



651 BLUFF ON BAYUGA LAKE, L. V. R. R.

W. G. L. & S. CO., PHOT.

RISE OF THE MODERN WORLD

With the invention of photography, in 1839, the industrial age had the perfect ally with which to forge a modern world. Rapidly accelerating change induced a constantly shifting panorama for the camera to record, and the camera in turn, through its great sweep of subjects, fired the imaginations and the ambitions of inventors, scientists, engineers, builders, doctors, explorers, social reformers, journalists, historians, and not least artists. Fact oriented, photography was attuned to the industrial period, even as its technology today extends into media embedded in our own time: film, video, and computer-imaging techniques unimaginable a century ago. Back then, however, the simple photographic image itself was still revolutionary.

The complementary relationship between modernity and photography extended beyond the documentation of advances in science, technology, and industry. From the moment it was invented, photography offered a new pictorial language. The medium's factual accuracy, its ability to stop time and action and to open up previously unimagined perspectives, were radical contributions to the evolution of visual representation. From telescope pictures of the moon to X rays of the human body, photographs described in detail what earlier could only be imagined. They communicated, educated, incited economic ambition, served as propaganda and advertising, aided memory, and inspired.

The industrial culture of invention moved with unbridled speed and intensity. A startling array of changes occurred within a compressed time span. In 1844, five years after the invention of photography, Samuel Morse's telegraph was used for the first time, between Baltimore and Washington, D.C. In 1846 Elias Howe patented the sewing machine; in 1864 Louis Pasteur devised the pasteurization process; in 1866 Alfred Nobel produced dynamite. The Brooklyn Bridge opened in 1872. The Remington gunsmith firm began making typewriters in 1873, Alexander Graham Bell invented the telephone in 1876, and

OPPOSITE: William Rau. *Bluff on Cayuga Lake, L.V.R.R.* 1895. Albumen silver print from glass negative, 20½ x 17¾" (52.1 x 44.1 cm). The Museum of Modern Art, New York. Lois and Bruce Zenkel Fund

in 1877 Thomas Edison played back the first phonograph recording—of himself shouting “Mary had a little lamb.” Three years later he and J. W. Swan independently invented the first electric lights. The Wright brothers flew at Kitty Hawk in 1903, and Henry Ford produced his Model T in 1908; the car revolutionized the automotive industry, and Ford also revolutionized industrial production itself through the creation of the factory assembly line. By 1917 he had produced his millionth car.

With the application of the steam engine to commercial transportation after 1829, the railroad became integral to the expanding industrial economies, and trains became powerful symbols of the new dynamism. They were crucial in the westward expansion of the United States, as railroad companies won vast public lands in order to lay tracks to new territories. (A transcontinental railroad was completed in 1869.) Photographers such as Andrew Russell, Frank Jay Haynes, and Timothy O’Sullivan documented the construction of these railroads during the 1860s, often working for the U.S. government or for the railroad companies themselves. By the time of William Rau’s photograph *Bluff on Cayuga Lake, L.V.R.R.* (1895; p. 230), pioneering effort had given way to settled dailiness: this train rounding a corner in a tamed but verdant landscape may be taking tourists to visit relatives or to stay at resort hotels. The photograph was probably intended as an advertisement for the Lehigh Valley Railroad, for which Rau was the official photographer.

After the railroads had bridged America’s coasts came the conquest of the western wilderness, through farming, hunting, logging, and the growth of towns and cities. These projects also were fodder for photographers, for example Darius Kinsey, who documented Washington State loggers for over fifty years beginning in 1890, his means of transport first a horse and buggy, later the train, and later still a Ford Model T. He would often have to hike into the woods a good dozen miles or so carrying his eleven-by-twenty-two-inch camera, tripod, and heavy glass plates—a weight of some 100 pounds. Kinsey made a successful business out of selling the loggers portraits of themselves at work. Intended to be kept as mementos or sent to relatives and friends, his photographs also constitute a detailed record of the men and methods of the forestry industry of the period. In *Cedar* (1916; p. 234), victorious loggers perch on a mammoth felled tree like Lilliputians in *Gulliver’s Travels*, dramatizing their own situation in the western landscape.

Unparalleled in its ability to describe events and objects vividly and accurately, photography had innumerable practical applications. Companies used it to document new inventions, factories, and machinery, governments to chart the progress of the construction and civic-improvement projects that were contributing their share to the upheaval and transformation of the physical landscape. In 1863 Adolphe Terris photographed the site for a new thoroughfare in Marseilles (p. 235). France’s conquest of Algeria in 1830, and the digging of the Suez Canal in 1859–69, had brought tremendous expansion to the city, the most important French port on the Mediterranean. In Terris’s photograph, torn hillsides frame a baroque cathedral whose cross centers the picture; amid tumbled rock and earth, the world is changing before our eyes.

The accomplishments of engineers like Terris’s road builders during this era included everything from suspension bridges, railway tunnels, aqueducts, and dams through the laying of cable across the Atlantic. All of these were photographed, as was the construction of the Eiffel Tower, a spectacular feat on the part of the noted French engineer Alexandre-Gustave Eiffel. Designed for the Paris Exposition of 1889, a showplace celebrating the

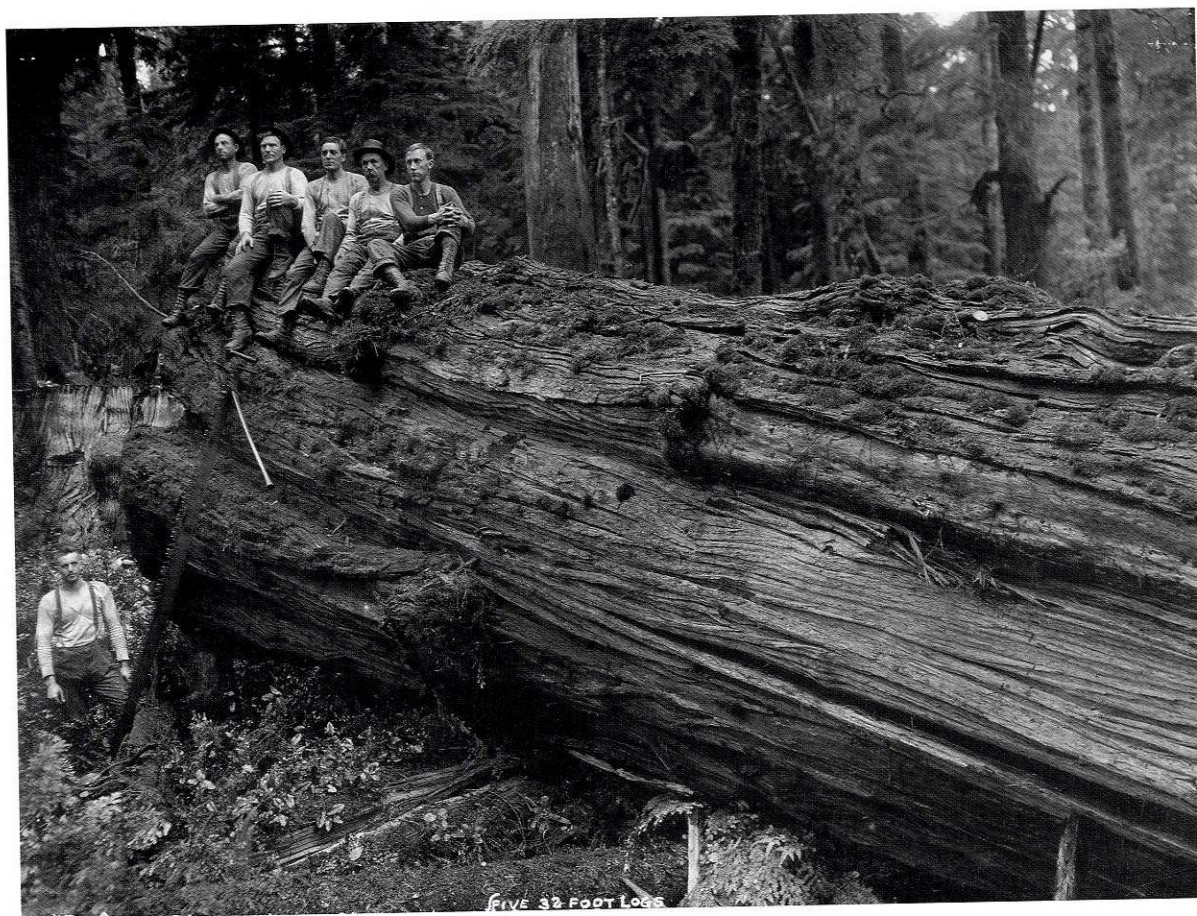
nation's commitment to industry, the tower has come to symbolize French progressive thinking at the end of the century. H. Blancard's photographs (pp. 236–37) track the progress of its construction over a period of about a year.

