

CONTRIBUTORS

Conjuring in Fog: *Eadweard Muybridge at Point Reyes*

In 1871, Eadweard Muybridge (1830–1904) traveled on the steamship *Shubrick* from San Francisco to the headlands of Point Reyes, some thirty-four miles north. With a small party, he landed on the beach at Drake’s Bay, so called because this inlet is supposed to be the stopping place of the British navigator during his Pacific voyage of 1579, and made his way to the top of the cliff to create a portrait of the lighthouse which had recently been erected there (fig. 1).

This picture has been praised as a masterpiece of romantic reverie. Several qualities of the image are essential to this interpretation, including the positioning of the figures so that they do not interact with one another but gaze down at the crashing surf, and the fact that the horizon dissolves into an inchoate, misty abyss whose depth and distance are impossible to fathom. It is Muybridge’s ability to inspire this kind of metaphysical association that has caused his work to be identified within the immense archive of nineteenth-century landscape photographs as works of art. While he is perhaps best known for his motion studies, Muybridge is also a celebrated recorder of the western landscape. His 1868 and 1872 images of Yosemite, produced using large glass negatives called “mammoth plates” carried into the park on mules and sensitized and exposed in the field, have been praised as unsurpassed masterpieces (fig. 2).¹

Muybridge is generally known as a photographer who is able to make the unseen seen, especially in the motion studies he began

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Eadweard Muybridge, *First Order Light-House at Punta de los Reyes*, 1871. Albumen print from plate glass negative, 7 × 9 in. (17.78 × 22.86 cm). United States Coast Guard Historian’s Office, Washington, DC.



producing in the early 1870s and continued making at the University of Pennsylvania in the 1880s.² Indeed, he may be as famous for inventing the technological means of capturing individual moments of human and animal locomotion—batteries of cameras whose shutters were triggered by trip lines—as for the images themselves. But in the lighthouse pictures, what is notable is the unavailability of detail, particularly in the skies and seas that make up the backgrounds of the compositions.

Point Reyes is the westernmost spot on the West Coast of the continental United States, visible on a clear day from fifty miles offshore, and thus a significant landmark for those traveling by sea, as many still did at the time of Muybridge's exposures. This prominence is hardly obvious from his views of the building, however. For while it is clear from the composition that the light stands on, indeed takes up most of, a point jutting out over the sea, the background offers only a hint of sea and sky, with no horizon line to separate them. Indeed, the frothy water down below has the same tone and texture as the billowy clouds, reminding the viewer that both are composed of the same material elements.

While lacking a pleasing depiction of recessional space, the view is not without visual interest. Stymied in an attempt to penetrate the scene further, the viewer is prompted to look down, study the details of the rocky cliff in the foreground, and notice how the massive rocks below give way to a more sculpted and controlled plane of a road edged by cut boulders at the top. The rock in the right foreground with its white ring facing directly out catches our attention, especially as the rock just behind it seems to be another piece cut from the same boulder. One might see this as an articulation of the mastery of man over nature, a minor version of the achievement better represented by the lighthouse itself that is the focus of the composition.

Tiered like the cliff, the lighthouse looks solid and stable. We can see the rivets holding the exterior together, and the door facing the cliff is further protected from the elements by a protruding metal doorframe. The railing on the balcony comes up to the armpits of the man standing there, again offering a reassuring sense of security, and the light itself is secure within a double enclosure—exterior rail and interior casing of windows, covered with a slanting roof whose top is the only touch of whimsy in the scene. The light, as we can see, is massive, much taller than a human figure. The composition shows the bulb unobstructed in all directions, reminding us of the power of the light, a first-order Fresnel lens, whose compact form achieves

2

Eadweard Muybridge, *Falls of the Yosemite*, 1872. Albumen print from plate glass negative, 21 ¼ x 16 ¾ in. (54.0 x 42.5 cm). Yale University Art Gallery, New Haven, Connecticut. Gift of Harrison H. Augur, B.A. 1964, 1980.27.3.



projection power by incorporating rings of prisms on each domed surface to capture and reflect more light from the internal source than the bulkier lenses which preceded it.³

In his 1873 catalog of photographic views, Muybridge lists thirteen whole-plate (seven-by-nine-inch) views of Pacific coast lighthouses and seventy-two stereoscopic views of the same subject. In both groups, the Point Reyes light is prominently featured; it comes first in the catalog listing, and while there is only one large print of each venue, no fewer than fourteen of the stereos depict this site. This is more than any other lighthouse included in the group. When examined as a whole, these images share many qualities with the photograph with which I began. In particular, most show the lighthouse or the point from close range in compositions that lack a background or horizon line, in many cases dedicating a significant portion of the composition to a milky, impenetrable sky, as, for example, in the view from the lighthouse looking south (fig. 3). Under the right conditions, this point of view might have revealed a glimpse of the Farallon Islands or a whale breaching in the gulf, but this photograph is impenetrable; the eye catches on the rough cliff face in the immediate foreground whose consistent texture gives no clear sense of the scale or distance of each crag. Presenting a drop-off immediately inside the bottom frame, the picture offers viewers no purchase on the view, undermining the sense of mastery offered by other western landscape photographs of the period such as the images made by Timothy O'Sullivan (1840–1882) for the United States Geological Survey.⁴

3
Eadweard Muybridge,
*Point Reyes, from
Light-House Looking
South*, 1871. Stereo-
graphic albumen print
from plate glass negative,
3 × 3 in. (7.62 × 7.62 cm)
(each exposure).
Bancroft Library,
University of California,
Berkeley, BANC PIC
1971.055: 834-STER.





4

Caspar David Friedrich, *Der Wanderer über dem Nebelmeer* (Wanderer above the sea of fog), 1818. Oil on canvas, 37 × 29 in. (94.8 × 74.8 cm).

Hamburger Kunsthalle, Hamburg. On permanent loan from the Foundation for the Promotion of the Hamburg Art Collections.

Does this lack of the vanishing point essential to picturesque landscape representation signal aesthetic failure? Muybridge scholars have folded the potentially aberrant lighthouse photographs back into the artist's oeuvre by linking them to the same kind of aesthetic experience of nature that has been found in Caspar David Friedrich's (1774–1840) haunting depictions of lone observers contemplating the sublime vastness of the North Sea, such as the 1818 *Wanderer above the Sea of Fog* (fig. 4). For example, Philip Brookman writes of *Point Reyes, from Light-House Looking South* (1871), “[Muybridge] brings forth at once both the moment fixed in the photograph and the eternal nature of time. . . . The structure's symbolic relationship to the natural world—the light is a warning signal to sailors about a physical danger they do not see—is transcended by the vastness of the ocean. The sailor's journey is one, like that of Odysseus, with no ground on which to stand, no horizon, and no safe harbor in site.”⁵ In this interpretation, the figures positioned in the composition take on the role of the Romantic *Rückenfigur* marveling at nature. This Romanticism is similarly evoked by Muybridge biographer Rebecca Solnit, who describes “his pleasure in observing natural phenomena for their own sake . . . [as] evidence of his persistent passion for the mutable, the fleeting, and the unstable” enabling the abstract conception of time as an unending series of moments.⁶

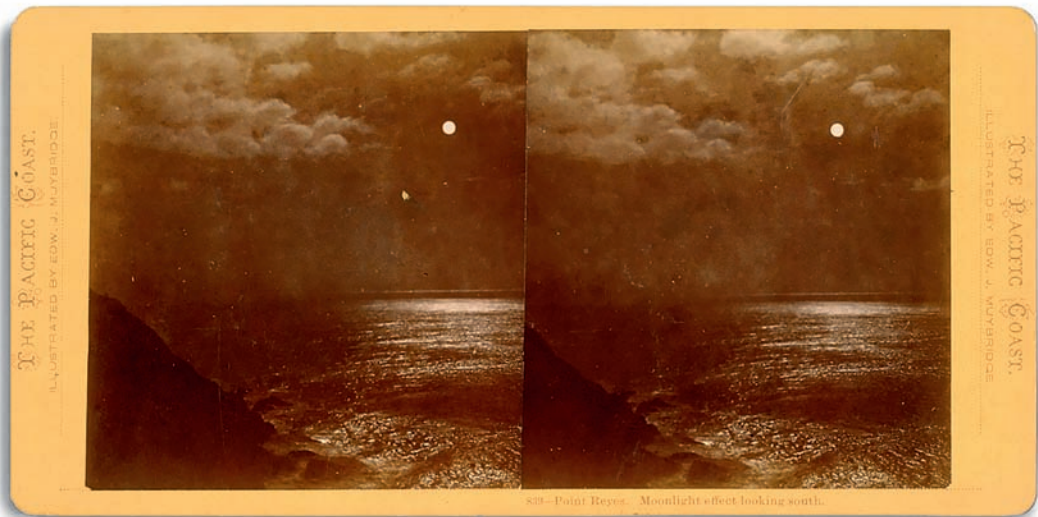
The problem with this interpretation is that Muybridge's figures are not “above the fog” like Friedrich's heroic wanderer but are stuck within it, a fact that is reinforced when looking at his other depictions of Point Reyes. Whether he looks north, south, down at the water, or out to sea, there is no getting “above the fog,” and this Odysseus-like predicament was, for Muybridge's patrons, the United States Coast Survey, far from allegorical. Point Reyes is the second foggiest place in North America, and the difficulty of seeing in this region is testified to by the numerous carcasses of ships that came to lie on the seafloor surrounding it, twenty-one in the three decades preceding the illumination of the Point Reyes light.⁷ The *San Francisco Chronicle* described the waters of the region as “a land of wrecks,” and one letter to the Lighthouse Board listed the total costs incurred there in the 1860s alone (the damage or loss of seven vessels) as \$756,827.⁸ As one book offering navigational advice noted: “Sailing vessels from the northern coast are sometimes two and even three weeks without observations on account of the density of the fogs.”⁹

