded Aylmer in the world of proto-photography, particularly in photography's hereditary streams of optics and chemistry. He immerses Aylmer in the material elements necessary to begin the search for an answer of fixing an exposed emulsion. As Aylmer exhausts himself in "chemical experiment" (46), his hands betray a "stain of acids" (36) and his laboratory is full of requisite equipment: "around the room were retorts, tubes, cylinders, crucibles, and other apparatus of chemical research. An electrical machine stood ready for immediate use" (50). His affinity for chemistry and his use of electrical phenomena as well as his choice of books—Albertus Magnus, Cornelius Agrippa, and Paracelsus—clearly echo the pride of Victor Frankenstein. An experimenter with mixtures and baths, Aylmer promises his wife's "freckles may be washed away" (47) and Georgiana herself seems imbued with the chemical atmosphere when "she pour[s] out the liquid music of her voice" (50) and notes "the development of this experiment" (51). Aylmer's chemical affinities and expertise are matched with a proficiency in "optical phenomenon" exhibited in his proto-daguerreoty and use of the magic lantern, as well as in the power of his surveillant gaze (307). As the story opens, Aylmer "sat gazing" at his wife, specifically upon the "visible mark of earthly imperfection" (37). In his desire to remove the birth-mark, Aylmer adopts a plan of "intense thought and constant watchfulness," worthy of Jeremy Bentham, wherein his wife is placed within range of his panoptical eye. The narrative skepticism for the scientific promise to "make new worlds" notwithstanding, Aylmer's efforts involve focusing on his wife's cheek. His method of redefinition pairs chemistry with optics.

Aylmer represents a harsh source of light acting upon the sensitized surface of Georgiana. He who precipitates the fluctuation of the birth-mark by striking his wife with his powerful, focused gaze: "It needed but a glance with the peculiar expression that his face often wore to change the roses of her cheeks into a deathlike paleness, amid which the crimson hand was brought strongly out" (39). Aylmer's claim is that "he could draw a magic circle around her within which no evil might intrude" (44), but it is clear that the threat to the object in need of protection is already within the circle. Georgiana seeks to shield herself by placing "her hand over her cheek to hide the terrible mark from her husband's eyes" and ultimately, fearing the pain of over-exposure, im-
plores her husband: “Pray do not look at it again” (44). Like Melville’s Ahab, who would “strike the sun if it insulted me,” Aylmer has replaced the sunlight with his own arrogant illumination, hoping to arrest a fluidity he induces (144). Aylmer’s defiant costs Georgiana her life.

As was the case for his proto-photographic contemporaries, Aylmer’s problem is that he cannot readily stabilize the image he seeks to record. He has isolated the light-sensitive Georgiana, as well as demonstrated his prowess with optics and his experience in chemicals, but he cannot control the emulsion on which those materials contest. Georgiana suspects “she was already subjected to certain physical influences” and fears “a strange, indefinite sensation creeping through her veins” and, to be sure, she is the center of experiments before she can precisely say what those experiments are (48). This is more than a simple case of poisoning: in the proto-photographic search for a fixable chemical combination, Aylmer has Georgiana ingest the chemicals that kill her. He conceives of his wife as a sensitized surface and, if he cannot remove the mark, then his goal is to fix her at the point when the mark is no longer visible. In a competition that rivals the magical force which “left [its] impress” upon the infant Georgiana, Aylmer believes his wife is meant to receive his impressions like the “polished metal plate” he employs in the portrait. Georgiana’s role as a photographic plate is further illustrated upon her unexpected entrance to the laboratory when Aylmer “rushed towards her and seized her arm with a grip that left the print of his fingers upon it” (51). Under Aylmer’s sway, Georgiana conceives of herself as little more than a sensitized plate who will perish in the larger world if Aylmer has not “developed” her. In her submission, Georgiana interprets herself as a creature of delicate moral balance: “Were I weaker and blinder, it might be happiness. Were I stronger, it might be endured hopefully” (53). Failing to hear correctly, Alymer understands her delicate balance as a question of substance and scientific adjustment to ensure the proper moment never fades. These perspectives converge in the goals (noble for Aylmer, desperate for Georgiana) of chemistry.