The early photographers' exercise of their imaginations had been encumbered by their equipment. To make an image, the photographer had to coat a glass plate with light-sensitive collodion emulsion, a process requiring complete darkness and careful temperature control; the plate had to dry; and once exposed, it had to be developed immediately. Photographers, then, were forced to carry a virtual darkroom wherever they worked. Within these tiresome physical constraints, they nevertheless managed to explore an astonishing variety of subjects and to travel widely, daring foreign territories and inhospitable conditions, from the deserts of North Africa to the peaks of the French Alps. Camera and photographer were in any case liberated from the wet-plate system in the early 1880s, with the introduction of dry-plate negatives, which photographers could make themselves or could even purchase commercially. When Robert Falcon Scott set out on his ill-fated expedition of 1911–13 to the South Pole, he took with him a photographer, Herbert G. Ponting, who used a dry-plate glass negative to record, for example, Mr. E. W. Nelson using a device to analyze water (p. 249).

In 1888 the American inventor George Eastman marketed his first box camera with roll film, the Kodak. It sold for twenty-five dollars. The film was already loaded; after the purchaser had taken 100 pictures, the camera was returned to the factory, where the film was removed for processing and was replaced with a new roll. Then the camera was returned to its owner. With the invention of the Kodak, men and women in all walks of life, working out of an ever increasing array of professional and personal motivations, could easily make photographs, further opening up the medium to new image-makers uninhibited by the restraints of pictorial convention or the exacting standards of the professional photographer. This dramatically widened photographers' potential subject matter, and also their own numbers: within fifty years after the medium's invention, the camera had moved from the hands of the few to the many.

Photographs themselves were broadcast still more widely. The reciprocity between technical advances in photography and the pace of the modern age is demonstrated nowhere more clearly than in the halftone process, invented in the 1880s to make images easily reproducible. By the late 1890s, photographic images were regularly disseminated to huge numbers of people, gaining incalculably in power in the process. A new audience materialized for photography—the broad population beyond the confines of the photo salon or the art gallery. The need on the part of newspapers, magazines, and picture weeklies for an unending supply of images not only broadened the subject matter of photography but generated a variety of far-reaching enterprises to deal with its production and reproduction, including the photo agencies that today enlist photographers to make pictures on assignment. After it became possible to transmit photographs by wire, in the mid-1920s, they were distributed almost instantaneously around the world. Like a second language, photography entered the lexicon of daily life.

If the benefits of the industrial revolution were invention, technology, new forms of architecture, and so on, their negative counterparts included the living conditions of the urban poor. The cities of Europe and the United States grew enormously during the nineteenth century, their factories attracting huge labor pools. In America, this population



Darius Kinsey. *Cedar*. 1916. Gelatin silver print, 10 $\frac{1}{16}$ x 13 $\frac{7}{16}$ " (25.5 x 34 cm). The Museum of Modern Art, New York. Courtesy of Jesse E. Ebert

explosion occurred through migration not only from the countryside to the city, as in Europe, but from the old world to the new; and the tenement neighborhoods in which the new arrivals were forced to take residence were often deprived, unsafe, and squalid. In response, by the late nineteenth century a new kind of photographer had arisen, one who would use the medium in the service of social or cultural goals. Jacob Riis and Lewis Hine, for example, were amateur image-makers in the sense that neither of them took up photography as a first calling—Hine was a social worker, Riis a journalist, and both men were committed reformers—but they understood how to apply photography to a goal, using it to provide graphic and persuasive description of the conditions they sought to redress (pp. 238–39). Through images such as those in Riis's book *How the Other Half Lives*, published in 1890, photography played an essential role in the social reforms necessitated by the industrial age.

The police departments that attempted to bring order to the new urban conditions also found practical applications for photography; by the 1880s, French gendarmes routinely documented crime scenes (p. 240), while American police departments amassed "rogues'

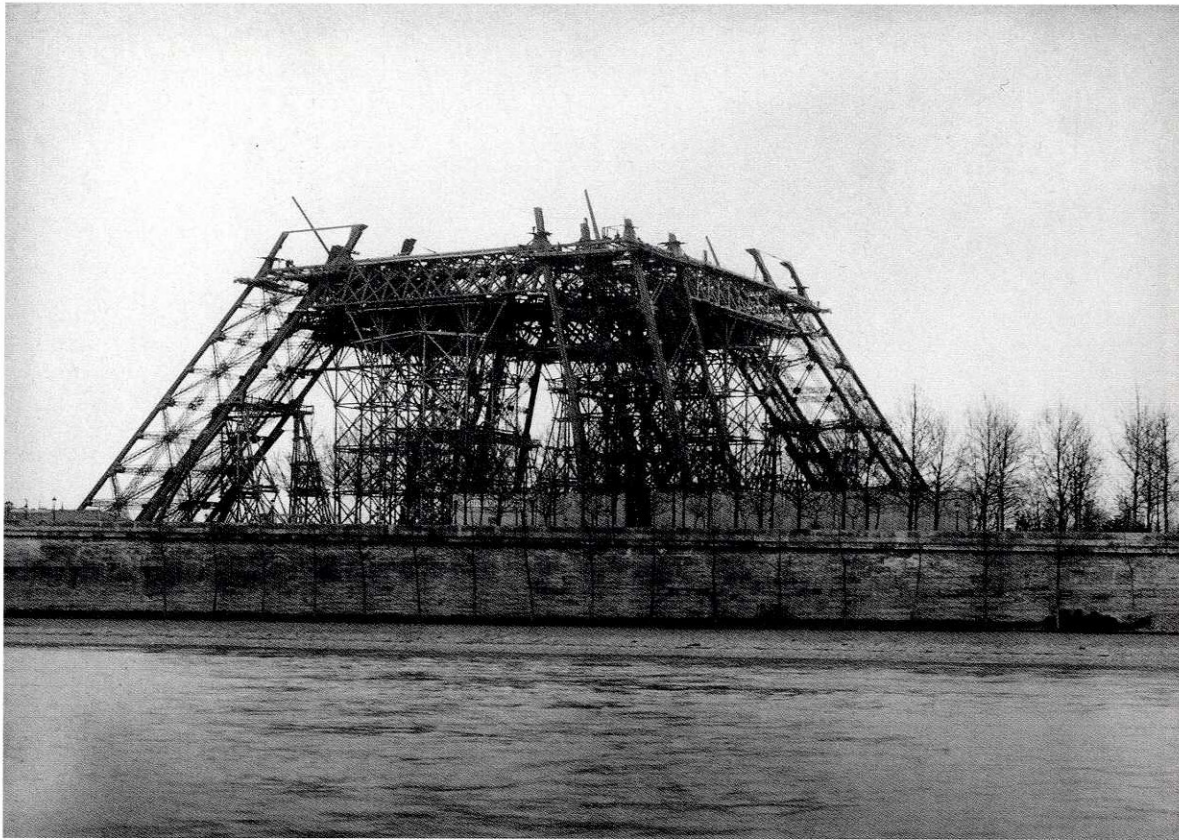


Adolphe Terris. *Marseilles*. 1863. Albumen silver print from a glass negative, 13 $\frac{1}{16}$ x 15 $\frac{3}{4}$ " (34.8 x 40 cm). The Museum of Modern Art, New York. Samuel J. Wagstaff, Jr., Fund