From this perspective, it might be said that the fog in Muybridge's pictures is less about metaphor than it is about materiality—offering

a record of the geographical and climatic conditions of the Pacific coast and the instruments used by Muybridge and his employers to engage this environment in a way that met their own needs. Significantly, we might also think of the fragments of silver fixed to the surface of an albumen-coated piece of paper that present the *image* of fog to us as material. And we might further recall that making a photograph in foggy conditions unsettled the photographer's confidence in the operation of his tools. As a result, I would argue that these photographs do not demonstrate mastery over that environment but, rather, document a struggle and negotiation between human and nonhuman forces in the environment. In yielding information about this engagement, they offer an opportunity to gain a deeper understanding of the material practice of photography even as they unsettle complacent narratives about the ease with which nature can be pictorially claimed and controlled by human beings. As my investigation of the Pacific coast environment and period writings about its significance will demonstrate, Muybridge's photographs document what political theorist Jane Bennett would later call "the negative power or recalcitrance of things." The best interpretation of this body of work requires moving beyond an exclusive focus on the image maker and his or her human patrons, critics, and collaborators to an understanding of how each interacts with the natural world and vice versa.¹⁰

By considering the landscape to be a potentially interfering factor in the making of images of the American West, I want to complicate an older argument, which has asserted that a visual representation of space as already known and owned was sufficient to control geographic territory, advanced in the work of scholars such as Albert Boime, Alan Trachtenberg, Nancy Anderson, and W. J. T. Mitchell.¹¹ These scholars have made a vital contribution by identifying the key role played by aesthetic landscape representation in the conceptual work of westward expansion, but their reliance on a notion of conquest through image making belies the fraught and often failing negotiations with nature that were frequently involved in the work of expansion. Focusing on an example that challenges the confidence in Manifest Destiny expressed by the painters and photographers they discuss, my work serves to undermine our sense of the inevitability of American settler colonialism.¹²

As I will argue, Muybridge's work at Point Reyes is very revealing about the specific challenges involved in depicting the Pacific coast for American sailors in the second half of the nineteenth century. In meeting these challenges, Muybridge engaged the visual culture of navigation that had emerged from earlier attempts to envision the



5
 Eadweard Muybridge,
*Point Reyes, Moonlight
 Effect Looking South*,
 1871. Stereographic
 albumen print from
 plate glass negative,
 3 × 3 in. (7.62 × 7.62 cm)
 (each exposure).
 Bancroft Library,
 University of California,
 Berkeley, BANC PIC
 1971.055: 839-STER.

unfamiliar, but the resulting work may best be understood as a sign of negotiation, not mastery. I will show that Muybridge’s visual strategies not only reveal his own culture’s insecurity about how meaningfully to frame the Pacific, but they also open up opportunities for a careful viewer to see that this coastal landscape was not nearly as alien to members of other cultural groups.



From the moment of its origins, photography has been celebrated as an artifact made simultaneously by man and nature. While we have moved on from William Henry Fox Talbot’s notion that photographs are drawn by the “pencil of nature,” we still cling to photography’s indexicality—Peirce’s term denoting the physical relationship between that which is photographed and the resulting image—as its defining quality. This line of thought has produced extraordinary photo criticism, particularly in Roland Barthes’s work on how photographic meaning is produced both through what is self-consciously put into a picture by the photographer and by the “punctums” that may occur because of details in the scene outside of the image maker’s control or even consciousness.¹³

As long as there has been photography there have also been interferences in the direct communication between object and image that this kind of analysis implies. In our digital age when retouching the celebrity image is frankly expected, we are most sensitive to those

interferences which are intentionally placed there, such as the widespread phenomenon of spirit photography in the nineteenth century or other early forms of photocollage. Muybridge was certainly alert to the potential of retouching; he frequently created composite prints that borrowed information from two different negatives, as in his presentation of a moonlight effect at Point Reyes in an image that was undoubtedly taken on the same foggy day as the other Point Reyes photographs already discussed (fig. 5). By 1871, Muybridge was an experienced and persistent camera operator. He even developed new tools keyed to the challenges he faced. For example, in 1869, he patented what he called a sky shade, a device that could be attached to the frame of a camera to limit the exposure of a portion of the negative by casting the top part of the lens in shadow, solving a persistent problem facing landscape photographers: the fact that the blue light of the sky was exposed more quickly than the rest of the negative, resulting in pictures that showed no atmospheric details.

At the same time, it would be wrong to suggest Muybridge or anyone else exercised complete control over the photographic process at this time. Elsewhere, I have discussed another kind of intervention which occurred because damage to the negative created marks in a finished photographic print that were unconnected to the scene in which the photograph was made.¹⁴ The fingerprint in the late print of this Carleton Watkins (1829–1916) photograph (fig. 6) is not the result of self-conscious manipulation but, rather, a reminder of the usually unmarked material processes that occur between the moment of exposure and the finished print encountered by the viewer of a so-called straight photograph.

These processes occurred both in the camera and in the darkroom. When one considers the steps Muybridge undertook to create his Point Reyes images, it is easy to see that there were many opportunities for such things to happen. Muybridge traveled to Point Reyes on a ship moving through uncertain seas and landed at a beach from which his equipment would have been lifted by rope to the top of the peninsula. At any point in this process, his wooden box camera could have been jostled in such a way to create a slight crack at a joint that would allow light to leak in, a glass plate for a negative could have cracked, chemicals could have spilled. Once he had set up a shot, he prepared and exposed a negative and then packed everything up for the precarious trip back to his darkroom.

Avoiding damage to equipment was only one obstacle in Muybridge's way in making these pictures. The photographer also



113. Section of the "Grizzly Giant," 33 feet diameter, Mariposa Grove, Cal. Photo, San Francisco.

grappled with atmospheric conditions that influenced the effectiveness of the chemical operations involved in making his exposures. Marcus Aurelius Root (1808–1888), a noted photographer and writer based in Philadelphia, wrote about the necessity for photographers to understand the impact weather had on their practices in the field and darkroom: “Changes of weather affect the action of the sunbeam upon the chemical coating which receives the impression, and accelerate or retard the development of such impressions,” and he tells of a colleague whose work was impeded during damp weather so much that he was, to quote Root, “(technically speaking) ‘lost in the fog.’”¹⁵ Root notes that the presence of some “fleecy clouds and vaporous haze” is beneficial because of its ability to dilute the bright-blue light of a clear sky. The underlying lesson is that the photographer needs to understand atmospheric conditions, such as humidity and what Root calls “electricity,” and work with them in order to produce the desired result. Root’s words remind us that Muybridge would have had to adjust the chemistry used to coat his negatives and assess the modifications needed in his shooting practice to give the fog which surrounds Point Reyes the pictorial form he desired.

My discussion so far has focused on confronting fog as an atmospheric condition. But in the history of photography, the term also refers to a cloudy passage in the visual field that does *not* index the weather. Photographic fog is defined as a coating that appears on a negative obscuring the recorded image. As M. Carey Lea (1823–1897), whose writings Muybridge followed in the professional journal the *Philadelphia Photographer*, notes, “Fogging is a trouble that affects different operators very variously; some are very frequently, others almost never affected by it. The learner may expect to be frequently troubled; the experienced operator will have learned how to avoid it, except, perhaps, when he works under unusual conditions, or with chemicals different from those which he habitually employs.”¹⁶

Fogging took many forms, ranging from a negative that was completely blank, or one in which an image disappeared over the course of developing, to negatives that when developed had only a narrow tonal range. In addition, fogging could occur in isolated parts of an image. Lea diagnosed three potential sources of photographic fog: issues with the camera, in particular a camera that leaked light onto the unexposed negative; issues with the chemistry of the emulsion or the developing baths, ranging from old or inactive materials to mistakes in preparing solutions; and problems with “the atmosphere of the dark room,” which could stem from the presence of fumes or dampness.¹⁷

6

Carleton Watkins,
*Section of the Grizzly
Giant with Galen
Clark, Mariposa Grove,
Yosemite, 1865–1866,*
printed ca. 1876.
Albumen print from
plate glass negative,
20 ⁷/₁₆ × 16 in. (52.23 ×
40.64 cm). Metropolitan
Museum of Art,
New York. The Elisha
Whittelsey Collection,
The Elisha Whittelsey
Fund, 1972, 1972.643.3.