At the moment of the final experiment, Georgiana, who has been an object of material study in an experiment since near the beginning of the story, names herself an object of material substance. She has found herself to be not a “who” but a “what,” and Hawthorne underscores this morph to objectivity with Georgiana’s words following the quaff-
ing of Aylmer's chemicals: "'It is grateful,' she said, with a placid smile. 'Methinks it is like water from a heavenly fountain'" (53). Here she collapses her identity into that of the chemicals now inside her. Georgiana is in the midst of a process of transformation she cannot name, but the process is moving her from an individual to a material; her identity is receding and merging with what Aylmer desires.

As with most scientific experimentation, repeated attempts are required for the scientist to discern the responsiveness of his or her material to various stimuli. Such is also true in Aylmer's attempts to fix Georgiana's appearance and identity into his imagined success. In his book, *Latent Image: The Discovery of Photography*, historian Beaumont Newhall explains the basic elements at stake in photography's formative years:

Almost every substance is altered by light, some to a greater extent than others. On this phenomenon photography depends. If light-sensitive material is exposed to an image, the varying intensities of light forming the image can be recorded and made visible. If the unexposed sensitive material is desensitized or removed, the record becomes permanent. (x-xi)

Georgiana, exposed to the flash of Aylmer's vision or light, awaits the scientist's discovery of a way to fix her cheek with the latent image of his vision. Having been exposed and secluded from additional adulterating light, the emulsion of Georgiana requires the "unexposed sensitive material" be "desensitized or removed" so the "record becomes permanent." As Georgiana's "earthly senses" wither, Aylmer scrutinizes her surface. With the birth-mark fading, Aylmer exclaims, "By Heaven! it is well nigh gone...Success! Success!" (55). I read what Newhall calls the "unexposed sensitive material" in need of removal as the rest of Georgiana. At this point, because the offending hand has disappeared through Aylmer's use of chemistry, the emulsion has stabilized and is no longer threatened by the addition of sunlight. Now that sensitive material has been desensitized, and now that Georgiana has been chemically transformed into a new state, Aylmer "drew aside the window curtain and suffered the light of natural day to fall into the room and to rest upon her cheek" (55). Aylmer's euphoric moment of photographic invention, the discovery of a combination of materials that allows the fixing of an image, quickly collapses into tragedy and murder when the mark fades
and is accompanied by “the parting breath of the now perfect woman” (56).

Hawthorne leaves the utterance of his “deeply impressive moral” (37) until the story’s end, when we learn that Aylmer “need not thus have flung away the happiness which would have woven his mortal life of the selfsame texture with the celestial” (56). That Aylmer has “flung away” his chances at happiness echoes his earlier action regarding the daguerreotype-like image he made of Georgiana: “Aylmer snatched the metallic plate and threw it into a jar of corrosive acid” (45). In his egotism and obsession, Aylmer has at once abandoned his wife, his happiness, and his success in photographic invention, squandering the chance “to look beyond the shadowy scope of Time” and “to find the perfect Future in the present” (56). In a sense, photography offers just such an opportunity—to see the perfect future in the present—and as such, it is appropriate that the character of Aylmer rejects the incipient science/art, especially at the moment of its inception. Even as he contrasts Aylmer’s mechanical vision with his corrupt moral vision, Hawthorne does not necessarily equate an embrace of photography with human degradation. It may be possible to embrace both photography and humanity, but Aylmer embraces only the former. The fact that he scorns the results of the photographic techniques he practices--largely because they unflinchingly verify what is present in nature--contributes to his unsympathetic portrayal.