galleries” of mug shots (p. 241). A more elegiac response to social change appears in the work of Eugène Atget, who photographed the streets, parks, and architecture of Paris and its environs for over thirty years, amassing an extraordinary visual catalogue of French culture. Atget was interested in the preservationist role of photographs as visual records. He reacted to the changes growing out of the industrial revolution by rarely recognizing them; in his five to six thousand photographs, the Eiffel Tower appears only twice, and in the background. Even so, industrialization makes its appearance in his images: the Paris storefronts he photographed display mass-produced goods—machine-woven fabrics, for example, or ready-made clothing, or even prefabricated furniture (pp. 242–43).

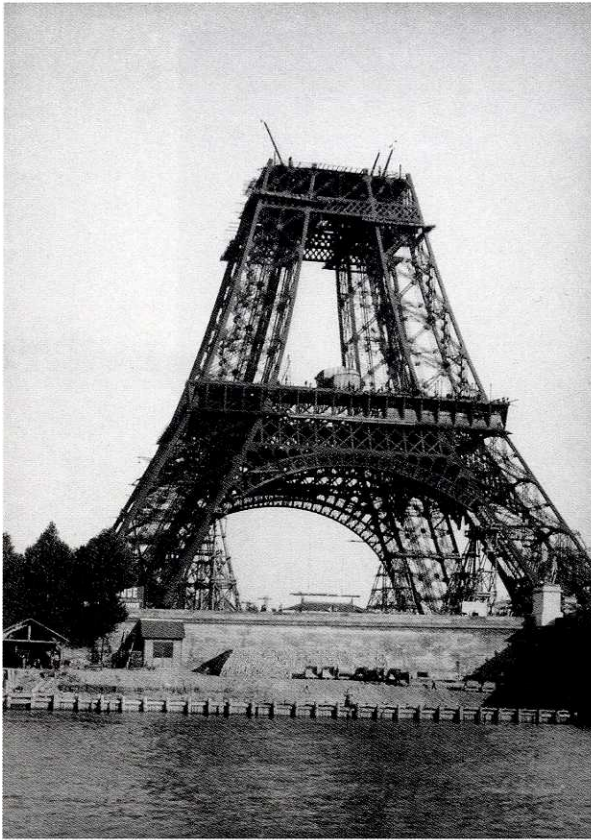
Working outside the aegis of art, the new photographer created a new kind of picture. The use of photography in science was inevitable. What had been too distant or too fast to see could now be visually captured; what had once been invisible could be fixed and studied.

Among the most influential advances were those of Eadweard Muybridge, an Englishman working in the United States, and of Étienne-Jules Marey, a French physiologist. In



the late nineteenth century, both men applied photography, with its ability to stop time in quick successive exposures, to the analysis of movement (p. 244). This became possible when emulsion speed—the speed with which the chemical emulsion in the film negative reacts to light—became fast enough and the camera mechanism sophisticated enough to record moving objects with reasonable precision. In 1882 Muybridge began his eleven-volume work *Animal Locomotion*, a thorough record of the human body walking, wrestling, running, jumping, rowing, and dancing, and of birds and other animals in motion. Muybridge used groups of ten or twelve cameras whose shutters were released mechanically as the subject passed the lens. The results of his work—19,347 individual photographs, in 781 multi-image plates—deeply affected artists and scientists of the time, and remain the most exhaustive pictorial analysis of the subject ever made. A list of some of the subscribers to *Animal Locomotion* (organized by profession, and published as an appendix to *The Human Figure in Motion*, 1901, a selection from the earlier book) includes scientists—biologists, physiologists, anatomists; artists—painters and sculptors, as well as writers on art; and also military men. Among those listed are Louis Comfort Tiffany, Augustus Saint-Gaudens, and John Ruskin.

Unlike Muybridge, Marey used a single camera, which, however, recorded multiple exposures. A Marey photograph contains a continuous stream of successive images, and delineates movement in finer increments than do Muybridge's. Marey invented what he called a "photographic gun," which took a series of exposures on a single plate. Behind the lens of this device was a revolving disc on which twelve exposures could be made in rapid

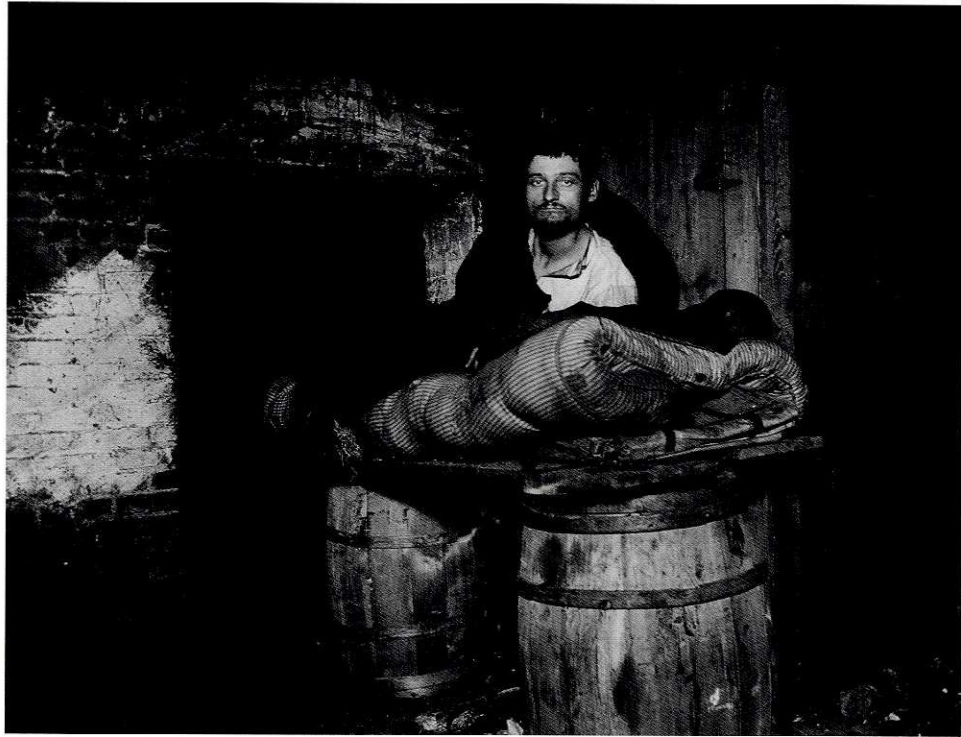


OPPOSITE: H. Blancard. Untitled (construction of the Eiffel Tower). February 1888. Platinum print, $6\frac{1}{8} \times 8\frac{1}{16}$ " (15.5 x 22 cm). The Museum of Modern Art, New York. Purchase