Chemical fogging can be quite obvious. But in some of Muybridge's Point Reyes images, it is difficult to determine what kind of fog we are seeing (fig. 7). While the veil across the expansive background of a distant view of the lighthouse seems to be a record of vapor *seen*, the relative lack of tonal range and clear focus in the rocks in the foreground seem to signal what Lea would call an "operational failure." This becomes clearer when showing the image next to the close-up of the lighthouse, in which both the details of the foreground and the richness of color are more dramatic (see fig. 1). Interestingly, both prints are darker in the lower-left corner than in other portions of the image, which may record a distinctive aspect of Muybridge's handling of the plates or reflect the inability of his lens to expose his negatives evenly. What we see in this corner of the view is something not visible to Muybridge at the site—fog or another kind of "failure" that indexes not Point Reyes but the materials from and through which such an image is produced. This kind of fog might be an artifact of the other kind—a disruption of the image caused by the humidity in the air at Point Reyes—or bring into our consciousness another environment altogether, perhaps the inside of Muybridge's camera or the darkened room on Montgomery Street in San Francisco where the glass plate from which the pictures were made sat in a bath.

The ability to respond to material challenges was presented by Root and Lea as part of the photographer's job, a construction that sees picture making as the act of a human in control of his tools and surroundings. But given the frequent occurrence of failure, it could be more effective to think about a photograph as the product of what has been called "distributed agency."¹⁸ Robin Kelsey has argued that photographs can be seen as "vital[ly] address[ing] . . . the material conditions of [their] production."¹⁹ Building on (and departing from) Rosalind Krauss's earlier writings on nineteenth-century photography, Kelsey reminds us that the cameramen of Muybridge's generation approached their work with a keen sense of the specific task at hand as well their own pictorial ambitions. For Timothy O'Sullivan, for example, the conditions of his work were structured by the record-making and propagandistic needs of the Wheeler Survey in the American Southwest. Kelsey takes into account not only the research done by the surveyors but also the material mode of conveying that research in illustrated reports as structuring conditions for O'Sullivan's work. Such things are also important to take into consideration in coming to terms with Muybridge's photographs for the US government.





7
Eadweard Muybridge,
*First Order Light-House
at Punta de los Reyes,*
1871. Albumen print
from plate glass negative,
7 × 9 in. (17.78 × 22.86 cm).
United States Coast
Guard Historian's Office,
Washington, DC.

However, I would argue that the environment in which the images were made can also be seen as a contributor to the photographs.



But first, what was the task, broadly speaking, that Muybridge was executing in making these pictures? The records of Muybridge's commission to make these photographs are incomplete. The Light-house Board files in Washington, DC, include a letter from Muybridge to Colonel R. S. Williamson negotiating fees for the task of making

pictures of new lighthouses when they are completed.²⁰ According to Muybridge scholar Gordon Hendricks, some of the earlier lighthouses had been documented by a different firm that no longer wanted the job.²¹ Muybridge asked for a daily fee of twenty dollars for time and expenses and in return offered to send two prints of each light and additional views when requested, with multiple prints furnished for an additional cost. The board saved money by asking Muybridge to accompany the tender ship *Shubrick* on its annual trip to supply and maintain the Pacific coast lighthouses. Muybridge undertook the commission in January of 1871, when nineteen of the projected twenty-one lights had been completed and lit. The images from Point Reyes were submitted to Washington in early May of that year.²²

As this timing indicates, these photographs were not made as a means of facilitating the siting or construction of the lighthouses but as evidence of their completion. As such, it would be wrong to think of them as “scientific” pictures. Indeed, as Robin Kelsey and Jennifer Tucker have pointed out, the tendency of later scholars to interpret pictures made under the auspices of nineteenth-century scientific endeavors as contributing to that scientific research is generally inaccurate. For example, the photographers on the United States Geological Survey projects were generating promotional materials and documents of work accomplished, not providing evidence to support a geological claim.²³ Muybridge’s pictures served a similar promotional purpose at least once. In March 1874, the Lighthouse Board supplied images (and presumably information) for an article promoting American lighthouses published in *Harpers New Monthly Magazine*. Author Charles Nordhoff praises the board for making the American lighthouse service “at the head of all for its excellence of different devices for relieving navigation risks.”²⁴ Nordhoff goes on to explain the particular challenges offered by the Pacific coast environment and to champion the board’s ability to respond to these challenges by making different choices about building design in different locales. Illustrations of thirteen different lighthouses and buoys demonstrate this variety and an engraved copy of Muybridge’s Point Reyes photo appears among them. The fact that the United States Coast Guard historical collection has exhibition prints of many of Muybridge’s photos, mounted on heavy stock with printed titles that identify the view but not the photographer (see fig. 7), suggests that these images circulated, perhaps for other illustrations or for inclusion in an exhibition of the board’s work.²⁵ The modern Coast Guard absorbed the lighthouse service in 1939.

Muybridge claimed that “the careful execution and surpassing excellence of his work has occasioned his being employed during several years by the U.S. government in the production of the numerous views upon this Coast, required by the Treasury and War Departments.”²⁶ However, it is likely that Muybridge’s relationship to the government was convenient and informal, based not only on the quality of his work, but also on his availability and location close to the work. The logistics of the assignment were coordinated by George Davidson, who was director of United States Coast Survey activities in the Pacific. The Coast Survey worked closely with the Lighthouse Board, sharing many key staff members. For example, when Congress created the Lighthouse Board in 1852 as a division of the Department of the Treasury responsible for constructing and maintaining lighthouses and other navigational aids, the group included Alexander Dallas Bache, who was the superintendent of the US Coast Survey.

This agency was created in 1807 to enhance American navigation and naval defense by producing a consistent and systematic study of coastal waters using the latest scientific methods. Science in the service of commerce was considered an appropriate federal investment in the Early Republic, when there were misgivings about the appropriate extent of governmental patronage. Because of this, the Coast Survey (and, to a lesser extent, its military complement and sometime rival, the Army Topographical Engineers) attracted some of the best scientific minds of the time. Especially under Bache, great-grandson of Benjamin Franklin and founder of the American Academy of Sciences, the Coast Survey became the organization taking on the most complex and ambitious work on the continent, with many figures going on from the agency to found science departments at major universities. Davidson had been a student of Bache’s when the latter taught at Philadelphia’s rigorous Central High School, and he followed his mentor into the Coast Survey. He was sent to California to produce reliable navigational charts shortly after the Gold Rush made them essential, and except for a break during the Civil War, he conducted the rest of his career from San Francisco, publishing several editions of *The Pacific Coast: Coast Pilot of California, Oregon, and Washington Territory* (hereafter *Pacific Coast Pilot*),²⁷ producing numerous charts, and conducting the first American exploration of Alaska in 1867. Like Bache, he had broad scientific interests, at one time holding the presidency of the California Academy of Sciences.

It is unclear how Davidson came to hire Muybridge for the lighthouse commission. Perhaps they shared information about Alaska

before Muybridge's trip there in 1868. The encounter may have occurred at the Mercantile Library, an organization established in 1852 to foster conversations about literature and science. Muybridge served as a director of the library and donated copies of his photographs of California scenery. The California Academy of Sciences, where Davidson served as president in 1871, may also have been the site of an encounter between the two men. Or the commission may have been the result of a referral from a member of San Francisco's elite, many of whom were commissioning Muybridge to document their properties in the late 1860s and early 1870s.

The Coast Survey and Lighthouse Board came to Muybridge within the context of a multipronged effort to tame the Pacific coast environment by making accurate visual representations of it in the form of maps and charts and using lighthouses, fog signals, and channel markers to direct mariners past its often undetectable hazards. The particular dangers of the Pacific coast are the result of its environment. It is often the case that when humanists and social scientists discuss the Pacific, or the Atlantic, for that matter, it is the objects that transcend the ocean that take focus, whether they be exotic trade goods, human chattel, Enlightenment notions, or works of art. The ocean is an arena in which societies interact, sometimes peacefully and profitably and just as frequently with conflict. We discuss the China trade, the Pacific theater of war, and Pacific empire as expressions of human desires and ambitions. But as we move further into an Anthropocene—a term used to describe the historical period in which human activities began to significantly affect the operations of the natural environment²⁸—it is vital to also consider how we might look at human interactions with natural systems in earlier periods and reconstruct the roles played by aspects of the environment in these social histories. Such investigations would not only reveal how the Pacific ecosystem helped shape the social conflicts and negotiations that took place within it, but might also offer models from the past that could help envision future human-nonhuman interactions.