The challenge exemplified by this fictional proto-photographer concerns, as Georgiana suggests, the ability or inability “to love what shocks you” (37). As the practice of photography solidified and developed in the early- and middle-nineteenth century, the ability to experience “the perfect future in the present” via the recorded image, would be challenged by whether or not its audience would love, accept, or tolerate what shocked them. John Berger, in “Understanding a Photograph,” asserts that what gives a photograph meaning begins with the photographer’s powerful creative choice: “I have decided that seeing this is worth recording” (292). In the case of Aylmer, his shock and displeasure at Georgiana’s birthmark propel his efforts to alter his wife into something “worth recording” or, one might add, worthy of his love. The fledgling technology at hand to affect such alteration and to serve such a narcissistic love, is proto-photographic.
Imbued with optics, chemistry, and emulsions, Hawthorne's tale is also concerned with writing and language. Aylmer places himself in opposition to the "spectral hand that wrote mortality where he would fain have worshiped" (39), and in her seclusion, Georgiana is drawn to the extensive production of Aylmer's own writing, evident in the "folio from her husband's own hand" (48). Aylmer's ultimate goal is to eradicate—or at least replace—the "spectral hand" with his own. The scientist's journal is the detailed record of his losing battle to control the mysteries of nature and "the thoughts of years were all concentrated upon the last" (54). Although Georgiana cannot know what Aylmer's experiments reveal, she does sense the volume is "both the history and emblem" of her husband's conflicted life (49). Here Hawthorne suggests an anxiety for the collapse of writing with image. He reinforces this collapse by having Georgiana lower her face onto Aylmer's page: "So deeply did these reflections affect Georgiana that she laid her face upon the open volume and burst into tears" (49). Clearly, Georgiana is becoming the experiment Aylmer has recorded in his journal, and she presses her own light sensitive emulsion into the leaves of Aylmer's written record. While she hopes that "perhaps every man of genius, in whatever sphere, might recognize the image (my emphasis) of his own experience in Aylmer's journal," it is her own image that is at stake and subject to encasement in Aylmer's folio (49). Once she has taken the supposed cure, Georgiana's place in her husband's records is confirmed by Aylmer's steady attention after administering the potion: "Not the minutest symptom escaped him. A heightened flush of the cheek, a slight irregularity of breath...such were the details which, as the moments passed, he wrote down in his folio volume" (54). Aylmer hovers above the subject of his experiment, ready to add his findings to the "intense thought [which] had set its stamp upon every previous page of that volume" (54). The folio pages that earlier received the "stamp" of Georgiana's visage, are now sealed with Aylmer's careful notations. Georgiana's earlier resolve, "Give me the goblet. I joyfully stake all upon your word (my emphasis)," has gathered deeper meaning (53). Hawthorne, if we read Georgiana as a photographic emulsion or plate, has suggested a complex collusion between visual representations and written text.

Hawthorne's "The Birth-mark" engages in conversation with the historical search for a viable photographic process and with the phe-
nomenon that had become a cultural force in the early 1840s. By 1843 daguerreotypy had moved beyond curiosity, but had not yet reached its zenith of influence or accessibility. Hawthorne places Aylmer closer to Wedgwood and Davy’s time, working at a moment before this new magic box of representation is opened for the world. Szarkowski, in *Photography Until Now*, puts the impact and antecedent conditions succinctly: “Radical disruptions have long prior histories. After many incremental successes and nominal failures a new idea (which is generally not so new an idea) gains a measure of success that lifts it over the threshold into visibility, at which point it is given a name and begins its official history” (11). Hawthorne had his own history with the process that came to be the art and science of photography. His short fiction on both sides of the 1839 photographic demarcation line demonstrate a demand for the retention of fleeting images, and a desire for the impression of truthful “pictures” on sensitive human emulsions that could, as Hawthorne stated, effectively “print off our deepest and subtlest, and delicatest thoughts and feelings.”

Through these tales, Hawthorne joined in the cultural work of those artists and scientists who desired something that was not yet achievable. Like “Foot-prints on the Sea-shore,” which explores the challenge of attaching meaning to impermanent images, the earlier tale, “Sights from a Steeple,” expresses such desire even more explicitly:

> The most desirable mode of existence might be that of a spiritualized Paul Pry, hovering invisible round man and woman, witnessing their deeds, searching into their hearts, borrowing brightness from their felicity, and shade from their sorrow, and retaining no emotion peculiar to himself. But none of these things are possible… (192)

Because this “most desirable mode of existence” was not yet possible in 1831 when Hawthorne wrote “Steeple,” the tale exhibits a longing for the ability to present images in an objective manner. “Fancy’s Show-Box” is more developed than either of these tales in terms of its focus on the desire to fix images, and in the implications such images hold for identity. The desire for a permanent way of recording images quickly engenders an anxiety for its implications and use. Hawthorne was attuned to this complex cultural desire, so much so that he anticipated the medium’s destructive possibilities, even though—and perhaps be-
cause—his experimentation was with pen and not with optics or chemistry. “The Birth-Mark” extends this exploration, insisting on an ethical inquiry into the actions of a character working, not during the heyday of daguerreotypy (when Holgrave plies his new trade), but during the moment when proto-photographers labored amid the matrix of creation. Taken together, these tales mark Hawthorne as contributing to and concerned with, as Batchen says, the “collection of aspirations for which some sort of photography was in each case the desired object” (50). Hawthorne’s literary relationship with the medium of photography cannot be fairly understood without this earlier imaginative component.

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