ABOVE AND RIGHT: H. Blancard. Untitled (construction of the Eiffel Tower). June 1888. Platinum print, $8\frac{1}{16} \times 6\frac{1}{16}$ " (22.3 x 16 cm). The Museum of Modern Art, New York. Purchase

H. Blancard. Untitled (construction of the Eiffel Tower). August 1888. Platinum print, $8\frac{1}{16} \times 6\frac{1}{8}$ " (22.3 x 15.5 cm). The Museum of Modern Art, New York. Purchase

H. Blancard. Untitled (construction of the Eiffel Tower). April 28, 1889. Platinum print, $8\frac{1}{16} \times 6\frac{1}{8}$ " (22.7 x 15.5 cm). The Museum of Modern Art, New York. Purchase



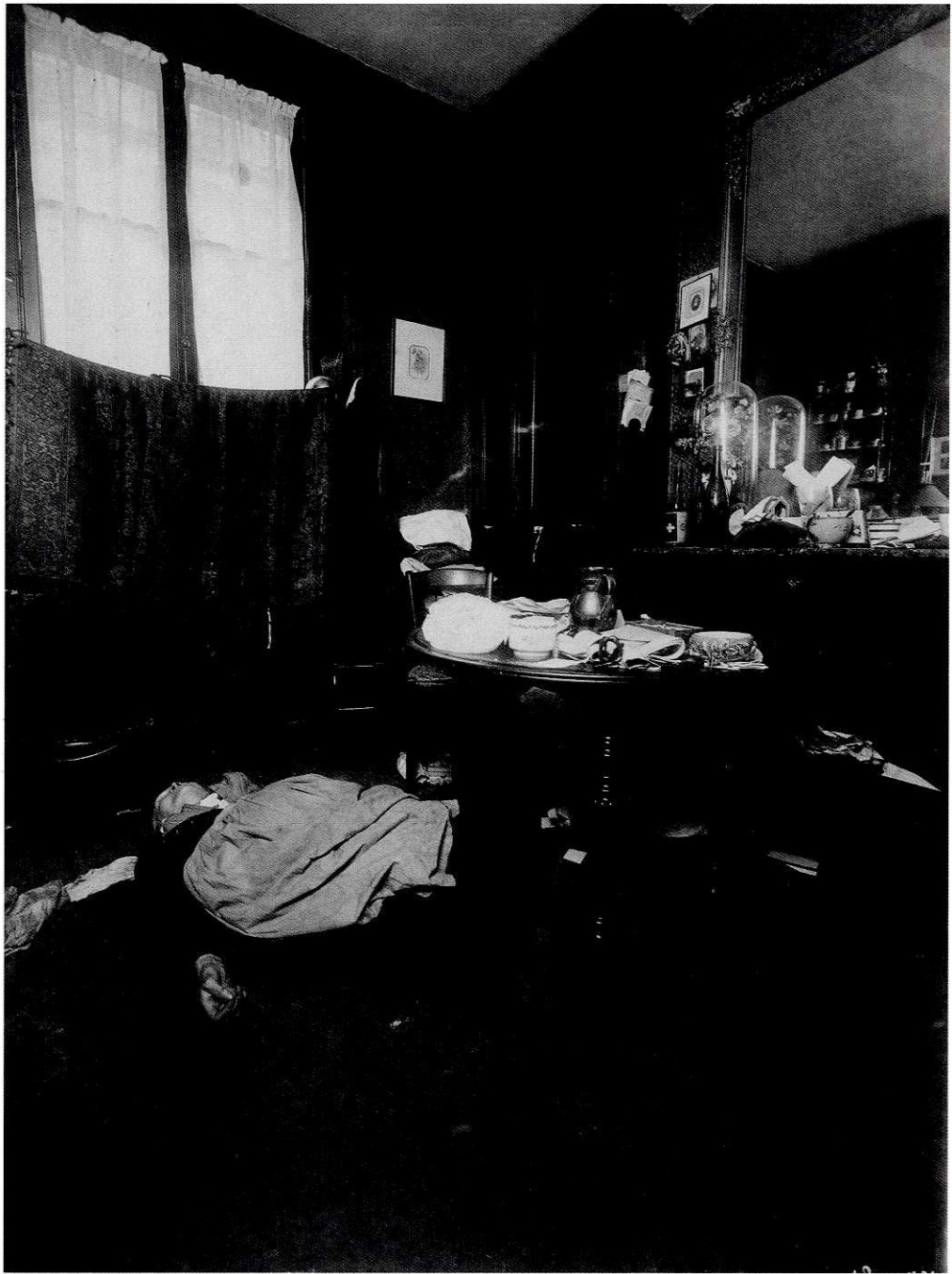
Jacob Riis. *Flashlight Photograph of One of Four Pedlars Who Slept in Cellar of 11 Ludlow Street, Rear.* c. 1890. Gelatin silver print, 5 x 7" (12.7 x 17.7 cm). The Museum of Modern Art, New York. Courtesy of The Museum of the City of New York

Lewis Hine. *New York City.* 1912. Gelatin silver print, 4¾ x 6¾" (12 x 17.1 cm). The Museum of Modern Art, New York. Stephen R. Currier Memorial Fund

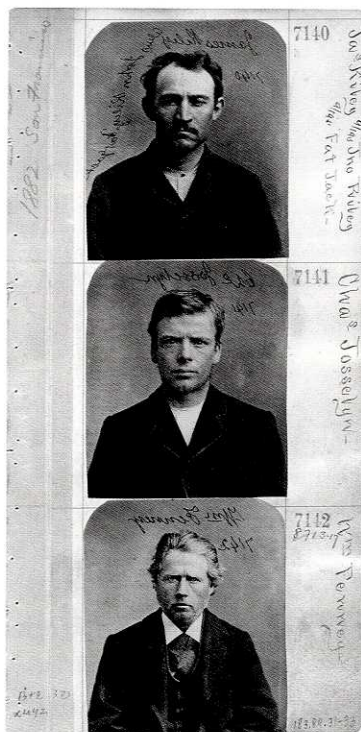
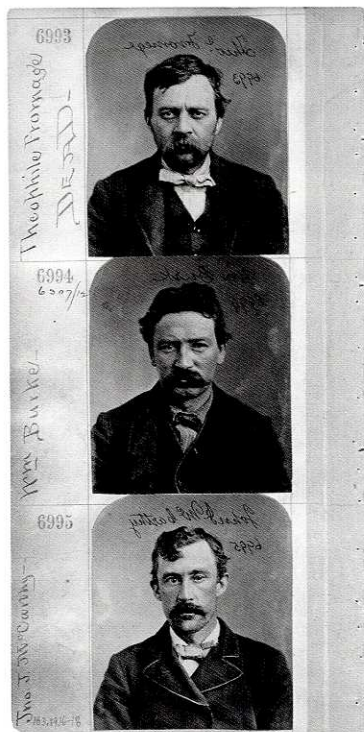
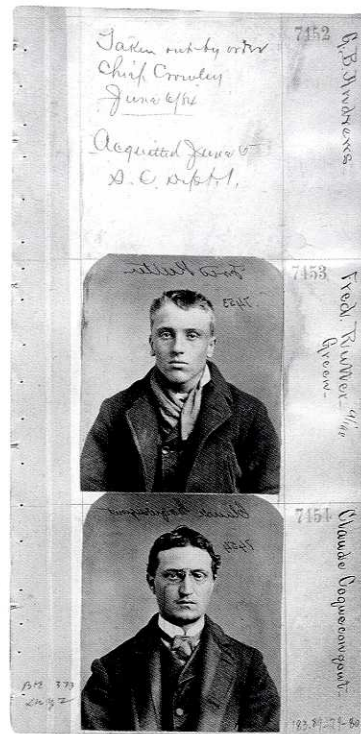
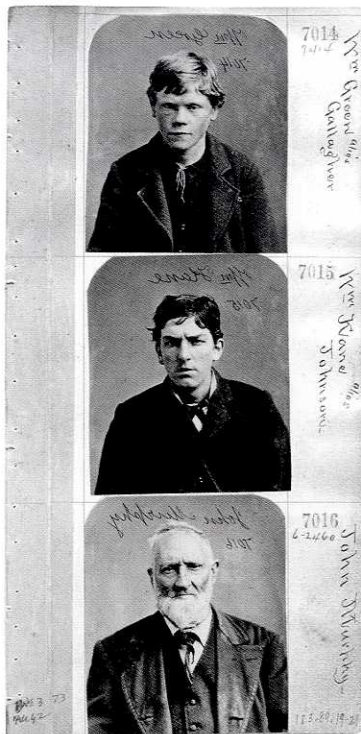
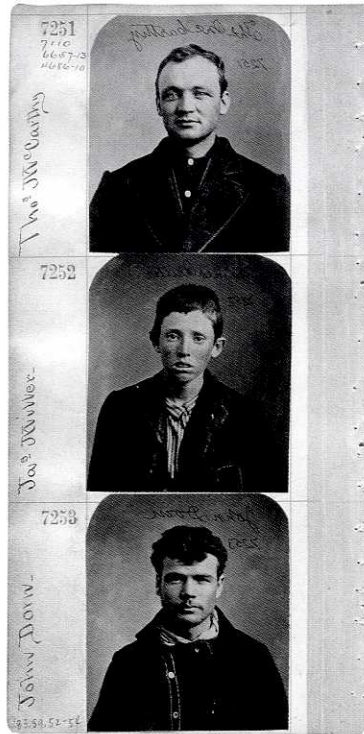