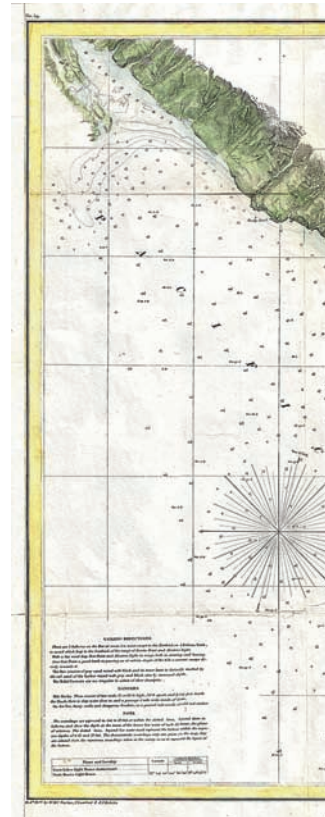
The topography and weather of the Pacific coast of the Americas are intimately related, as the fog is an artifact of the geological formation known as the Pacific Coast Ranges, a line of mountain ranges that extend down from Alaska through South America along the edge of the American continents. These peaks, the result of plate tectonics, trap moisture blown in off the ocean by the prevailing westerly winds ("Westerlies") along much of the coastline. Pacific waters may be thought of as making up a vast ecosystem held together by prevailing

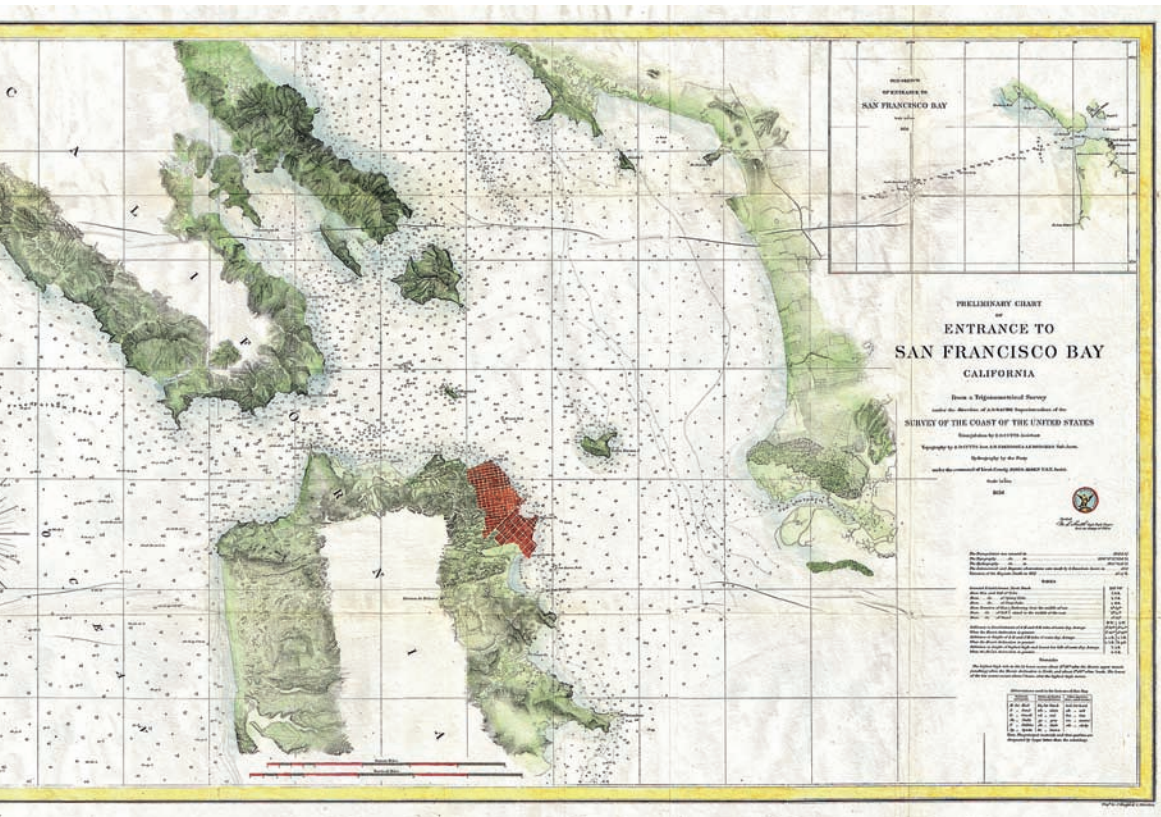
winds and currents that circulate plant and animal species throughout the ocean. These winds and currents also served to propel trade vessels across the waters, bringing them west along the equator and driving them back toward the Americas along the northern and southern reaches of the Atlantic. Like the whales that inspired so much human exploration of the Pacific, other creatures are also disseminated throughout those waters, including mollusks, algae, and the birds that feed on them. Pacific peoples mastered these natural forces enough to themselves follow the prevailing currents for hundreds of miles, and when whaling and the China trade brought European ships into the region, they, too, followed the circular paths inscribed by natural forces, generally without making landfall along the most mountainous areas of the Coast Ranges. The Manila Galleons, the Spanish trading ships that helped fuel the economy of the Spanish Empire by bringing the China trade to Mexico, depended on a knowledge of and cooperation with these natural forces.

John Law has argued that it is impossible to understand the Western oceanic expansion of the early modern period unless “the technological, the economic, the political, the social and the natural are all seen as interrelated.”²⁹ His explanation of the Portuguese dominance of the early spice trade draws on the fact that the Portuguese mobilized and combined elements of all these categories. Law interprets the specific tools through which exploration was carried out as providing an example of Latour’s conception of distributed agency that collectively, in Law’s words, “extract[s] compliance from the environment.”³⁰ Law explains the essential qualities of tools that offered material support of long-distance control: they must be portable and durably designed to survive and adapt to the instability of sea travel. Fitting under this umbrella are five things: seaworthy vessels; astronomical knowledge communicated through tables and charts that mark the movement of the sun and stars throughout time and space and indicate how to take measurements; geographical knowledge similarly documented in charts, maps, and journals; instruments for taking these measurements such as astrolabes and quadrants; and skilled human navigators with both the physical and mental acuity to manage. For Law, the agents involved in long-distance maritime control can be summarized as “documents, devices, and drilled people.” Charts and other graphic navigational aids that visualized the natural hazards of the ocean were a key component of human competition in the region, and these things were closely guarded; each commercial or national interest developed and kept close control over its own resources.

As soon as it was a nation, the United States eagerly entered this sphere to sponsor its own oceanic surveys. The first Yankee whaling ships came to the Pacific in 1791, and in 1828, the United States Congress voted to send an expedition to the Pacific with the purpose of developing commerce and fishing there by making reliable documents of its own. This act resulted in the United States Exploring Expedition of 1838–1842.³¹ In addition to maps and charts, good navigation relied on physical objects to guide ships through coastal waters. One of the early acts of the United States was to support its own military and civilian navigation by founding the United States Lighthouse Establishment, an institution within the Department of the Treasury, in 1789. The first federally built lighthouse was erected at Cape Henry at the entrance to the Chesapeake Bay in 1792. Fifteen years later, feeling a demand for better and more extensive charting of American waters, the United States also established the Coast Survey. The agency worked with the Lighthouse Board (the heir of the Lighthouse Establishment) to choose locations for Pacific coast lights. Throughout the early nineteenth century, the need for lighthouses, beacons, and buoys was a regular refrain in political speeches, including Andrew Jackson’s State of the Union in 1834.³²

By and large, the early economic development in the Pacific didn’t require coastal charts or supports for coastal navigation. While there was some Spanish and Russian settlement along the Pacific coast, ocean travel did not include the need to develop major ports along these shores or to develop navigational aids to help manage traffic arriving from multiple directions. This changed with the US annexation of California and the onslaught of vessels seeking port during the Gold Rush. The coastal fog, combined with the treacherous shoals, islands, and submerged rocks that are the marine extension of the Coastal Range, increased the frequency of wrecks and necessitated the federal establishment of navigational aids. In 1849, the Coast Survey extended its work to charting the 1,300 miles of US coastline (8,900 miles counting bays and inlets). The work began with taking measurements of the depth of channels into and out of major ports (fig. 8) and proceeded with the proposal of locations for a series of lighthouses which would facilitate the traffic into California harbors. Within two decades, the survey put this knowledge into the hands of all citizens. George Davidson’s *Pacific Coast Pilot*, first published in 1869 and revised and expanded twenty years later, was an almanac-like book combining a narrative description of a region and its hazards; demographic, ethnographic, and historical information; and advice





8
 United States Coast Survey, "Preliminary Chart of the Entrance to San Francisco Bay," 1856. Printed illustration, 20 1/2 x 38 in. (52.07 x 96.52 cm).

for navigators, including descriptions of landmarks and suggestions for proceeding in a wide array of conditions of weather, season, and time of day.

Navigational aids were particularly important because the development of ocean-worthy propeller-driven iron steamships meant that travel could be conducted without relying on winds and currents. But the coastal environment held dangers even for these ships.

The fact that West Coast lighthouses were planned in the early 1850s and were only finished being built when Muybridge made his pictures in the 1870s gives a hint at some of the challenges involved in extracting environmental compliance from the region. There were social factors—during the Gold Rush, workers often abandoned the Coast Survey for the lure of riches in the goldfields, and Civil War service called up many of the experienced engineers, including Davidson, and the Coast Survey continually faced legislative opposition to the appropriations needed to support its operation.³³ But the ecosystem provided its own challenges. Law does not consider nature

an actor in the system of distributed power he describes. Yet it is helpful to think about how natural forces resisted the human control of the Pacific coast.

The Coast Survey's work was more about groping for knowledge than asserting control. This is well illustrated by the fact that much of its research was achieved by a practice called "sounding." The very name of this procedure, which involved lowering a weighted line to determine the depth of a channel and the nature of the seafloor, reminds us of navigation's reliance on all the senses working together: sounding appeals as much to the sense of feeling as it does to hearing, and moving forward relies on cross-referencing sensory experiences, since different atmospheric conditions affect not only sight but also the movement of sound waves. But the thick atmosphere of the Pacific coast confounded the senses. Fog not only denies sailors the ability to detect obstacles using sight; it also impairs hearing, as it changes the direction and strength of sound waves. In 1858, for example, the Lighthouse Board determined that the weather at South Farallon Island rendered the lighthouse frequently useless and had a fog signal installed, only to find the latter was also unreliable due to the atmosphere's interference.³⁴

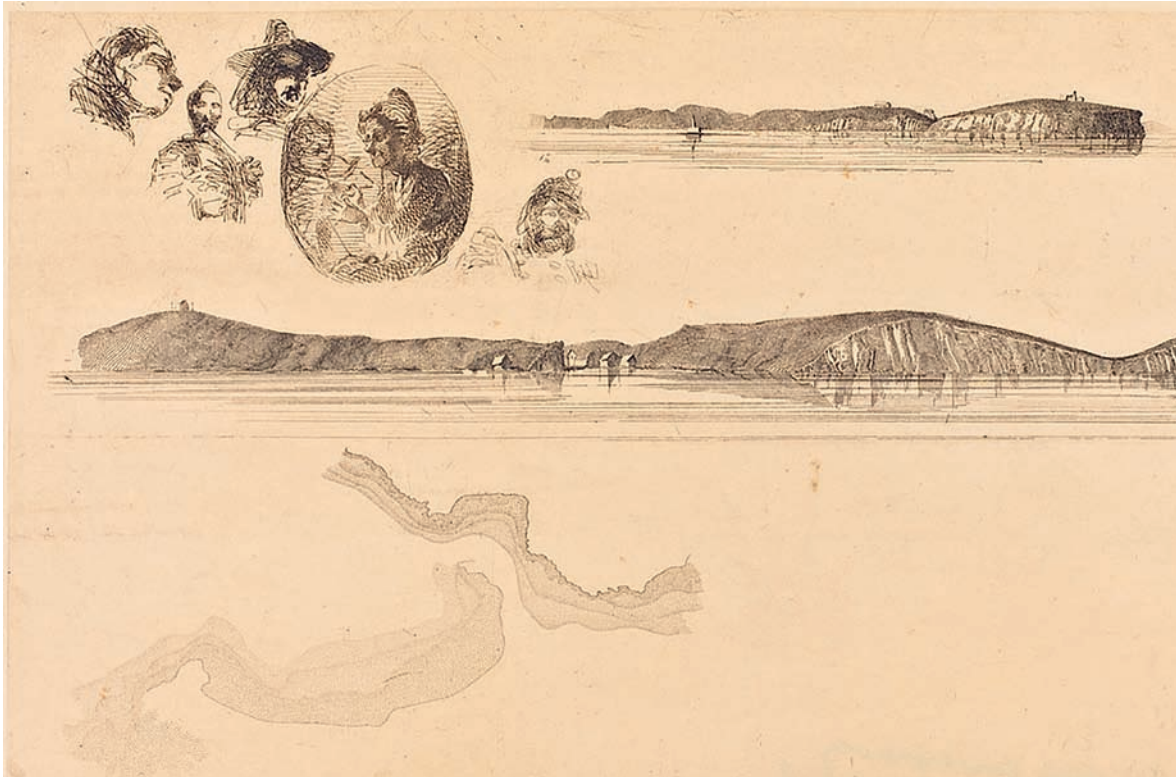
Because of these conditions, the coastline was routinely described as unmanageable and the Coast Survey was viewed with skepticism. Before the Farallon light was finished, an article stated that it "could be of no use in entering the harbor in foggy weather, and probably but little any other time."³⁵ Further up the coast was the challenge of opening safe passage into the mouth of the Columbia, where the roiling encounter of ocean and river offered unpredictable hazards. "Mere description can give little idea of the terrors of the bar of the Columbia," wrote Charles Wilkes, commander of the United States Exploring Expedition. After losing a boat there, he called it "one of the most fearful sights that can possibly meet the eye of the sailor."³⁶ When the project of erecting lighthouses began, the Lighthouse Board itself faced this problem, losing *The Oriole*, a ship full of supplies en route to build the light at Cape Disappointment on the Washington coast at the mouth of the Columbia River in 1853.³⁷

This circumstance helps explain why each Pacific coast light had the different architectural features described by Nordhoff. On the Atlantic coast, most lighthouses are tall, slender beacons that extend into the sky with an attached keeper's residence. Many eastern lights were built from the same architectural plans. But on the Pacific coast, the location of a beacon dictated the height and shape of the tower

as well as the proximity of the keeper's home. As a result, a light might appear as a tower or be nestled into a cliff face. This development only occurred over time, however, as a result of trial and error. In the beginning, the Lighthouse Board set out to efficiently and inexpensively install six lighthouses all based on plans drawn up by the Baltimore architectural firm Gibbons and Kelly.³⁸ But this model proved unequal to the conditions in at least one location and had to be redesigned.³⁹

Fog was a particular challenge for the Pacific lighthouse project that took years and experimentation to tackle. When a light was erected at Point Loma in 1855 according to the architectural plan generally used for Atlantic coast lights, it proved to be so tall that it was usually obscured by fog. A similar issue occurred at Point Bonita, on the northern side of the entrance to San Francisco Bay, and the Lighthouse Board moved the building two decades after it had been erected. Point Bonita's fog signal also met with problems, as its construction was hampered by a series of landslides.⁴⁰ The Lighthouse Board also encountered problems because the erection of navigational aids was occurring at the same time as American settlement of the environment instead of decades or centuries later, as had been the case in the East. At Point Loma, construction was delayed because of the need to build an eight-mile road to transport the materials to the site from the city of San Diego across the bay. Only later did planners realize that the point was too narrow for a cistern,⁴¹ so there was a need to cart water to the light. Similar poor planning resulted in the need to rebuild lights, because when expensive Fresnel lenses arrived from France for installation, it was discovered that the buildings were too small to accommodate them.

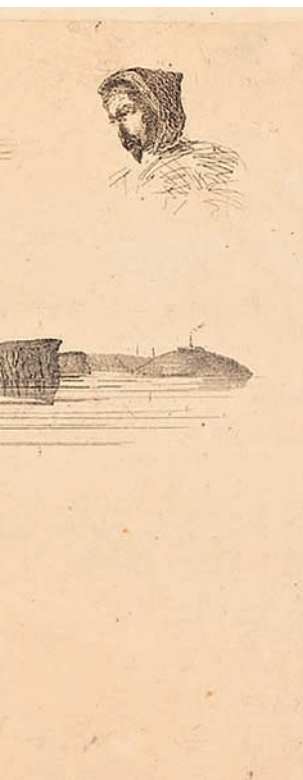
Point Reyes was the site of similar challenges. The stumpy lighthouse represents an attempt to keep the beacon below the fog line. So is the fact that the light itself was built on a ledge three hundred feet below the top of the cliff—a feat that required hauling materials first up to the top from the beach in Drake's Bay and then lowering them down over the point. While the light was located on a natural rock shelf, it was determined that the fog signal needed to be as close to the water line as possible to be audible in thick weather, meaning that workers had to blast another shelf further down the cliff. As in San Diego, making space for a cistern to store the water needed to operate the steam-driven fog whistle necessitated further work. While solutions to these challenges were found, it is difficult to characterize the Pacific coast environment as “compliant” with the desires of the Coast Survey.



9
James McNeill Whistler,
*Sketches on the Coast
Survey Plate*, 1854.
Etching, plate: 5 ¾ x
10 in. (14.6 x 25.4 cm);
sheet: 6 x 10 ¼ in.
(15.24 x 26.03 cm).
National Gallery of Art,
Washington, DC.
Rosenwald Collection,
1943.3.8396.