Jacob Riis. "I Scrubs"—Katie Who Keeps House in West Forty-Ninth Street. c. 1890. Gelatin silver print, 4 x 5" (10.2 x 12.7 cm). The Museum of Modern Art, New York. Courtesy of The Museum of the City of New York

Lewis Hine. *New York City*. 1912. Gelatin silver print, 4 $\frac{9}{16}$ x 6 $\frac{1}{2}$ " (11.6 x 16.5 cm). The Museum of Modern Art, New York. Stephen R. Currier Memorial Fund



Prefecture of Police, Paris. *Madame Simon as She Was Found after the Crime, April '95*, 1895. Albumen silver print from a glass negative, 9 $\frac{9}{16}$ x 6 $\frac{13}{16}$ " (23.3 x 17.3 cm). The Museum of Modern Art, New York. David H. McAlpin Fund



Photographer unknown. Untitled (portraits from mug shot album). 1870s–80s. Albumen silver prints, each 2 1/16 x 2 1/16" (7.5 x 6.5 cm). The Museum of Modern Art, New York. Purchase



Eugène Atget. *Avenue des Gobelins*. 1925. Albumen silver print, 9⁹/₁₆ x 7" (23.6 x 17.8 cm). The Museum of Modern Art, New York. Abbott-Levy Collection. Partial Gift of Shirley C. Burden



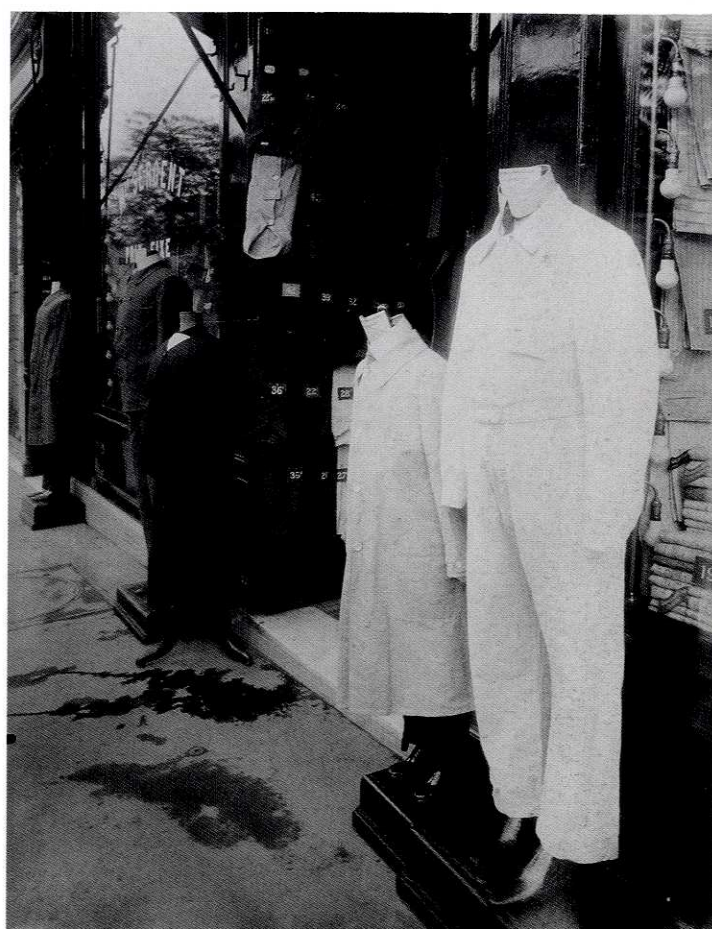
Eugène Atget. *Coiffeur, avenue de L'Observatoire*. 1926. Albumen silver print, 8¹/₁₆ x 6³/₄" (22 x 17 cm). The Museum of Modern Art, New York. Abbott-Levy Collection. Partial Gift of Shirley C. Burden

succession. Marey called this kind of photography "chronophotography"—the photography of time. The reverberations of the work of Marey and Muybridge would be felt throughout the twentieth century in both science and art. They can be seen in the work of artists as different as Francis Bacon, who sometimes used Muybridge's pictures as models in producing his figures, and Sol LeWitt, whose use of seriality is related to Muybridge's grid systems. Nearer to the photographers' own time, their most obvious influence appears in the work of the Futurists, whose images described the change, transition, transformation, and movement of daily life—the modern flux.

After 1900, as film got faster and cameras ever smaller and more manageable, the role of the amateur took on new importance. The French photographer Jacques-Henri Lartigue began work just after the turn of the century, and began using a hand-held Kodak Brownie at the age of eleven. As a teenager, Lartigue photographed the pleasurable pursuits and antics of his prosperous family, which included several engineers and inventors (p. 245). The family members vacationed, drove the first fast automobiles, attempted flight, and generally indulged themselves in the cutting-edge technologies of the day.