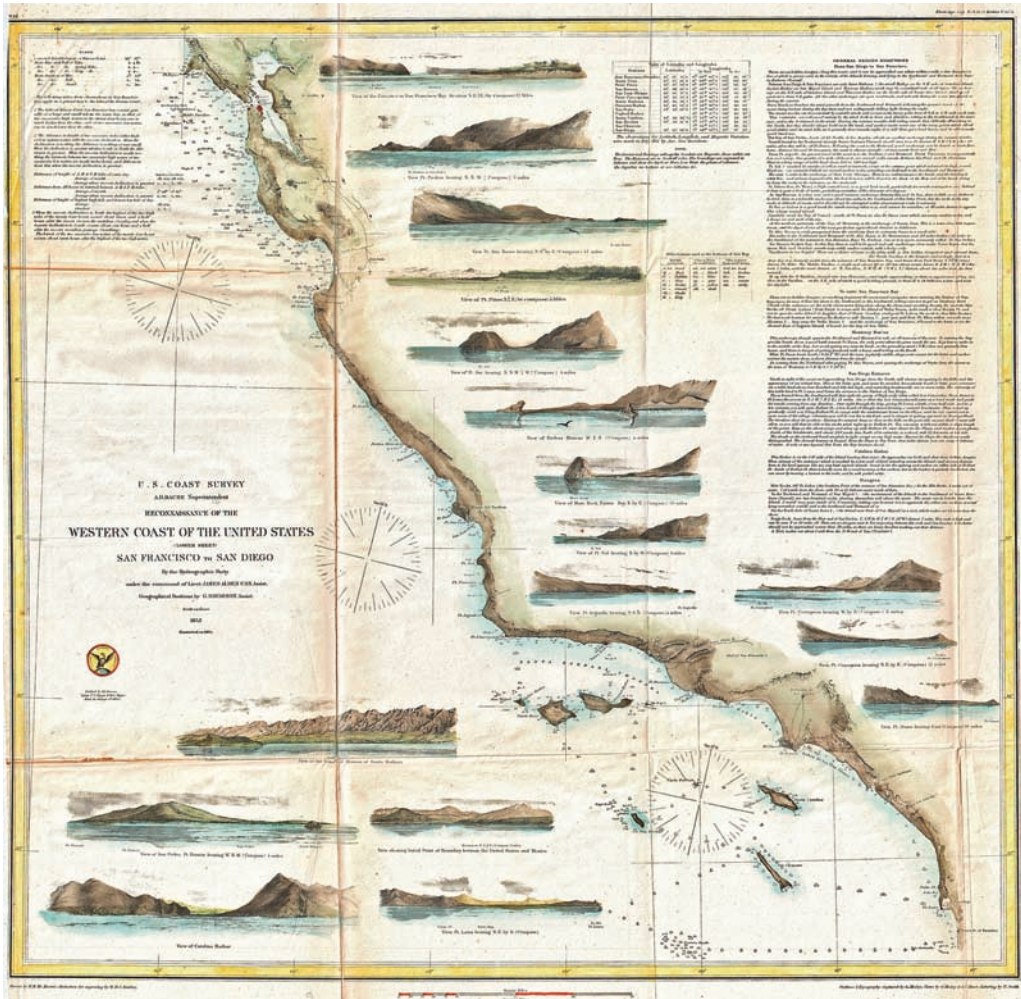
Rather, geological, meteorological, and oceanographic factors interfered with the agency's progress, exerting force over both the activity of the surveyors and the visual and architectural results of their work, and they continue to affect the navigational activity involving them.

This factor sheds light on Muybridge's lighthouse pictures. Photographs that document the completion of the lighthouses as well as the challenging terrain in which they were erected could provide valuable endorsements of the work of the Coast Survey and Lighthouse Board with which to rebuke skeptical legislators. As Robin Kelsey has argued, one of the "veiled" messages of archives of Geological Survey photographs in the nineteenth century is their implicit work as promotional material for the agency itself. "The reason for this," he writes, "is not merely that some degree of self-presentation among social entities is unavoidable but also that archives, especially publicly funded ones, rely on political support for their maintenance and growth."⁴² Presenting themselves as neutral records, survey photographs circulated to legislators, public officials, and the general public as evidence of the success of the surveying project and the need for its continued support.



Muybridge's photographs of lighthouses fit these criteria, and the value of giving visible form to this challenging environment could explain some of the ways in which Muybridge's composition eludes the norms of the picturesque.

In addition to their promotional use, Muybridge's photographs may have been distributed by the Coast Survey to navigators to supplement the visual information on charts and maps made by the agency before the lighthouses had been built. Before the advent of radar, navigators relied on making visual contact with landmarks as much as following the information given on charts. The Coast Survey's work often began with the production of drawings called "coast profiles" that traced the outlines of the cliffs, harbors, and islands that served as heading points for setting a course. West Point alumnus James McNeill Whistler (1834–1903) produced such drawings during his employment at the Coastal Survey in 1854–1855 that demonstrate the desired characteristics of such work (fig. 9). Such pictures were not only for information gathering but were also shared with mariners. For example, one Coastal Survey publication shows the outline of the northern California coast with coast profiles incorporated to correspond roughly with their geographic location (fig. 10). To facilitate visual apprehension of location, the *Pacific Coast Pilot* offers bearings between different landmarks and visual descriptions of each site such as Point Reyes from a variety of approaches—north, south, or west—so that a navigator would not find himself in the same position as Richard Henry Dana, author of the wildly popular memoir *Two Years before the Mast*, who described making a landing in San Francisco Bay wholly by accident after having charted a course for Monterey, a town 120 miles to the south, because of a lack of familiarity with the region.⁴³ The completion of the lighthouses gave navigators additional visual information to use in steering; even when a light was not lit, the profile of a building on the coast—in the case of the Pacific lighthouses, a *distinctive* building—could provide information that would be useful in confirming a ship's location. Although Muybridge was unable to make photographs from the deck of a ship because of the long exposure times needed by his camera making it impossible to get a sharp image from a floating surface, his photographs are careful to describe the direction in which a view is taken, a precaution that would have made the photographs a valuable supplement to a navigator's resources. Significantly, coast profiles usually eschew unnecessary detail. George Davidson's drawings for the 1869 *Pacific Coast Pilot* avoid shadows



10
 United States Coast
 Survey, "Reconnaissance
 of the Western Coast of
 the United States," 1854.
 Illustration, 22 × 23 in.
 (55.88 × 58.42 cm).

or other signs that could point to a specific time of day or year, and his emphasis on the outline of a coastal form downplays any sense of recession or distance from the shore to the peaks on the horizon. The qualities of Muybridge's photographs that lack aesthetic beauty might be seen to have more value when used in this way.



The value of the Point Reyes images for sailors is meaningful not only to explain what they show but also what they don't. By turning his camera *toward* the coastline, Muybridge turned away from the interior of Point Reyes, refusing the viewer information about how other

human communities negotiated the natural conditions of the region and each other. Considering how other groups extracted environmental compliance from this area helps illuminate alternatives to the ways in which Muybridge and his patrons sought to exercise control and to represent the accomplishment of this goal. It also helps us see the unfolding of settler colonialism in the region—first with the Spanish displacement of indigenous peoples and again with Americanization—as an emplaced historical process that played out not only *because of* the region’s rich natural resources but also in *negotiation* with nature.

While Anglo-Americans were only just becoming masters of a Pacific environment in the post–Civil War period, there were other populations around the Pacific who had long since developed ways of working with the currents, winds, rocks, and fogs. We might see this in the rich and varied use to which indigenous people of northern California put the tree that thrives in fog, the coast live oak. The original Miwok inhabitants of Marin County developed many cultural traditions around acorns, which served as a staple food. Miwok basketry is linked to the gathering, cooking, and presenting of acorns, and both baskets and nuts feature prominently in ceremonial life. For centuries, Coast Miwok people moved through the Point Reyes landscape from bluff to beach in seasonal cycles that did not require building roads or blasting shelves or developing foghorns or other means of countering the effects of foul weather.⁴⁴

Muybridge did not make pictures of indigenous people in Marin County, though he did document the Sierra Miwok community in Yosemite. This is likely because the Coast Miwok people had been dispossessed, first through Mexican land grants to what the ranchers called “unclaimed” territory and then due to an 1861 federal law claiming US title to all California territory not protected by prior Spanish land grants. Many Miwok people had been forced to leave the area during the Americanization of California; others remained as squatters or wage laborers on ranches owned by Anglos, often intermarrying with the European immigrants who came to the area to work in the dairy industry, as curator Theresa Harlan has demonstrated in an essay on photographs of the family of Coast Miwok Bertha Felix Campigli.⁴⁵ But this does not mean that Miwoks accepted this alienation from a familiar ecosystem placidly. The years when Muybridge executed his work at Point Reyes were marked by the spread of the Bole Maru cult, a local adaptation of the Ghost Dance, a pan-Indian movement predicting a disastrous end of the world and, with it, settler colonial

culture. The landscape that extended behind the photographer as he made his exposure was dotted with sweathouses and sites of Miwok, Pomo, Wintun, and Maidu congregation.

In another piece of writing, I have explored the colonial strategy of choosing a point of view that eschews depicting the violent conflicts that accompanied the imposition of American power over a Pacific landscape.⁴⁶ As I explained in my reading of *The Wreck of the "Ancon" in Loring Bay, Alaska* from 1889, the painter Albert Bierstadt (1830–1902) chose a vantage point turned away from a salmon cannery, denying the industrialization of the coast and the bitter battles among native, Chinese, and Anglo workers that accompanied it, and instead presenting the viewer with a seemingly peaceful wilderness waiting for conquest to reach out a gentle hand (fig. 11). Only the wrecked ship points to the submerged dangers lurking in this environment.

Turning away from Marin County to look out onto the sea, Muybridge, too, eschews an image of human struggles against nature and one another. Maps of the time show the boundaries of the ranches crowded onto the Miwok homeland. The rectangular shape of these ranches shows a new relationship to the landscape, one not defined by ecology—Miwok bands divided territory by watershed—but by rigid lines that cut across natural features. The establishment of ranches in the region began in 1834, with a grant made to Irish-born Mexican citizen John Reed from the Mexican government. As one rancher observed, the climatic conditions, including heavy dews, encouraged a “great luxuriance to the wild oats and other grains and grasses,” which supported all kinds of grazing animals, such as the local elk and black-tailed deer.⁴⁷ By the time of the American takeover, there were twenty ranches on the land, the majority in the hands of Americans who had purchased or wrested them from the original grantees through expensive court battles.⁴⁸ By 1870, white landowners were consolidating smaller ranches and using the majority of the space for dairy farming, and Marin became the leading county in California in the production of both butter and cheese for decades.⁴⁹ The foggy conditions of the peninsula enriched the grazing land, but the introduction of cattle transformed the varied ecosystem as the animals grazed away the brush that had sustained local grazing species and reduced the sustainability of the coast live oaks.⁵⁰ Pastures dried up for several months each year, so acres were cultivated for grains—oats, hay, or barley—to cover the difference, further threatening indigenous plant life.

In picturing Point Reyes, Muybridge didn't record an indigenous ease with the coastal environment or an Anglo destruction of it. But



11
Albert Bierstadt, *The Wreck of the "Ancon" in Loring Bay, Alaska*, 1889. Oil on paper mounted on Masonite, 14 $\frac{1}{8}$ x 19 $\frac{3}{4}$ in. (35.88 x 50.16 cm). Museum of Fine Arts, Boston. Gift of Martha C. Karolik for the M. and M. Karolik Collection of American Paintings, 1815-1865, 47.1250.

he does have one photograph that hints at richer Pacific social and natural history. Among the exposures from this commission is one titled *The "Heathen Chinese" Abalone Merchant at Drake's Bay* (1871) (fig. 12). Muybridge's language characterizes the figure as alien and evokes the anti-Chinese sentiment brewing in California at the time. But, in fact, this gatherer looks quite at home, using familiar tools to engage in a familiar act. While Muybridge's motivation may have been to present a picturesque view—something Anthony Lee identifies as one means of controlling Chinese Americans by viewing them through an aestheticizing Western lens—the photograph also reminds us that some aspects of Chinese life persisted on both sides of the ocean.⁵¹ Abalone is a mollusk that is distributed throughout the world's oceans, but most species are found in the waters of the Pacific Rim where abalone has been harvested by humans for thousands of years. A staple of the Miwok diet, abalone was also a particularly important foodstuff in coastal China. Thus it is possible to see the man in Muybridge's photograph having enough familiarity with this environment to continue a cultural practice despite his relocation across the sea.



12
 Eadweard Muybridge,
*The "Heathen Chinese"
 Abalone Merchant
 at Drake's Bay*, 1871.
 Stereographic albumen
 print from plate glass
 negative, 3 × 3 in. (7.62 ×
 7.62 cm) (each exposure).
 Bancroft Library,
 University of California,
 Berkeley, BANC PIC
 1971.055: 1040-STER.

The majority of Chinese people in America came from the southeastern region of that country, especially Guangdong Province. This is a region that was active in international trade since the fifteenth century and housed Macao, the first European settlement in China. The Chinese were not only familiar with the Pacific ecosystem; they were also experienced in traversing its waters. While Anglo-Americans in California sought to impose order on the Pacific, the ships they used to get there were frequently staffed by mariners who hailed from coastal China. Pacific Islanders, too, were part of these crews, as the Polynesian *Queequeg* signed on to Melville's *Pequod*—a Pacific whaling ship—suggests. Such sailors made up the “drilled people” who supported American control of the Pacific, to use Law’s term. Yet the fact that they shared across lines of national identity a knowledge of interacting with the ocean environment supports a more complex notion of international competition in long-distance maritime control than Law’s study allows. It also undermines the conceptualization of control as something that can be imposed without this knowledge.

Other objects of visual culture support this reading of Pacific navigation. A true contextualization of Muybridge’s photographs might involve not only an archive of charts, maps, and measurements that brought the Pacific into view for American audiences, but also the material objects that already existed in his time that testify to the already-accomplished collaboration with the Pacific environment

by the peoples who had inhabited it for centuries. As Mary Malloy demonstrates, Pacific trade networks routinely circulated objects made of coastal materials (grasses, shells, furs) and commercial goods (coins, pottery, printed cloth) among Alaska, the Hawaiian islands, the coast of California, and Southeast China at this time—for instance, one could find examples of Tlingit weaving near the site of Muybridge’s photographs at the Russian settlement of Bodega.⁵² While Muybridge seems to have cut this history of complex negotiations between humans *in* the natural environment and between humans *and* the natural environment out of his pictures, like fog, it creeps back into the frame when the viewer begins to look closely.



In many ways, the interpretive project I have undertaken here draws on one of art history’s older methodologies. In his classic text *Art and Illusion*, Ernst Gombrich defined the art historian’s job as interpreting a work in light of the two tasks faced by artists—“making,” or imaginative/expressive invention, and “matching,” or using a preexisting visual schema to render the work legible to its audience. As Gombrich puts it, “Every artist has to know and construct a schema before he can adjust it to the needs of portrayal.”⁵³ As I have argued, the balance in Muybridge’s Point Reyes photographs, which have often been interpreted as expressive inventions, lies in the latter field. Muybridge, a man who undertook ocean voyages many times before visiting Point Reyes and who traveled on this trip with the sailors most likely to make use of his images, undertook his act of picturing in relationship to the visual culture of navigation. Christopher Wood has argued that Gombrich’s work paved the way for the study of visual culture that has allowed art historians to ground their readings of works of art in a broad array of visual sources, as I do here.⁵⁴ But my goals for this essay go beyond finding a simple explanation of why Muybridge chose to compose and expose these pictures this way.

In this reading, I have explored how thing theory might enrich our understanding of the act of picturing. Building on Robin Kelsey’s call for understanding photography in relation to the “material conditions of its production,” I seek to expand the field of materiality being considered.⁵⁵ Seeing Muybridge’s photographs of Point Reyes as the product of distributed agency helps explain some of the distinctive visual features of this work that has so far eluded interpretation. But, more importantly, by offering an opportunity to think about the

difficulty with which a photographer, like other Americans of Muybridge's generation, struggled to extract compliance out of the Pacific coast environment, these photographs give us a record of human activity that does not presume human autonomy. Moreover, by suggesting some other ways in which people in the same region engaged the nonhuman forces of this environment, I hope I have illuminated that the triumphant narrative of American expansion that is frequently seen as confirmed by visual culture is not only not inevitable; it is not accurate. By focusing on the stumbling progress of lighthouse building and the difficulty with which sailors, surveyors, and photographers struggled to impose control over the material environment of the West Coast, I hope I have shown that, like the work of the Coast Survey, which reduced but did not eliminate the number of shipwrecks along the obdurate Pacific coast, Muybridge's pictures only partially bring this landscape under control.