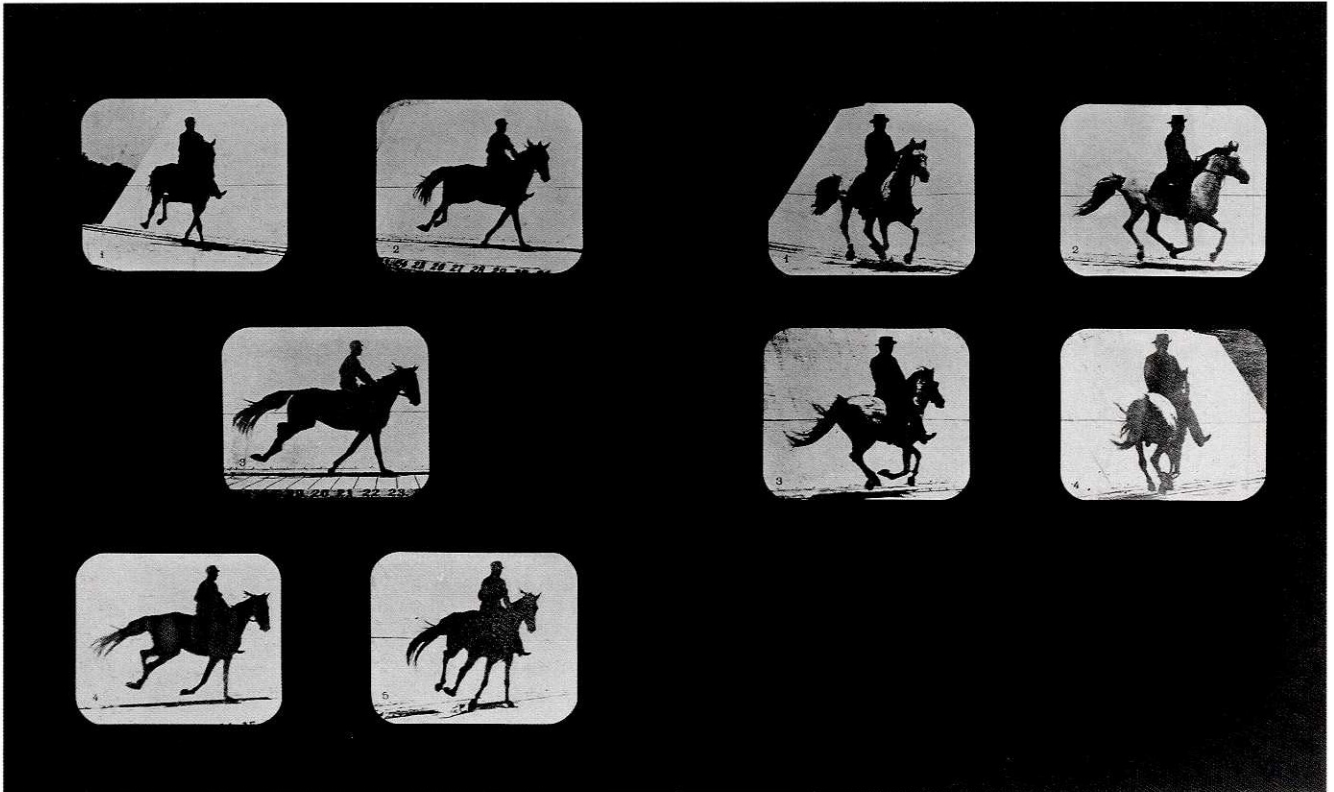
Eugène Atget. *Coiffeur, boulevard de Strasbourg*. 1912. Albumen silver print, 8¹³/₁₆ x 6⁷/₈" (22.3 x 17.5 cm). The Museum of Modern Art, New York. Abbott-Levy Collection. Partial Gift of Shirley C. Burden



Eugène Atget. *Avenue des Gobelins*. 1927. Albumen silver print, 8⁷/₈ x 6¹³/₁₆" (22.5 x 17.3 cm). The Museum of Modern Art, New York. Abbott-Levy Collection. Partial Gift of Shirley C. Burden

Within what amounts to a family album, Lartigue's pictures are together a masterpiece of the serendipitous. Their spontaneity, their exploitation of accidents of juxtaposition to create coherent meanings, would provide a foundation for the work of many photographers of the 1920s and 1930s. With the invention of even faster film and the 35mm camera, whose film could be advanced automatically, an artistic aesthetic emerged of transforming the banal events of everyday life into art.

Photography was applied in medicine early on. Among the first physicians to photograph their patients systematically were psychiatrists, including the French doctor Guillaume-Benjamin-Amand Duchenne (known as Duchenne de Boulogne), who, in the 1860s, took up the camera to document his analyses of human facial expression. By attaching current-bearing electrodes to his subjects' facial muscles, Duchenne de Boulogne hoped to generate different expressions, proving that their origin was physiological, and demonstrating bodily process as a kind of universal, objective causal system. Scientific in approach as Duchenne was, his image of "fright" has a morbid poetic intensity (p. 248). Photography would eventually become a more everyday, standard medical tool for



Étienne-Jules Marey or Georges Demenÿ. Untitled. c. 1890–1900. Gelatin silver print, 6 $\frac{1}{16}$ x 14 $\frac{5}{8}$ " (15.4 x 37.2 cm). The Museum of Modern Art, New York. Gift of Paul F. Walter

Eadweard Muybridge. *Studies of Foreshortening*. 1878–79. Albumen silver print from wet-collodion glass negative, 5 $\frac{1}{2}$ x 9" (14 x 23.1 cm). The Museum of Modern Art, New York. The Family of Man Fund



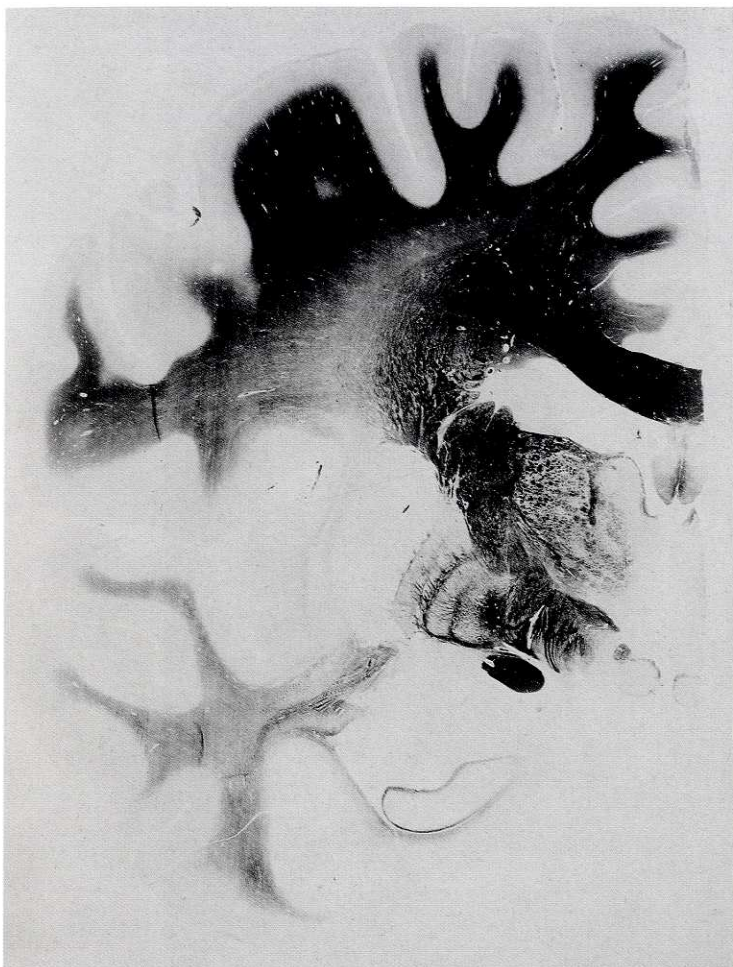
Jacques-Henri Lartigue. *Paris, avenue de Acacias*.
1912. Gelatin silver print, 11¾ x 15½" (29.8 x
39.4 cm). The Museum of Modern Art, New York.
Gift of the photographer



James Nasmyth (and James Carpenter). *Back of Hand and Wrinkled Apple to Illustrate the Origin of Certain Mountain Ranges Resulting from Shrinking of the Interior*, plate 11 from *The Moon: Considered as a Planet, a World, and a Satellite*. London: John Murray, 1874. Page: 11 x 8¼" (27.9 x 21 cm). The Museum of Modern Art, New York

mapping and documenting the body, as in an anatomical cross-section of a human brain, from about 1915 (p. 247). More clinical and cool, less theatrical, than Duchenne's work, these later images nevertheless tell their own stories: an X ray of a human leg from 1917, by an unknown photographer (p. 247), reveals a bullet at the lower left.