- 1 These works are heavily featured in Philip Brookman, ed., *Helios: Eadweard Muybridge in a Time of Change* (Washington, DC: Corcoran Gallery of Art, 2010), which circulated to several international art museums.
- 2 Eadweard Muybridge, *Animal Locomotion: An Electro-photographic Investigation of Consecutive Phases of Animal Movements, 1872–1885* (Philadelphia: Published under the auspices of University of Pennsylvania, 1887).
- 3 For more on the Fresnel lens, see Franklin Institute, *Report on the Dioptric System of August Fresnel for the Illumination of Lighthouses* (Philadelphia: Grattan and McLean, 1850).
- 4 For a classic illustration of this critical approach, see Alan Trachtenberg, “Naming the View,” ch. 3 in *Reading American Photographs: Images as History, Mathew Brady to Walker Evans* (New York: Hill and Wang, 1989).
- 5 Philip Brookman, “Helios: Eadweard Muybridge in a Time of Change,” in Brookman, *Helios*, 54.
- 6 Rebecca Solnit, *River of Shadows: Eadweard Muybridge and the Technological Wild West* (New York: Viking, 2003), 50.
- 7 “Shipwrecks at Point Reyes,” accessed May 4, 2015, http://www.nps.gov/pore/learn/historyculture/people_maritime_shipwrecks.htm.
- 8 “Sirens That Do Not Tempt,” *San Francisco Chronicle*, Sept. 25, 1887. See also an undated letter to William B. Shubrick from Board of Marine Underwriters, Letters Received, vol. 285, United States Light House Board, National Archives and Records Association, RG 26, cited in Anna Coxe Toogood, *A Civil History of Golden Gate National Recreation Area and Point Reyes National Seashore, California* (Denver: National Park Service, 1980), 244.
- 9 George Davidson, *The Pacific Coast: Coast Pilot of California, Oregon, and Washington Territory* (Washington, DC: Government Printing Office, 1889), 223.
- 10 Jane Bennett, *Vibrant Matter: A Political Ecology of Things* (Durham, NC: Duke University Press, 2010), 1. In Bennett’s terms, the fog might be considered to be *intervening* in the picture making. Bennett uses Bruno Latour’s “actor-network theory” to explain how nonhuman forces such as fog might exert influence, even though they have no will to act. Such a point of view allows for a perception of agency as distributed across an ontologically heterogeneous field rather than being localized only in one or a collective human source (Bennett, *Vibrant Matter*, 23).
- 11 In addition to Trachtenberg, “Naming the View,” see Nancy K. Anderson, “‘The Kiss of Enterprise’: The Western Landscape as Symbol and Resource,” in *The West as America: Reinterpreting Images of the Frontier, 1820–1920*, ed. William Truettner (Washington, DC: Smithsonian Institution, 1991), 237–84; Albert Boime, *The Magisterial Gaze: Manifest Destiny and the American Landscape Painting, c. 1830–1865* (Washington, DC: Smithsonian Institution, 1991); and W. J. T. Mitchell, *Landscape and Power* (Chicago: University of Chicago Press, 1994).
- 12 According to Patrick Wolfe, settler colonialism is the ongoing settlement of a colonial society that operates on the logic of the elimination of native society. Patrick Wolfe, “Settler Colonialism and the Elimination of the Native,” *Journal of Genocide Research* 8, 4 (Dec. 2006): 387–409. It has been used to describe all colonial systems which destroy in order to replace, including knowledge systems about the natural world.
- 13 Roland Barthes, “Rhetoric of the Image,” in *Image, Music, Text*, ed. and trans. Stephen Heath (New York: Hill and Wang, 1977), 32–51. See also Tom Gunning, “What’s the Point of an Index? Or, Faking Photographs,” *NORDICOM Review* 5, 1/2 (Sept. 2004): 39–49.
- 14 Elizabeth Hutchinson, “They Might Be Giants: Galen Clark, Carleton Watkins and the Big Tree,” *October* 109 (Summer 2004): 47–63.
- 15 Marcus Aurelius Root, *The Camera and the Pencil; or, The Heliographic Art* (New York: Appleton, 1864), 132–33.
- 16 M. Carey Lea, *A Manual of Photography* (Philadelphia: Benerman and Wilson, 1868), 230.
- 17 *Ibid.*, 230–35.
- 18 The term “distributed agency” has been used most prominently by Bruno Latour. See Latour, *Science*

- in Action: How to Follow Scientists and Engineers through Society* (Cambridge, MA: Harvard University Press, 1987). It is meaningful here to also note that Jennifer Tucker has discussed “failure” as a prominent characteristic of nineteenth-century photography, and she lists a lack of skill as one of many factors in this. Jennifer Tucker, *Nature Exposed: Photography as Eyewitness in Victorian Science* (Baltimore, MD: Johns Hopkins University Press, 2005), 3–4. However, Tucker’s use of the term “skill” suggests a confidence in the potential for the human to master the nonhuman.
- 19 Robin Kelsey, “Materiality,” *Art Bulletin* (Mar. 2013): 21.
- 20 Letter from Muybridge to Colonel R. S. Williamson, Jan. 13, 1871, Letters Received by the United States Light House Board, quoted in Solnit, *River of Shadows*, 263.
- 21 Gordon Hendricks, *Eadweard Muybridge: Father of the Motion Picture* (New York: Grossman Publishers, 1975), 29–30.
- 22 See John A. Martini, *Inventory of Eadweard Muybridge’s Photographs of Lands within the Future Golden Gate National Recreation Area, 1868–1873: Images from the Bancroft Library and Other Archival Collections* (Fairfax, CA: J. Martini, 2000).
- 23 See Robin Kelsey, *Archive Style: Photographs & Illustrations for U.S. Surveys, 1850–1890* (Berkeley: University of California Press, 2007); and Tucker, *Nature Exposed*.
- 24 Charles Nordhoff, “The Light-Houses of the United States,” *Harper’s New Monthly Magazine*, Mar. 1874, 465–77. The quotation is from page 469, and Muybridge’s photograph is illustrated on page 472.
- 25 The Coast Guard has made photographs of California light stations, including many by Muybridge, available online at <http://www.uscg.mil/history/weblighthouses/LHCA.asp> (accessed June 29, 2015).
- 26 Eadweard Muybridge, *Catalog of Photographic Views Illustrating the Yosemite, Mammoth Trees, Geyser Springs, and Other Remarkable and Interesting Scenery of the Far West* (San Francisco: Bradley and Rulofson, 1873), 2.
- 27 George Davidson, *The Pacific Coast: Coast Pilot of California, Oregon, and Washington Territory* (Washington, DC: Government Printing Office, 1869).
- 28 For a discussion of the critical development of the term “Anthropocene,” see Will Steffen, Jacques Grinevald, Paul Crutzen and John McNeill, “The Anthropocene: Conceptual and Historical Perspectives,” *Philosophical Transactions of the Royal Society A* 369 (2011): 842–67.
- 29 John Law, “On the Methods of Long-Distance Control: Vessels, Navigation and the Portuguese Route to India,” in *Power, Action and Belief: A New Sociology of Knowledge?*, ed. John Law, *Sociological Review Monograph* 32 (London: Routledge, 1986), 235.
- 30 *Ibid.*, 240.
- 31 For the Exploring Expedition, see Nathaniel Philbrick, *Sea of Glory: America’s Voyage of Discovery: The U.S. Exploring Expedition, 1838–1842* (New York: Viking, 2003).
- 32 A summary of the United States Lighthouse Service can be found in Hugh Richard Slotten, *Patronage, Practice, and the Culture of American Science: Alexander Dallas Bache and the U.S. Coast Survey* (New York: Cambridge University Press, 1994). Andrew Jackson, “Second Annual Message to Congress, December 6, 1830,” *Gales and Seaton’s Register of Debates in Congress, 21st Congress, 2nd Session*, appendix, v. This speech is better known for laying out Jackson’s support for Indian Removal.
- 33 See Slotten, *Patronage*.
- 34 Oscar Lewis, *George Davidson, Pioneer West Coast Scientist* (Berkeley: University of California Press, 1954).
- 35 “Light Houses,” *Daily Alta California*, Jan. 1, 1851, 2.
- 36 John Wilkes, *A Narrative of the United States Exploring Expedition* (Philadelphia, 1849), 4:243.
- 37 Pamela Welty and Randy Leffingwell, *Lighthouses of the Pacific Coast* (Minneapolis, MN: Voyageur Press, 2000), 35.
- 38 *Ibid.*, 31.

- 39 Ibid., 43.
- 40 Toogood, *Civil History*, 211–28, 243.
- 41 These mishaps and others are outlined in chapter 2 of Welty and Leffingwell, *Lighthouses*.
- 42 Kelsey, *Archive Style*, 5.
- 43 Richard Henry Dana, *Two Years before the Mast: A Personal Narrative* (New York: Harper Brothers, 1842), 280.
- 44 For an overview of Coast Miwok life in the pre-US period, see Toogood, *Civil History*, 3–6.
- 45 Theresa Harlan, “A View of Our Home, Tomales Bay, Calif.: Portrait of a Coast Miwok Family, 1930–1945,” in *Our People, Our Lands, Our Images: International Indigenous Photographers*, ed. Hulleah Tsinhnjinnie and Veronica Pasalacqua (Berkeley, CA: Heyday Books for R. C. Gorman Museum, 2006).
- 46 Elizabeth Hutchinson, “‘A Narrow Escape’: Albert Bierstadt’s *Wreck of the Ancon*,” *American Art* (Spring 2013): 50–69.
- 47 Toogood, *Civil History*, 45.
- 48 Ibid., 63–64.
- 49 In 1862, Marin County produced 200,000 pounds of butter and 300,000 pounds of cheese. Ibid., 96.
- 50 Aida López-Sánchez et al., “Effects of Cattle Management on Oak Regeneration in Northern Californian Mediterranean Oak Woodlands,” *P One* (Aug. 15, 2014), doi:10.1371/journal.pone.0105472. See also “Impacts of Grazing,” US Fish and Wildlife Service, accessed June 29, 2015, <http://www.fws.gov/invasives/staffTrainingModule/methods/grazing/impacts.html>.
- 51 Anthony Lee, “Picturesque Chinatown,” in *Picturing Chinatown: Art and Orientalism in San Francisco* (Berkeley: University of California Press, 2001), 59–100.
- 52 Mary Malloy, *Souvenirs of the Fur Trade: Northwest Coast Indian Art and Artifacts Collected by American Mariners, 1788–1844* (Cambridge, MA: Peabody Museum of Archaeology and Ethnology, 2000), 49.
- 53 Ernst Gombrich, *Art and Illusion: A Study in the Psychology of Pictorial Representation* (New York: Bollingen Foundation, 1961), 116.
- 54 Christopher S. Wood, “Art History Reviewed VI: E. H. Gombrich’s ‘Art and Illusion: A Study in the Psychology of Pictorial Representation,’ 1960,” *Burlington Magazine*, Dec. 2009, 837.
- 55 Kelsey, “Materiality,” 22.