The invention of manned flight fulfilled centuries of dreams, and the coming of the airplane offered photographers dramatic new perspectives on the earth (p. 250). (Even before the Wright brothers, Félix Nadar had shot photographs from the sky, working from a balloon in 1858.) Nor did Earth itself exhaust the camera's curiosity: as early as the 1850s, photographers were combining the technologies of photography and the telescope to capture the heavens. Images like those of the Frenchmen Loewy and Puiseux made sights previously seen only by astronomers, such as the surface of the moon, available to everyday vision (p. 251). The camera could also be used metaphorically, to chart an argument: in the 1870s, James Nasmyth used photographs of skin—of the body, of fruit—to advance a geological theory about the moon (see above).

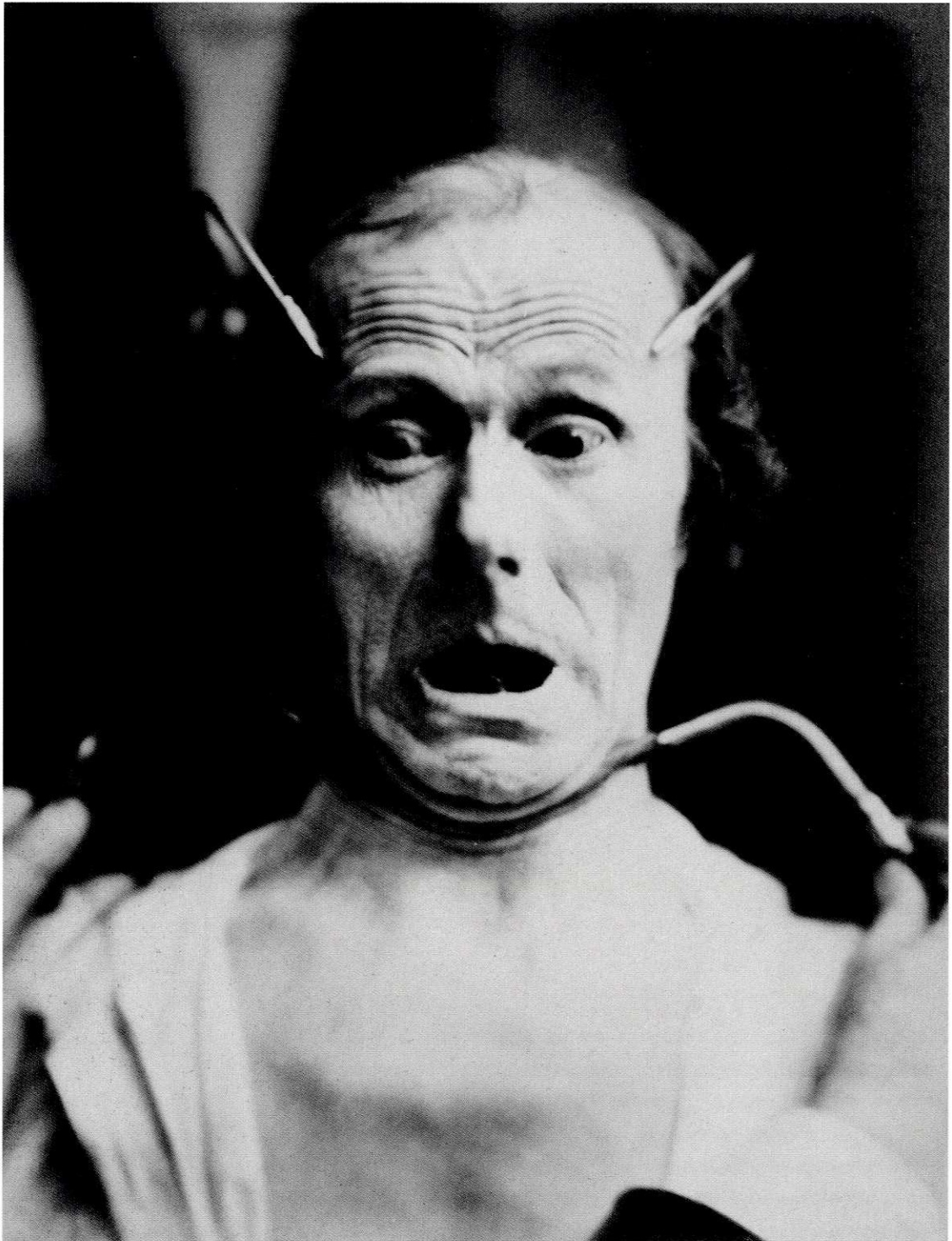


Photographer unknown (German). *Map of the Brain. Cross-section I. Frontal section*, plate 13 from an album published by the Psychiatric Clinic of Breslar. c. 1915. 7 $\frac{1}{16}$ x 5 $\frac{1}{16}$ " (18.5 x 14 cm). The Museum of Modern Art, New York. Christie Calder Salomon Fund

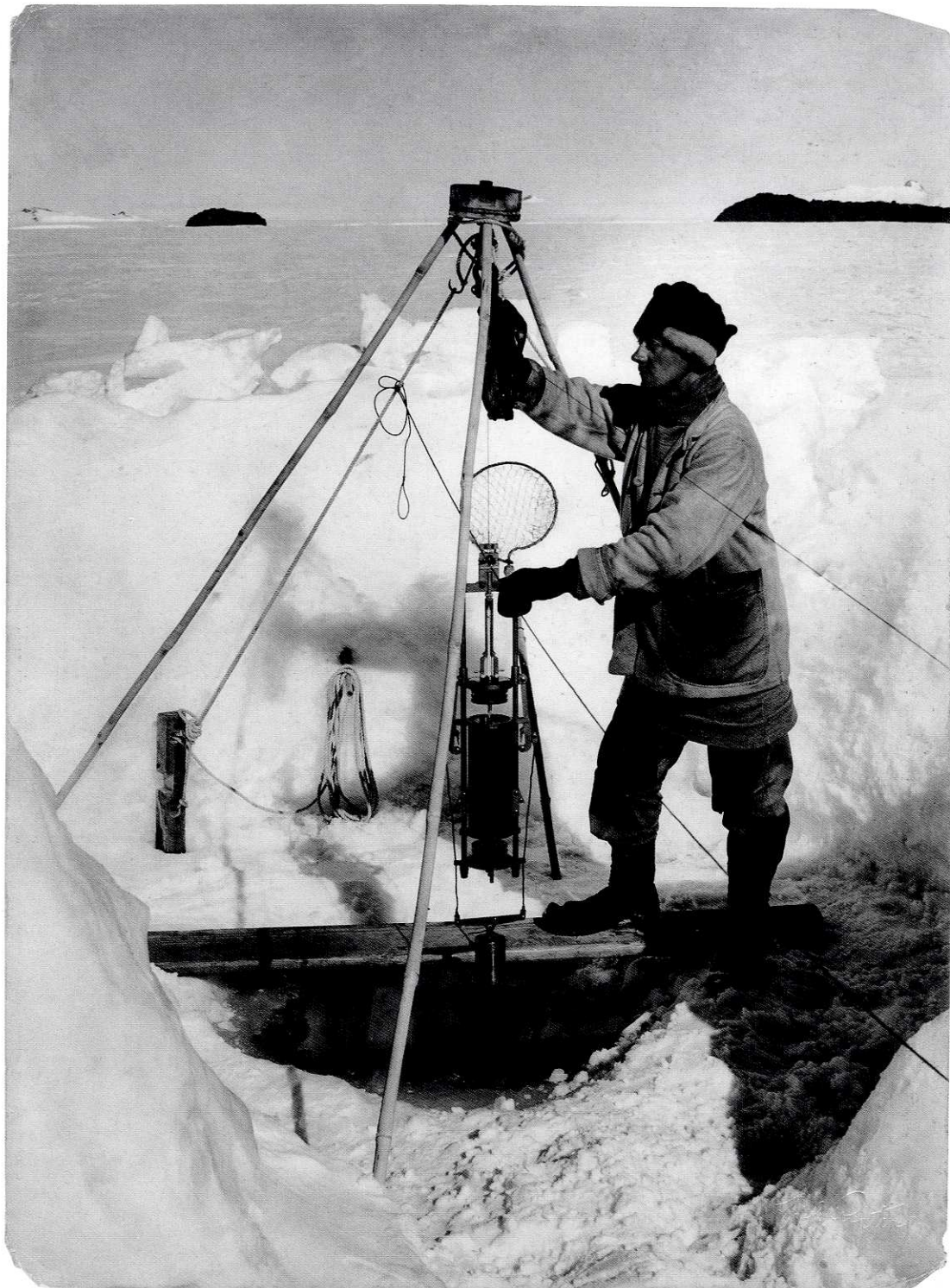


Photographer unknown. X ray. 1917. Gelatin silver print, 15 $\frac{3}{4}$ x 11 $\frac{1}{4}$ " (40 x 29.8 cm). The Museum of Modern Art, New York. Gift of Paul F. Walter

Photography supercharged the experiment and change of the industrial age. Photographic images both recorded and inspired technological achievement—inspired it by recording it. There were certainly many photographers during this period who made self-conscious works of art, some conforming to the traditional pictorial conventions of painting, others eventually more adventurous; and among these men and women were great photographers such as Alfred Stieglitz, Edward Steichen, and Gertrude Käsebier. But in actuality it was the photographs made without artistic intention that would prove the most inventive and influential. It was through images of the countless machines and inventions of the industrial revolution, and of the social and physical changes they precipitated, that photography demonstrated itself as modernity's great partner, nurturing the complicitous relationship between itself and the world and forever changing our future.



Guillaume-Benjamin-Amand Duchenne de Boulogne. *Fright* from *Mécanisme de la physiologie humaine*. 1862. Albumen silver print from wet-collodion glass negative, $4\frac{3}{4} \times 3\frac{1}{16}$ " (12.1 x 9.4 cm). The Museum of Modern Art, New York. Gift of Paul F. Walter



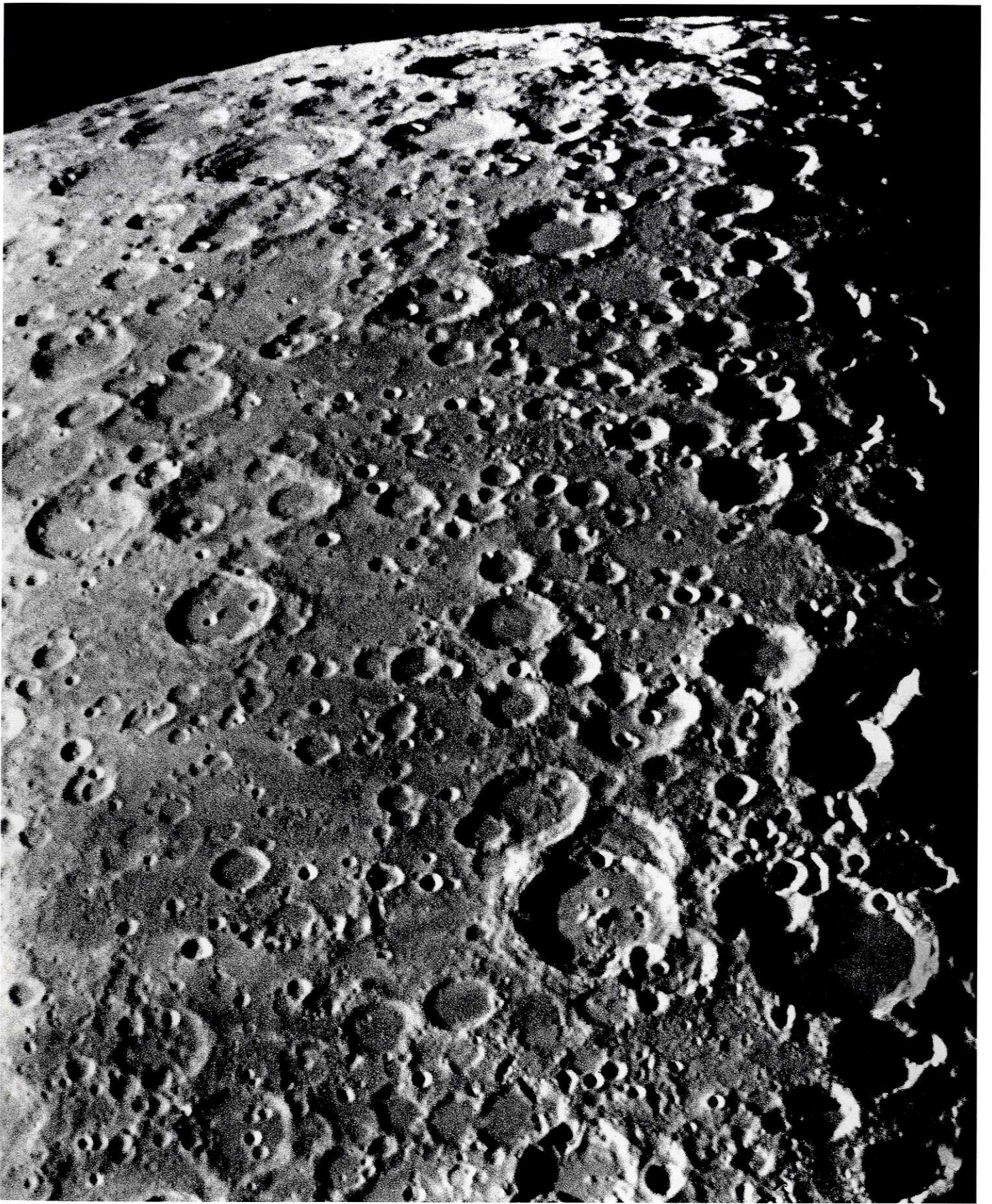
Herbert G. Ponting. *Mr. E. W. Nelson*. 1911.
Gelatin silver print, 17¹/₁₆ x 13³/₁₆" (45.3 x 33.5
cm). The Museum of Modern Art, New York. The
Family of Man Fund



Photographer unknown (British?). *London Terminal Aerodrome, Croydon*. 1921–22. Gelatin silver print, 14 $\frac{1}{16}$ x 18 $\frac{1}{16}$ " (37.4 x 48.1 cm). The Museum of Modern Art, New York. Gift of Paul F. Walter



Photographer unknown. *Untitled (aerial reconnaissance photograph, Lavannes, World War I)*. 1917. Gelatin silver print, 6 $\frac{1}{2}$ x 8 $\frac{3}{8}$ " (16.5 x 22.5 cm). The Museum of Modern Art, New York. Gift of Edward Steichen



Loewy and Puiseux. *The Moon* (Boussingault, Vlacq, Maurolicus). 1899. Photogravure, 22½ x 18¼" (57.3 x 46.4 cm). The Museum of Modern Art, New York. Purchase